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Computation Results from a Parametric Study to Determine Bounding Critical Systems of Homogeneously Water-Moderated Mixed Plutonium–Uranium Oxides

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*Japan Nuclear Cycle Development Institute (JNC), Tokai, Japan; work performed while on assignment at ORNL.

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Computational Results from a Parametric Study to Determine Bounding Critical Systems of Homogeneously Water-Moderated Mixed Plutonium—Uranium Oxides

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ABSTRACT

This report provides computational results of an extensive study to examine the following:

1. infinite media neutron-multiplication factors;

2. material bucklings;

3. bounding infinite media critical concentrations;

4. bounding finite critical dimensions of water-reflected and homogeneously water-moderated one-dimensional systems (i.e., spheres, cylinders of infinite length, and slabs that are infinite in two dimensions) that were comprised of various proportions and densities of plutonium oxides and uranium oxides, each having various isotopic compositions; and

5. sensitivity coefficients of delta *k*-eff with respect to critical geometry delta dimensions were determined for each of the three geometries that were studied.

The study was undertaken to support the development of a standard that is sponsored by the International Standards Organization (ISO) under Technical Committee 85, Nuclear Energy (TC 85) — Subcommittee 5, Nuclear Fuel Technology (SC 5) — Working Group 8, Standardization of Calculations, Procedures and Ppractices Related to Criticality Safety (WG 8). The designation and title of the ISO TC 85/SC 5/WG 8 standard working draft is WD 14941, "Nuclear energy – Fissile materials – Nuclear criticality control and safety of plutonium-uranium oxide fuel mixtures outside of reactors." Various ISO member participants performed similar computational studies[1] using their indigenous computational codes to provide comparative results for analysis in the development of the standard.

*Japan Nuclear Cycle Development Institute (JNC), Tokai, Japan; work performed while on assignment at ORNL.

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1. INTRODUCTION

This report provides computational results of an extensive study that was undertaken to support the development of an international nuclear criticality safety standard on mixed plutonium-uranium oxides. The standard is sponsored by the International Standards Organization (ISO) under Technical Committee 85, Nuclear Energy (TC 85) - Subcommittee 5, Nuclear Fuel Technology (SC 5) - Working Group 8, Standardization of Calculations, Procedures and Practices Related to Criticality Safety (WG 8). The designation and title of the ISO TC 85/SC 5/WG 8 standard working draft is WD 14941, "Nuclear energy - Fissile materials - Nuclear criticality control and safety of plutonium-uranium oxide fuel mixtures outside of reactors." Various ISO member state participants performed similar computational studies using their indigenous computational codes to provide comparative results for analysis in the development of computed critical values. The standard will provide mixed plutonium-uranium oxide (MOX) nuclear criticality specifications that may be used to establish process and equipment limits for controlling the risk of criticality (e.g., choice of process-monitoring modes, choice of equipment geometry) in installations using MOX fuel. This type of fuel results from the use of fissile isotopes, such as ^{239}Pu, ^{241}Pu and ^{235}U, and more or less neutron-absorbent isotopes, such as ^{242}Pu, ^{240}Pu and ^{238}U, in miscellaneous physicochemical forms and in various homogeneous geometric forms.

Results from this and other computational studies will provide standard values that may be applied to operations and storage of MOX within fuel fabrication facilities dedicated to PWR and BWR power plants, except fast neutron breeder reactors. The standard resulting from this and other computational studies is not concerned with design, building and working rules of power or research reactors. Additionally, this standard will not provide information on safety factors that may be used to weight the critical values, in order to obtain "safe" values. The concept and use of safety factors are left to the discretion of the users of the standard, who will ascertain the degree of criticality safety for their facility.

2. CALCULATIONAL METHODS

The one-dimensional discrete-ordinates code XSDRNPM,[2,3] as implemented in the SCALE system calculational sequence CSAS1X, was used to obtain *k*-infinity and critical dimensions (sphere radius, infinite cylinder radius, infinite slab thickness). CSASI (BONAMI-S, NITAWL-II, ICE) and XSDRNPM were used to obtain the material buckling data (direct buckling search). The 238GROUPNDF5 (238-neutron-energy group ENDF/B-V) cross-section library was used. The specified angular quadrature was S_{32}. The maximum number of outer iterations was 200. Overall convergence criteria and point convergence criteria were 10^{-6} and 10^{-7}. The critical dimensions were searched for a *k*-effective equal to 1.00. The sensitivity coefficients of delta *k*-eff with respect to critical geometry delta dimensions, dk/dr, were obtained from the process of the dimension search calculations. ***This option of XSDRNPM is being developed and is not included in SCALE 4.4 package. This option will be released next version of SCALE.***

3. CHARACTERISTICS OF FISSILE MATERIALS

The characteristics of the fissile materials include variations in the uranium-235 enrichment, plutonium isotopic weight percentages, plutonium weight percentages, MOX density, thickness of full-density water reflector, and H/(U + Pu) ratio. These variations are described in Sections 3.1 to 3.6.

3.1. URANIUM-235 ENRICHMENT

Two ^{235}U enrichments were considered. They are:

1. 0.3% (depleted uranium)
2. 0.718% (natural uranium).

3.2. PLUTONIUM ISOTOPIC WEIGHT PERCENTAGES

Three plutonium isotopic weight percentages were considered. They are:

1. ^{239}Pu = 100%
2. ^{239}Pu: ^{240}Pu = 95: 5% (^{239}Pu = 95%)
3. ^{239}Pu: ^{240}Pu: ^{241}Pu: ^{242}Pu = 65.883: 20.000: 12.941: 1.176% (^{240}Pu = 20.0%)

3.3. PLUTONIUM WEIGHT PERCENTAGES

Two plutonium weight percentages in the plutonium-uranium mixtures (i.e., 100 × Pu/(U + Pu)) were considered. They are:

1. 35% (powder)
2. 12.5% (powder, green pellet and sintered pellet)

3.4. MOX DENSITY

Three MOX densities were considered. They are:

1. 3.5 g/cm^3 (powder, plutonium weight percentage is 35% or 12.5%)
2. 5.5 g/cm^3 (green pellet, plutonium weight percentage is 12.5%)
3. Void-free [sintered pellet (low-moderation), plutonium weight percentage is 12.5%]

In the case of the 3.5 g/cm^3 MOX with plutonium weight percentage of 35% with H/(U + Pu) ratios between 0.1 to 5.88, the MOX densities were held constant at 3.5 g/cm^3. However, when the H/(U + Pu) ratios were more than 5.88, the MOX densities were reduced to permit a void-free mixture of MOX and water.

Because calculations of void-free conditions have been calculated previously in case (3) above for the cases of 3.5 and 5.5 g/cm^3 MOX with plutonium weight percentage of 12.5%, only calculations for fixed MOX densities of 3.5 or 5.5 g/cm^3 were performed in this study.

3.5. FULL-DENSITY WATER REFLECTOR

Two full-density water reflectors were considered. They are:

1. 2.5 cm (nominal reflector)
2. 30.0 cm (full reflector)

3.6. H/(U + Pu) RATIO

Four water-hydrogen-to-fissionable-atom ratios, H/(U + Pu), and water weight percentage (H_2O wt %) ranges were considered. They are:

1. 0.1(~0.33 wt %) to about 1000 (35 wt %, 3.5 g/cm^3)

2. 0.1(~0.33 wt %) to 5.84 (12.5 wt %, 3.5 g/cm^3)
   In the range of more than 10 H/(U + Pu), the results are the same as for void-free mixtures.

3. 0.1(~0.33 wt %) to 2.73 (12.5 wt %, 5.5 g/cm^3)
   In the range of more than 5 H/(U + Pu), the results are the same as for void-free mixtures.

4. 0.1 (~0.33 wt %) to about 400 (12.5 wt %, void-free)

4. RESULTS AND DISCUSSIONS

Infinite media neutron-multiplication factors (k-infinity), material buckling, critical sphere (radius, dk/dr, volume, U + Pu mass, MOX mass), critical infinite cylinder (diameter, dk/dr, linear density), and critical infinite slab (thickness, dk/dr, surface density) were calculated for the materials specified in Section 3. These results are shown in Appendix A.1 to A.6 and compared with IPSN (French) data.[1]

From these results, bounding finite critical dimensions of water-reflected and homogeneously water-moderated, one-dimensional systems (critical dimensions for spheres, cylinders and slabs) and bounding infinite media critical concentrations (minimum critical concentrations) are provided in Tables 4.1.1 to 4.4.2. The criticality concentrations were defined from the calculations of *k*-infinity.

- Minimum critical sphere radius: Tables 4.1.1 and 4.1.2
- Minimum critical volume: Tables 4.1.3 and 4.1.4
- Minimum critical U + Pu mass: Tables 4.1.5 and 4.1.6
- Minimum critical MOX mass: Tables 4.1.7 and 4.1.8
- Minimum critical cylinder diameter: Tables 4.2.1 and 4.2.2
- Minimum critical linear density: Tables 4.2.3 and 4.2.4
- Minimum critical slab thickness: Tables 4.3.1 and 4.3.2
- Minimum critical surface density: Tables 4.3.3 and 4.3.4
- Minimum critical concentrations: Tables 4.4.1 and 4.4.2

Features of the results that were observed are:

1. Most SCALE 4.4 results correspond well with the IPSN calculated data, but in large H/X region (high moderation) and small H/X region (low moderation) the critical values with SCALE 4.4 tend to be smaller than IPSN data.

2. The results for the 0.3-wt % ^{235}U enrichment compare with those for the 0.718-wt % ^{235}U. Little difference is noted between them, especially in the case of the 35-wt % plutonium calculations.

3. The sensitivity coefficients of delta *k*-eff with respect to critical geometry dimensions are calculated, and their importance is demonstrated. For the same conditions, the dk/dr of slabs are the largest of the three geometries. However, the tendencies of three geometries with H/X are similar.

The dk/dr (r means sphere radius, cylinder radius or slab thickness) are obtained from each dimension calculation. ***At first, the results (dk/dr) of this report were calculated directly. Because there are discontinuous points in some plots, the method of calculation was modified. (p/k)dk/dp are calculated in the modified XSDRNPM. p means a parameter of search and*** $r = r_0 * p$ ***(***r_0***: initial value of dimension).***

Recalculations in some cases were executed, and this problem was considered.

However, the dk/dr obtained from (p/k)dk/dp is not much different from direct dk/dr. The results of recalculation are essentially the same as the previous results determined for the dimensional searches.

The calculational condition as follows:

- Uranium-235 enrichment: 0.718%
- Plutonium isotopic weight percentages: $^{239}Pu = 100\%$
- Plutonium weight percentages: 35%
- MOX density: 3.5 g/cm^3

Infinite media neutron multiplication factors (*k*-infinity), material buckling, sphere (radius, dk/dr), infinite cylinder (diameter, dk/dr), infinite slab (thickness, dk/dr) were calculated. The results of those calculations are shown in Appendix B.

The maximum difference between the data of this report and the results with modified SCALE 4.4 is within 10%, except a few large H/X (large dimension). ***Most of the differences of are within 5% about cylinder and slab.*** Therefore, the sensitivity coefficients of delta *k*-eff with respect to critical geometry delta dimensions are grasped sufficiently.

Because the plutonium isotopic weight percentages of the IPSN data and this report are somewhat different, calculated comparisons were performed with SCALE4.4.

The calculational conditions were as follows:

- Uranium-235 enrichment: 0.718%
- Plutonium weight percentages: 35%
- MOX density: 3.5 g/cm^3
- Plutonium isotopic weight percentages:
  (1) ^{239}Pu: ^{240}Pu: ^{241}Pu: ^{242}Pu = 65.883: 20.0: 12.941: 1.176% (this report)
  (2) ^{239}Pu: ^{240}Pu: ^{241}Pu: ^{242}Pu = 65.83: 20.0: 13.0: 1.17% (same as IPSN data)

Calculation results are shown in Appendix C. Because the percentages of ^{241}Pu of the IPSN data are more than that of this report, critical values of IPSN's plutonium weight percentages are a little less than those of this report. The minimum critical values, and their associated H/X, were virtually the same for the two plutonium isotropic weight percentages. The behavior of dk/dr became smooth because the modified version of XSDRN was used.

Table 4.1.1. Minimum critical sphere radius (^{235}U enrichment: 0.3%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	Minimum critical radius (cm)	
		Water reflector: 30 cm	Water reflector: 2.5 cm
^{239}Pu = 100%	35	12.99	14.90
	12.5	14.47	16.41
^{239}Pu: ^{240}Pu = 95: 5%	35	14.45	16.36
	12.5	15.99	17.89
^{240}Pu = 20%	35	17.04	19.05
	12.5	19.01	21.09

Table 4.1.2. Minimum critical sphere radius (^{235}U enrichment: 0.718%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	Minimum critical radius (cm)	
		Water reflector: 30 cm	Water reflector: 2.5 cm
^{239}Pu = 100%	35	12.97	14.89
	12.5	14.42	16.37
^{239}Pu: ^{240}Pu = 95: 5%	35	14.43	16.35
	12.5	15.88	17.83
^{240}Pu = 20%	35	17.01	19.02
	12.5	18.88	20.94

Table 4.1.3. Minimum critical volume (^{235}U enrichment: 0.3%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	Minimum critical volume (L)	
		Water reflector: 30 cm	Water reflector: 2.5 cm
^{239}Pu = 100%	35	9.18	13.86
	12.5	12.68	18.53
^{239}Pu: ^{240}Pu = 95: 5%	35	12.63	18.35
	12.5	16.98	24.00
^{240}Pu = 20%	35	20.72	28.94
	12.5	28.78	39.30

Table 4.1.4. Minimum critical volume (^{235}U enrichment: 0.718%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	Minimum critical volume (L)	
		Water reflector: 30 cm	Water reflector: 2.5 cm
^{239}Pu = 100%	35	9.15	13.84
	12.5	12.57	18.39
^{239}Pu: ^{240}Pu = 95: 5%	35	12.59	18.30
	12.5	16.76	23.73
^{240}Pu = 20%	35	20.61	28.81
	12.5	28.17	38.48

Table 4.1.5. Minimum critical U + Pu mass (^{235}U enrichment: 0.3%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	Minimum critical mass (kg-(U + Pu))	
		Water reflector: 30 cm	Water reflector: 2.5 cm
^{239}Pu = 100%	35	1.56	2.04
	12.5	5.15	6.62
^{239}Pu: ^{240}Pu = 95: 5%	35	1.91	2.47
	12.5	6.36	8.11
^{240}Pu = 20%	35	3.17	4.02
	12.5	10.99	13.81

Table 4.1.6. Minimum critical U + Pu mass (^{235}U enrichment: 0.718%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	Minimum critical mass (kg-(U + Pu))	
		Water reflector: 30 cm	Water reflector: 2.5 cm
^{239}Pu = 100%	35	1.55	2.02
	12.5	5.04	6.47
^{239}Pu: ^{240}Pu = 95: 5%	35	1.89	2.45
	12.5	6.21	7.90
^{240}Pu = 20%	35	3.14	3.98
	12.5	10.58	13.35

Table 4.1.7. Minimum critical MOX mass (^{235}U enrichment: 0.3%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	Minimum critical mass (kg-MOX)	
		Water reflector: 30 cm	Water reflector: 2.5 cm
^{239}Pu = 100%	35	1.77	2.31
	12.5	5.84	7.50
^{239}Pu: ^{240}Pu = 95: 5%	35	2.16	2.80
	12.5	7.22	9.20
^{240}Pu = 20%	35	3.59	4.55
	12.5	12.46	15.67

Table 4.1.8. Minimum critical MOX mass (^{235}U enrichment: 0.718%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	Minimum critical mass (kg-MOX)	
		Water reflector: 30 cm	Water reflector: 2.5 cm
^{239}Pu = 100%	35	1.76	2.30
	12.5	5.72	7.34
^{239}Pu: ^{240}Pu = 95: 5%	35	2.15	2.78
	12.5	7.05	8.96
^{240}Pu = 20%	35	3.56	4.51
	12.5	12.01	15.14

Table 4.2.1. Minimum critical cylinder diameter (^{235}U enrichment: 0.3%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	Minimum critical diameter (cm)	
		Water reflector: 30 cm	Water reflector: 2.5 cm
^{239}Pu = 100%	35	16.81	20.76
	12.5	19.09	23.06
^{239}Pu: ^{240}Pu = 95: 5%	35	19.04	22.98
	12.5	21.34	25.30
^{240}Pu = 20%	35	22.93	27.03
	12.5	25.92	30.15

Table 4.2.2. Minimum critical cylinder diameter (^{235}U enrichment: 0.718%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	Minimum critical diameter (cm)	
		Water reflector: 30 cm	Water reflector: 2.5 cm
^{239}Pu = 100%	35	16.80	20.75
	12.5	19.02	23.00
^{239}Pu: ^{240}Pu = 95: 5%	35	19.02	22.95
	12.5	21.24	25.20
^{240}Pu = 20%	35	22.88	26.99
	12.5	25.71	29.93

Table 4.2.3. Minimum critical linear density (^{235}U enrichment: 0.3%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	Minimum critical linear density (g-(U + Pu)/cm)	
		Water reflector: 30 cm	Water reflector: 2.5 cm
^{239}Pu = 100%	35	32.29	40.32
	12.5	100.58	124.86
^{239}Pu: ^{240}Pu = 95: 5%	35	37.56	46.61
	12.5	118.36	145.04
^{240}Pu = 20%	35	55.97	68.35
	12.5	181.21	219.46

Table 4.2.4. Minimum critical linear density (^{235}U enrichment: 0.718%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	Minimum critical linear density (g-(U + Pu)/cm)	
		Water reflector: 30 cm	Water reflector: 2.5 cm
^{239}Pu = 100%	35	32.12	40.11
	12.5	98.50	122.56
^{239}Pu: ^{240}Pu = 95: 5%	35	37.33	46.31
	12.5	115.45	141.85
^{240}Pu = 20%	35	55.50	67.84
	12.5	175.33	213.02

Table 4.3.1. Minimum critical slab thickness (^{235}U enrichment: 0.3%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	Minimum critical thickness (cm)	
		Water reflector: 30 cm	Water reflector: 2.5 cm
^{239}Pu = 100%	35	6.30	10.64
	12.5	7.89	12.13
^{239}Pu: ^{240}Pu = 95: 5%	35	7.87	12.07
	12.5	9.33	13.58
^{240}Pu = 20%	35	10.31	14.68
	12.5	12.30	16.63

Table 4.3.2. Minimum critical slab thickness (^{235}U enrichment: 0.718%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	Minimum critical thickness (cm)	
		Water reflector: 30 cm	Water reflector: 2.5 cm
^{239}Pu = 100%	35	6.29	10.63
	12.5	7.85	12.09
^{239}Pu: ^{240}Pu = 95: 5%	35	7.85	12.06
	12.5	9.27	13.52
^{240}Pu = 20%	35	10.29	14.65
	12.5	12.17	16.50

Table 4.3.3. Minimum critical surface density (^{235}U enrichment: 0.3%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	Minimum critical surface density (g-(U + Pu)/cm^2)	
		Water reflector: 30 cm	Water reflector: 2.5 cm
^{239}Pu = 100%	35	0.76	0.88
	12.5	2.25	2.61
^{239}Pu: ^{240}Pu = 95: 5%	35	0.84	0.98
	12.5	2.52	2.90
^{240}Pu = 20%	35	1.14	1.30
	12.5	3.46	3.94

Table 4.3.4. Minimum critical surface density (^{235}U enrichment: 0.718%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	Minimum critical surface density (g-(U + Pu)/cm^2)	
		Water reflector: 30 cm	Water reflector: 2.5 cm
^{239}Pu = 100%	35	0.75	0.88
	12.5	2.22	2.55
^{239}Pu: ^{240}Pu = 95: 5%	35	0.84	0.97
	12.5	2.47	2.84
^{240}Pu = 20%	35	1.13	1.29
	12.5	3.36	3.84

Table 4.4.1. Minimum critical concentrations (^{235}U enrichment: 0.3%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	U + Pu density g-(U + Pu)/L	MOX density g-MOX/L
^{239}Pu = 100%	35	20.73	23.51
	12.5	59.22	67.17
^{239}Pu: ^{240}Pu = 95: 5%	35	22.34	25.34
	12.5	64.11	72.72
^{240}Pu = 20%	35	27.61	31.31
	12.5	79.83	90.55

Table 4.4.2. Minimum critical concentrations (^{235}U enrichment: 0.718%)

Plutonium isotopic weight percentages	Pu/(U + Pu) (wt %)	U + Pu density g-(U + Pu)/L	MOX density g-MOX/L
^{239}Pu = 100%	35	20.62	23.39
	12.5	22.27	25.26
^{239}Pu: ^{240}Pu = 95: 5%	35	27.44	31.12
	12.5	58.18	66
^{240}Pu = 20%	35	62.89	71.34
	12.5	77.94	88.41

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APPENDIX A.1

DATA PLOTS

(^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%)

APPENDIX A.1

DATA PLOTS

(^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%)

(a) Plutonium weight percentages: 35% and density: 3.5 g/cm^3

Table A.1.a.1. MOX data [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 30.0 cm]

Table A.1.a.2. MOX data [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 2.5 cm]

Figure A.1.a.1. *k*-infinity [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3]

Figure A.1.a.2. B_m^2 [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3]

Figure A.1.a.3. Sphere radius [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3]

Figure A.1.a.4. Sphere volume [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3]

Figure A.1.a.5. U + Pu mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3]

Figure A.1.a.6. MOX mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3]

Figure A.1.a.7-1. Cylinder diameter [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3]

Figure A.1.a.7-2. Cylinder diameter infinity [^{235}U/U= 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3]

Figure A.1.a.8. Linear density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3]

Figure A.1.a.9. Slab thickness [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3]

Figure A.1.a.10. Surface density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3]

Figure A.1.a.11. Comparison of delta lambda divided by delta dimension for geometry [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 35%, 3.5g/cm^3, water reflector: 30.0 cm]

Figure A.1.a.12. Comparison of delta lambda divided by delta dimension for geometry [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 35%, 3.5g/cm^3, water reflector: 2.5 cm]

(b) Plutonium weight percentages: 12.5% and density: void-free

Table A.1.b.1. MOX data [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Table A.1.b.2. MOX data [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Figure A.1.b.1. *k*-infinity [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.1.b.2. B_m^2 [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.1.b.3-1. Sphere radius [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) =12.5%, void-free]

Figure A.1.b.3-2. Sphere radius [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.1.b.4. Sphere volume [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.1.b.5. U + Pu mass [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.1.b.6. MOX mass [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.1.b.7-1. Cylinder diameter [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.1.b.7-2. Cylinder diameter infinity [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.1.b.8. Linear density [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.1.b.9-1. Slab thickness [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.1.b.9-2. Slab thickness [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, void-free]

(c) Plutonium weight percentages: <u>12.5%</u>, density: <u>3.5 and 5.5 g/cm^3</u> and water reflector: <u>30 cm</u>

Figure A.1.c.12. Delta lambda divided by delta dimension [slab, $^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.1.c.13. Surface density [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

(d) Plutonium weight percentages: <u>12.5%</u>, density: <u>3.5 and 5.5 g/cm^3</u> and water reflector: <u>2.5 cm</u>

Table A.1.d.1. MOX data [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Table A.1.d.2. MOX data [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Figure A.1.d.1. Sphere radius [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.1.d.2. Delta lambda divided by delta dimension [sphere, $^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.1.d.3. Sphere volume [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.1.d.4. U + Pu mass [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.1.d.5. MOX mass [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.1.d.6. Cylinder diameter [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.1.d.7. Delta lambda divided by delta dimension [cylinder, $^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.1.d.8. Linear density [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.1.d.9. Slab thickness [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.1.d.10. Delta lambda divided by delta dimension [slab, $^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.1.d.11. Surface density [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Table A.1.a.1. MOX data [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**100.000**	**0.000**	**0.000**	**0.000**

Maximum fissile material oxide
Density = 3.5 g (UO_2 + PuO_2)/cm^3

Water reflector
30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 35 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	3.0858	3.5000	2.13356	2.894E-03	33.291	1.626E-02	154.549	476.906	540.919	42.566	2.177E-02	4391.160	16.539	3.517E-02	51.035
0.5	1.64	3.0858	3.5000	1.92819	3.585E-03	30.639	1.747E-02	120.484	371.790	421.693	39.249	2.331E-02	3733.489	15.211	3.733E-02	46.939
0.928	3.00	3.0858	3.5000	1.84046	4.529E-03	27.873	1.935E-02	90.709	279.909	317.480	35.768	2.574E-02	3100.643	13.843	4.079E-02	42.715
1.5	4.76	3.0858	3.5000	1.77906	5.997E-03	24.776	2.206E-02	63.705	196.580	222.966	31.828	2.931E-02	2455.171	12.262	4.609E-02	37.839
1.916	6.00	3.0858	3.5000	1.75163	7.200E-03	22.914	2.409E-02	50.397	155.514	176.388	29.446	3.199E-02	2101.465	11.292	5.017E-02	34.844
5.88	16.38	3.0858	3.5000	1.67296	2.444E-02	13.463	4.245E-02	10.221	31.539	35.772	17.298	5.650E-02	725.163	**6.303**	9.212E-02	19.451
10	24.99	2.0847	2.3645	1.66588	2.461E-02	13.382	4.269E-02	10.038	20.926	23.735	17.206	5.705E-02	484.709	6.315	9.454E-02	13.165
20	39.99	1.1661	1.3227	1.68186	2.532E-02	13.178	4.444E-02	9.585	11.177	12.678	16.968	5.958E-02	263.696	6.328	9.969E-02	7.380
30	49.98	0.8095	0.9181	1.69993	2.588E-02	13.055	4.595E-02	9.320	7.544	8.557	16.843	6.166E-02	180.358	6.370	1.035E-01	5.156
40	57.13	0.6199	0.7031	1.71388	2.627E-02	12.999	4.704E-02	9.200	5.703	6.469	**16.808**	6.643E-02	137.544	6.441	1.060E-01	3.992
50	62.49	0.5022	0.5697	1.72382	2.650E-02	**12.989**	4.777E-02	**9.180**	4.610	5.229	16.836	6.749E-02	111.807	6.532	1.077E-01	3.281
60	66.65	0.4221	0.4788	1.73044	2.661E-02	13.012	4.823E-02	9.228	3.896	4.419	16.907	6.813E-02	94.769	6.639	1.088E-01	2.803
70	69.99	0.3641	0.4129	1.73438	2.664E-02	13.060	4.846E-02	9.330	3.397	3.853	17.010	6.847E-02	82.737	6.758	1.094E-01	2.460
80	72.72	0.3200	0.3630	1.73614	2.659E-02	13.126	4.852E-02	9.474	3.032	3.439	17.138	6.855E-02	73.831	6.886	1.095E-01	2.204
90	74.99	0.2855	0.3238	1.73614	2.648E-02	13.207	4.845E-02	9.650	2.755	3.125	17.286	6.844E-02	67.001	7.020	1.092E-01	2.004
100	76.91	0.2577	0.2923	1.73469	2.634E-02	13.300	4.826E-02	9.854	2.540	2.880	17.448	6.816E-02	61.616	7.160	1.088E-01	1.845
150	83.32	0.1733	0.1966	1.71306	2.517E-02	13.881	4.618E-02	11.203	1.942	2.202	18.410	6.525E-02	46.139	7.912	1.039E-01	1.371
200	86.95	0.1306	0.1481	1.67839	2.367E-02	14.583	4.589E-02	12.991	1.696	1.924	19.531	6.103E-02	39.119	8.721	9.686E-02	1.139
250	89.28	0.1047	0.1188	1.63832	2.206E-02	15.366	4.242E-02	15.198	1.592	1.805	20.759	5.634E-02	35.448	9.576	8.910E-02	1.003
275	90.16	0.0953	0.1081	1.61740	2.126E-02	15.782	4.065E-02	16.465	1.569	1.780	21.407	5.395E-02	34.302	10.019	8.520E-02	0.955
300	90.90	0.0874	0.0992	1.59627	2.045E-02	16.216	3.888E-02	17.863	**1.562**	**1.771**	22.080	5.155E-02	33.478	10.475	8.128E-02	0.916
350	92.10	0.0750	0.0851	1.55400	1.888E-02	17.131	3.537E-02	21.060	1.580	1.792	23.494	4.685E-02	32.530	11.426	7.359E-02	0.857
400	93.02	0.0657	0.0745	1.51238	1.737E-02	18.118	3.200E-02	24.911	1.637	1.857	25.011	4.232E-02	**32.289**	12.438	6.626E-02	0.817
500	94.34	0.0527	0.0597	1.43285	1.454E-02	20.329	2.571E-02	35.192	1.853	2.102	28.402	3.393E-02	33.357	14.638	5.301E-02	0.771
550	94.82	0.0479	0.0543	1.39528	1.323E-02	21.581	2.284E-02	42.100	2.016	2.287	30.317	3.010E-02	34.571	15.893	4.688E-02	0.761
600	95.24	0.0439	0.0498	1.35926	1.198E-02	22.957	2.013E-02	50.681	2.225	2.524	32.421	2.651E-02	36.249	17.242	4.125E-02	**0.757**
650	95.59	0.0406	0.0460	1.32476	1.080E-02	24.473	1.760E-02	61.394	2.490	2.824	34.736	2.316E-02	38.428	18.752	3.596E-02	0.760
700	95.89	0.0377	0.0427	1.29174	9.669E-03	26.168	1.525E-02	75.059	2.827	3.206	37.325	2.004E-02	41.207	20.419	3.108E-02	0.769
800	96.38	0.0330	0.0374	1.22995	7.582E-03	30.254	1.103E-02	115.997	3.824	4.338	43.565	1.449E-02	49.145	24.453	2.239E-02	0.806
900	96.772	0.0293	0.0333	1.17339	5.690E-03	35.770	7.469E-03	191.702	5.621	6.375	51.9878	9.790E-03	62.238	29.913	1.508E-02	0.877
1000	97.086	0.0264	0.0299	1.12151	3.967E-03	43.937	4.508E-03	355.295	9.376	10.635	64.4672	5.912E-03	86.140	38.012	9.086E-03	1.003
1150	97.456	0.02292	0.02600	1.05145												
1200	97.560	0.02197	0.02492	1.02992												
1250	97.655	0.02110	0.02393	1.00925												
1270	97.743	0.02029	0.02301	1.00119												
1272	97.691	0.02076	0.02355	1.00041												
1273	**97.694**	**0.02073**	**0.02351**	**1.00000**												
1274	97.696	0.02071	0.02349	0.99961												
1275	97.698	0.02070	0.02348	0.99922												
1280	97.700	0.02068	0.02346	0.99722												
1300	97.709	0.02060	0.02337	0.98936												
1500	98.038	0.01759	0.01995	0.91693												

Table A.1.a.2. MOX data ($^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and Water reflector: 2.5 cm)

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	99.700	100.000	0.000	0.000	0.000

Maximum fissile material oxide
Density = 3.5 g (UO_2 + PuO_2)/cm^3

Water reflector
2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 35 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	3.0858	3.5000	2.13356	2.894E-03	44.496	1.773E-02	369.024	1138.734	1291.581	62.246	2.328E-02	9390.384	32.495	3.637E-02	100.273
0.5	1.64	3.0858	3.5000	1.92819	3.585E-03	40.217	1.874E-02	272.477	840.811	953.669	56.329	2.463E-02	7689.973	29.475	3.845E-02	90.953
0.928	3.00	3.0858	3.5000	1.84046	4.529E-03	35.920	2.041E-02	194.139	599.073	679.484	50.331	2.685E-02	6139.391	26.339	4.196E-02	81.278
1.5	4.76	3.0858	3.5000	1.77906	5.997E-03	31.320	2.178E-02	128.689	397.108	450.410	43.881	2.876E-02	4666.709	22.929	4.710E-02	70.753
1.916	6.00	3.0858	3.5000	1.75163	7.200E-03	28.631	2.348E-02	98.307	303.356	344.074	40.112	3.104E-02	3899.554	20.925	5.097E-02	64.571
5.88	16.38	3.0858	3.5000	1.67296	2.444E-02	15.734	4.142E-02	16.317	50.351	57.109	21.987	5.486E-02	1171.606	11.270	8.644E-02	34.776
10	24.99	2.0847	2.3645	1.66588	2.461E-02	15.616	4.150E-02	15.951	33.252	37.716	21.797	5.505E-02	777.916	11.149	8.710E-02	23.242
20	39.99	1.1661	1.3227	1.68186	2.532E-02	15.316	4.307E-02	15.049	17.550	19.905	21.345	5.725E-02	417.293	10.891	9.082E-02	12.700
30	49.98	0.8095	0.9181	1.69993	2.588E-02	15.113	4.452E-02	14.458	11.703	13.274	21.048	5.920E-02	281.657	10.736	9.395E-02	8.691
40	57.13	0.6199	0.7031	1.71388	2.627E-02	14.990	4.559E-02	14.110	8.746	9.920	20.875	6.066E-02	212.146	10.677	9.600E-02	6.619
50	62.49	0.5022	0.5697	1.72382	2.650E-02	14.926	4.633E-02	13.929	6.996	7.935	20.788	6.165E-02	170.465	**10.641**	9.764E-02	5.344
60	66.65	0.4221	0.4788	1.73044	2.661E-02	**14.903**	4.679E-02	**13.864**	5.852	6.638	**20.764**	6.228E-02	142.939	10.643	9.867E-02	4.493
70	69.99	0.3641	0.4129	1.73438	2.664E-02	14.911	4.704E-02	13.887	5.056	5.735	20.786	6.263E-02	123.540	10.673	9.923E-02	3.886
80	72.72	0.3200	0.3630	1.73614	2.659E-02	14.944	4.714E-02	13.978	4.474	5.074	20.844	6.275E-02	109.204	10.725	9.943E-02	3.432
90	74.99	0.2855	0.3238	1.73614	2.648E-02	14.995	4.709E-02	14.122	4.032	4.573	20.929	6.269E-02	98.226	10.793	9.933E-02	3.082
100	76.91	0.2577	0.2923	1.73469	2.634E-02	15.061	4.693E-02	14.310	3.688	4.183	21.037	6.247E-02	89.575	10.875	9.898E-02	2.803
150	83.32	0.1733	0.1966	1.71306	2.517E-02	15.546	4.505E-02	15.737	2.728	3.094	21.801	5.993E-02	64.700	11.415	9.480E-02	1.979
200	86.95	0.1306	0.1481	1.67839	2.367E-02	16.187	4.222E-02	17.765	2.320	2.631	22.795	5.611E-02	53.285	12.091	8.862E-02	1.579
250	89.28	0.1047	0.1188	1.63832	2.206E-02	16.928	3.902E-02	20.319	2.128	2.414	23.935	5.525E-02	47.122	12.854	8.167E-02	1.346
275	90.16	0.0953	0.1081	1.61740	2.126E-02	17.327	3.739E-02	21.789	2.077	2.355	24.547	5.298E-02	45.105	13.262	7.813E-02	1.264
300	90.90	0.0874	0.0992	1.59627	2.045E-02	17.747	3.575E-02	23.414	2.047	2.322	25.191	5.069E-02	43.575	13.688	7.456E-02	1.197
350	92.10	0.0750	0.0851	1.55400	1.888E-02	18.639	3.494E-02	27.124	**2.035**	**2.309**	26.555	4.616E-02	41.560	14.590	6.759E-02	1.095
400	93.02	0.0657	0.0745	1.51238	1.737E-02	19.607	3.165E-02	31.575	2.075	2.354	28.034	4.177E-02	40.566	15.501	6.116E-02	1.019
450	93.75	0.0585	0.0663	1.47192	1.592E-02	20.657	2.850E-02	36.920	2.158	2.448	29.634	3.758E-02	**40.320**	16.547	5.475E-02	0.967
500	94.34	0.0527	0.0597	1.43285	1.454E-02	21.794	2.551E-02	43.361	2.283	2.589	31.369	3.361E-02	40.691	17.644	5.232E-02	0.929
600	95.24	0.0439	0.0498	1.35926	1.198E-02	24.407	2.001E-02	60.902	2.674	3.033	35.353	2.638E-02	43.103	20.210	4.089E-02	0.887
650	95.59	0.0406	0.0460	1.32476	1.080E-02	25.917	1.752E-02	72.919	2.957	3.354	37.655	2.308E-02	45.158	21.704	3.569E-02	0.880
700	95.89	0.0377	0.0427	1.29174	9.669E-03	27.609	1.519E-02	88.150	3.320	3.765	40.235	2.001E-02	47.882	23.361	3.090E-02	**0.880**
750	96.15	0.0352	0.0399	1.26016	8.600E-03	29.512	1.301E-02	107.662	3.785	4.293	43.138	1.709E-02	51.388	25.232	2.643E-02	0.887
800	96.38	0.0330	0.0374	1.22995	7.582E-03	31.689	1.101E-02	133.293	4.395	4.985	46.460	1.450E-02	55.894	27.377	2.231E-02	0.903
900	96.772	0.0293	0.0333	1.17339	5.690E-03	37.202	7.461E-03	215.672	6.324	7.172	54.875	9.827E-03	69.344	32.827	1.505E-02	0.962
1000	97.086	0.0264	0.0299	1.12151	3.967E-03	45.371	4.510E-03	391.220	10.324	11.710	67.353	5.909E-03	94.025	40.920	9.081E-03	1.080
1150	97.456	0.02292	0.02600	1.05145												
1200	97.560	0.02197	0.02492	1.02992												
1250	97.655	0.02110	0.02393	1.00925												
1270	97.743	0.02029	0.02301	1.00119												
1272	97.691	0.02076	0.02355	1.00041												
1273	**97.694**	**0.02073**	**0.02351**	**1.00000**												
1274	97.696	0.02071	0.02349	0.99961												
1275	97.698	0.02070	0.02348	0.99922												
1280	97.700	0.02068	0.02346	0.99722												
1300	97.709	0.02060	0.02337	0.98936												
1500	98.038	0.01759	0.01995	0.91693												

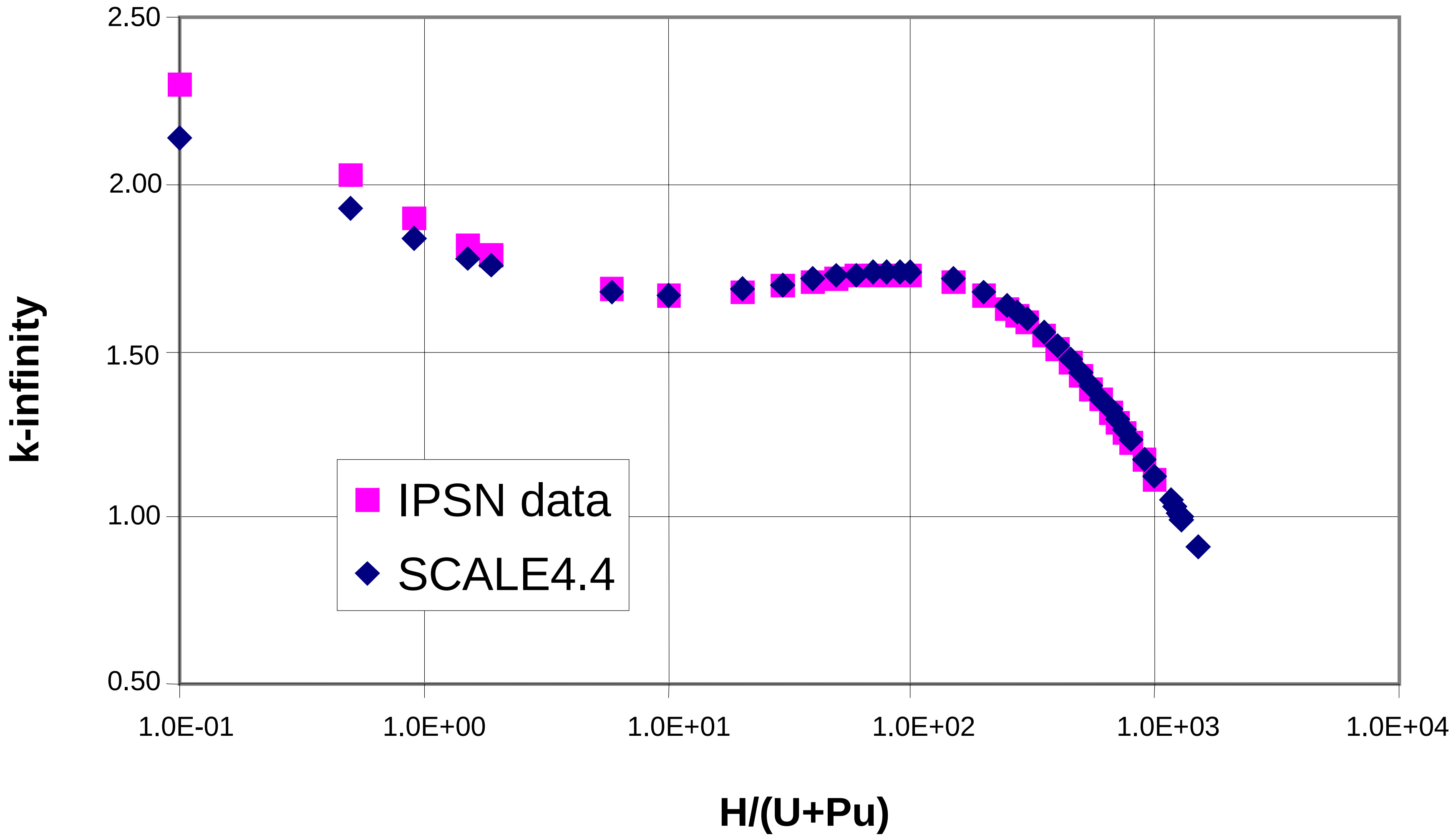

Fig. A.1.a.1. ***k*-infinity [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].**

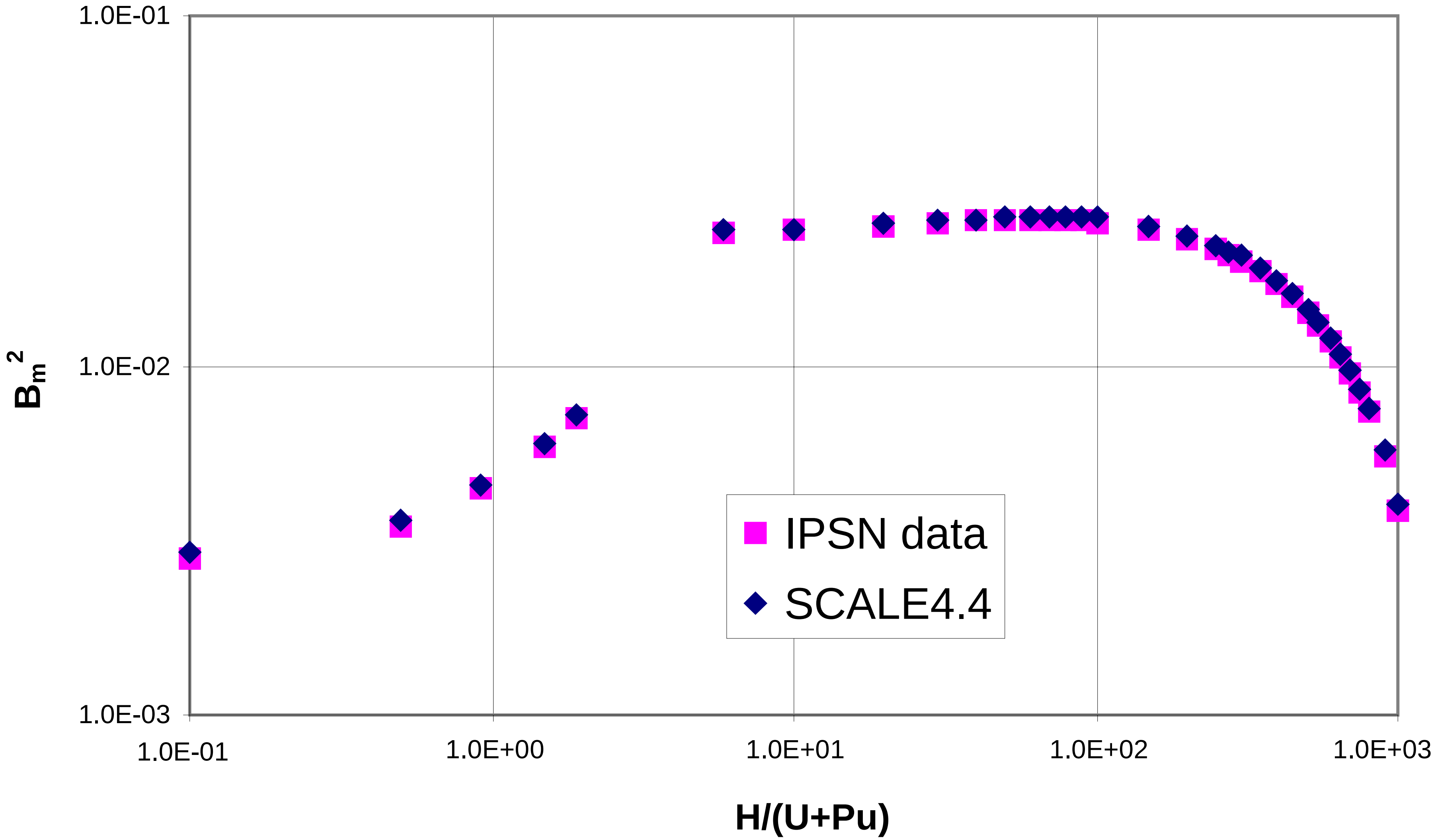

Fig. A.1.a.2. B_m^2 [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

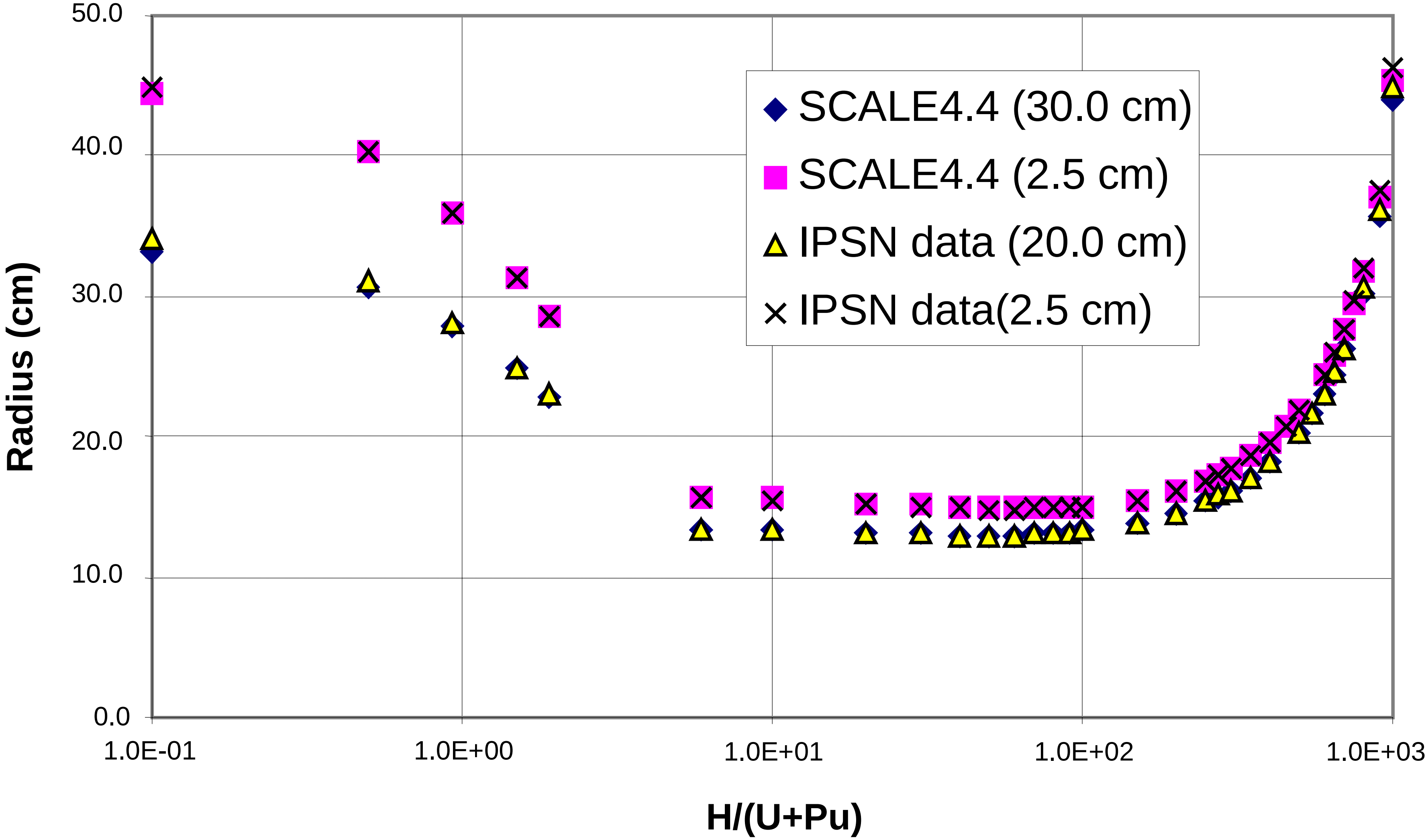

Fig. A.1.a.3. Sphere radius [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

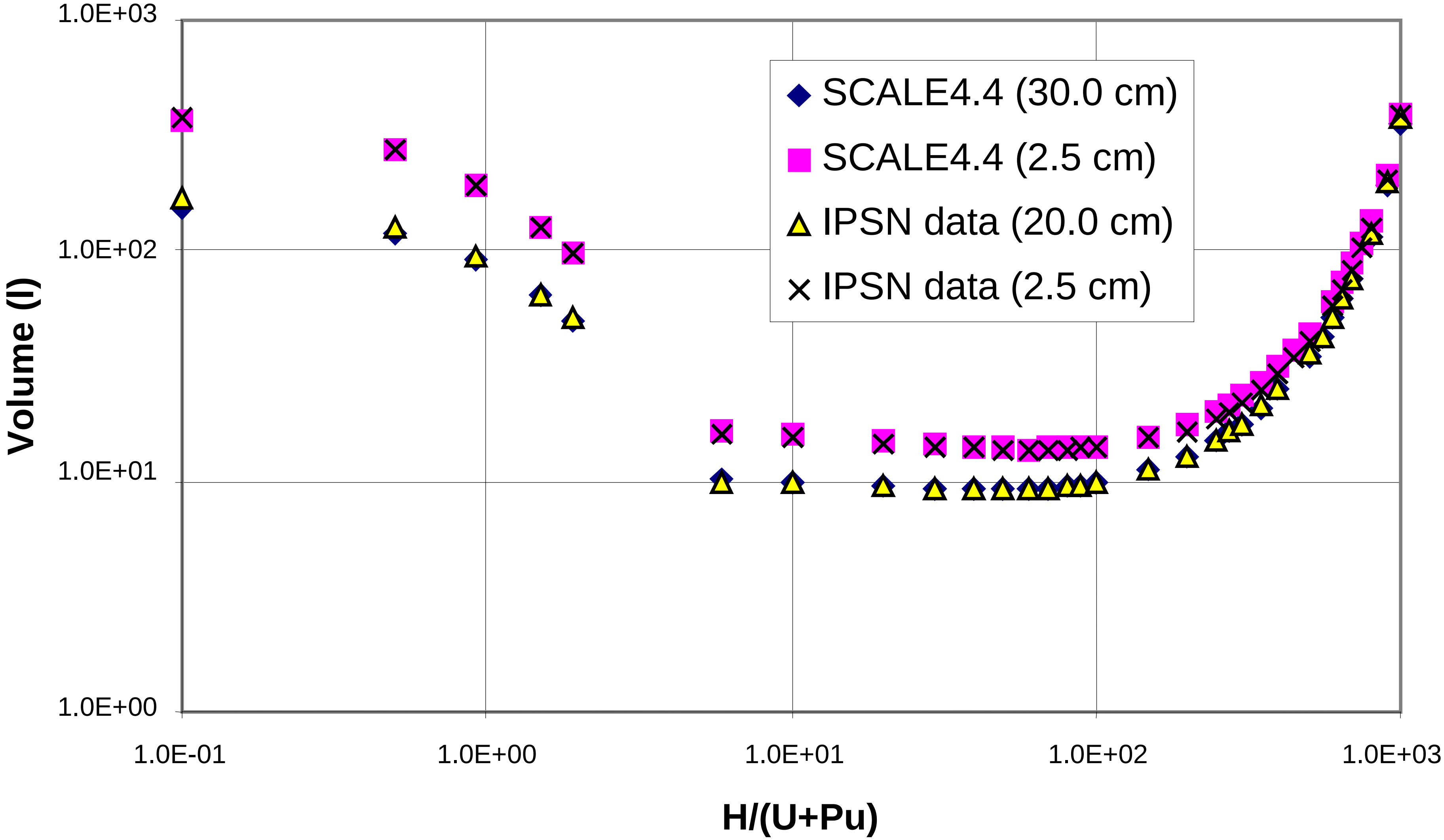

Fig. A.1.a.4. Sphere volume [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

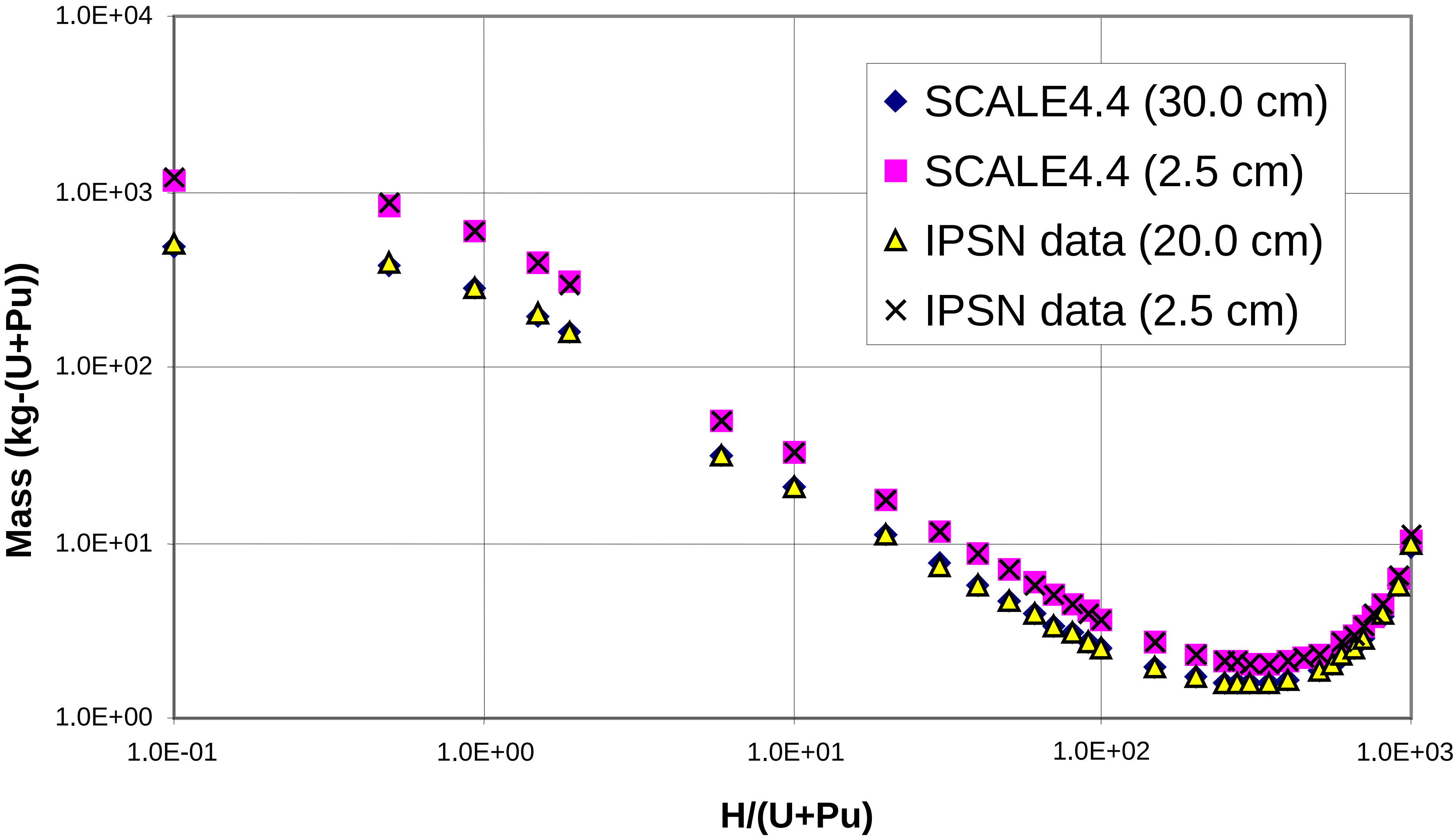

Fig. A.1.a.5. U + Pu mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

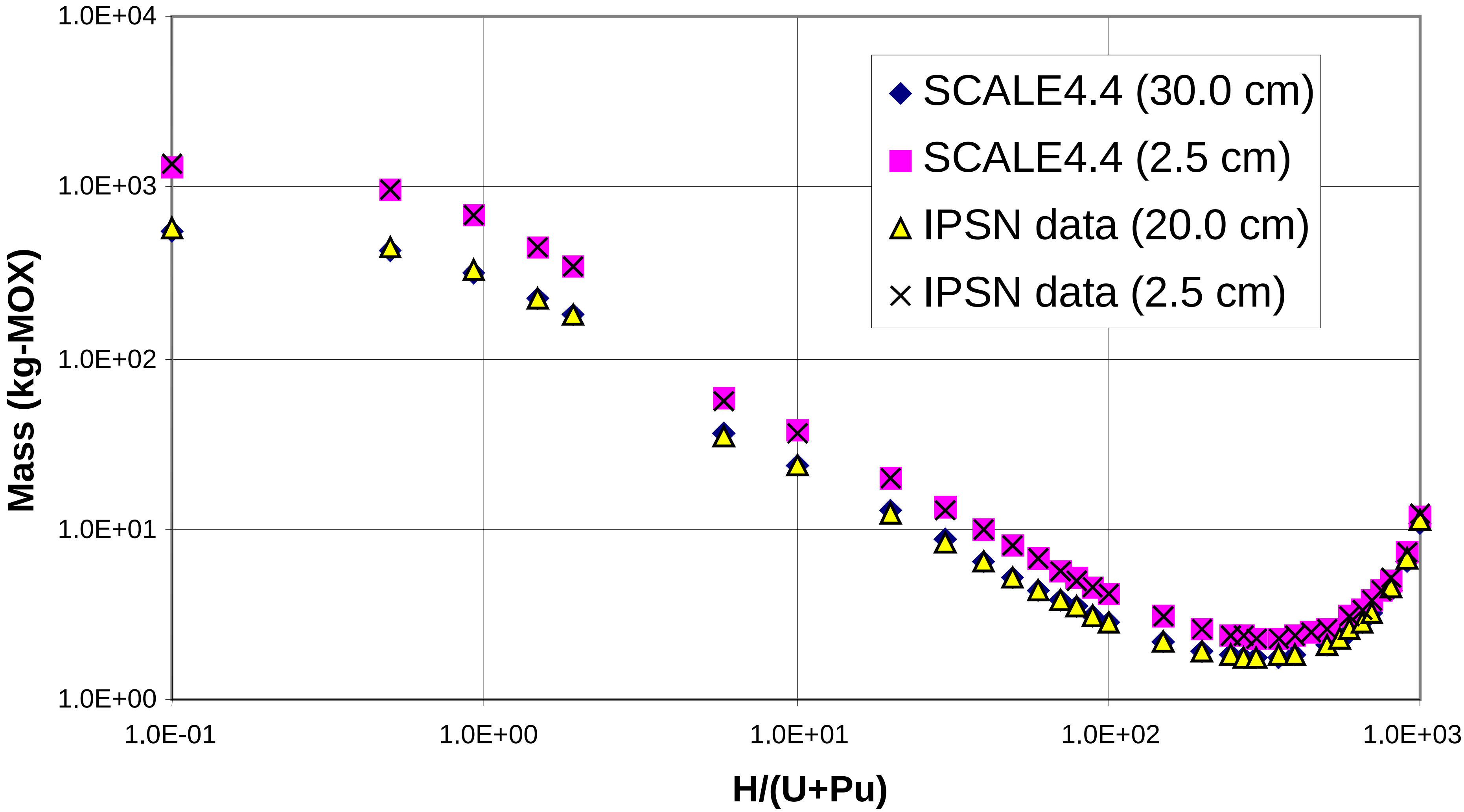

Fig. A.1.a.6. MOX mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) =35%, 3.5 g/cm^3].

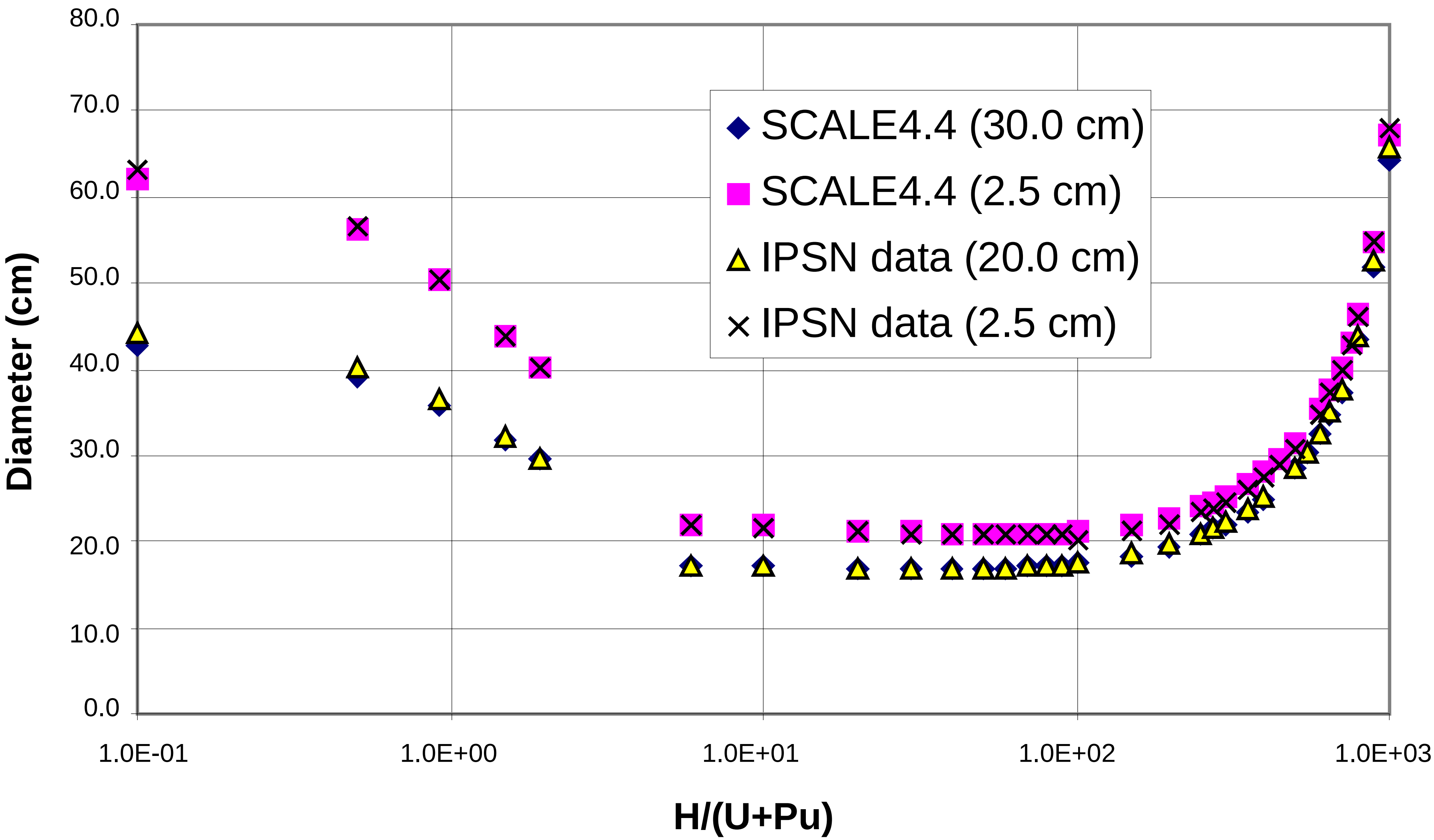

Fig. A.1.a.7-1. Cylinder diameter [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

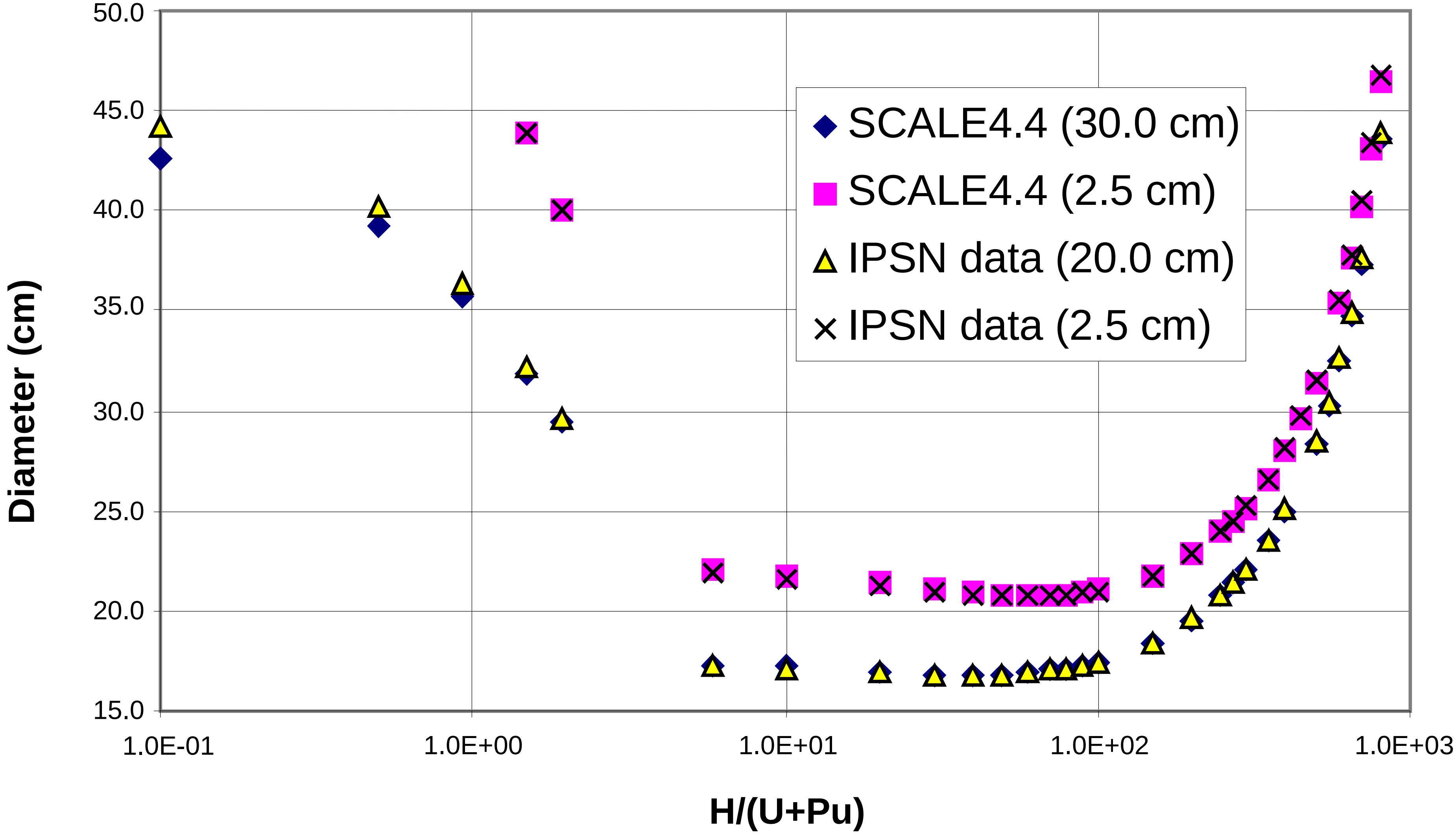

Fig. A.1.a.7-2. Cylinder diameter infinity [$^{235}U/U$= 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

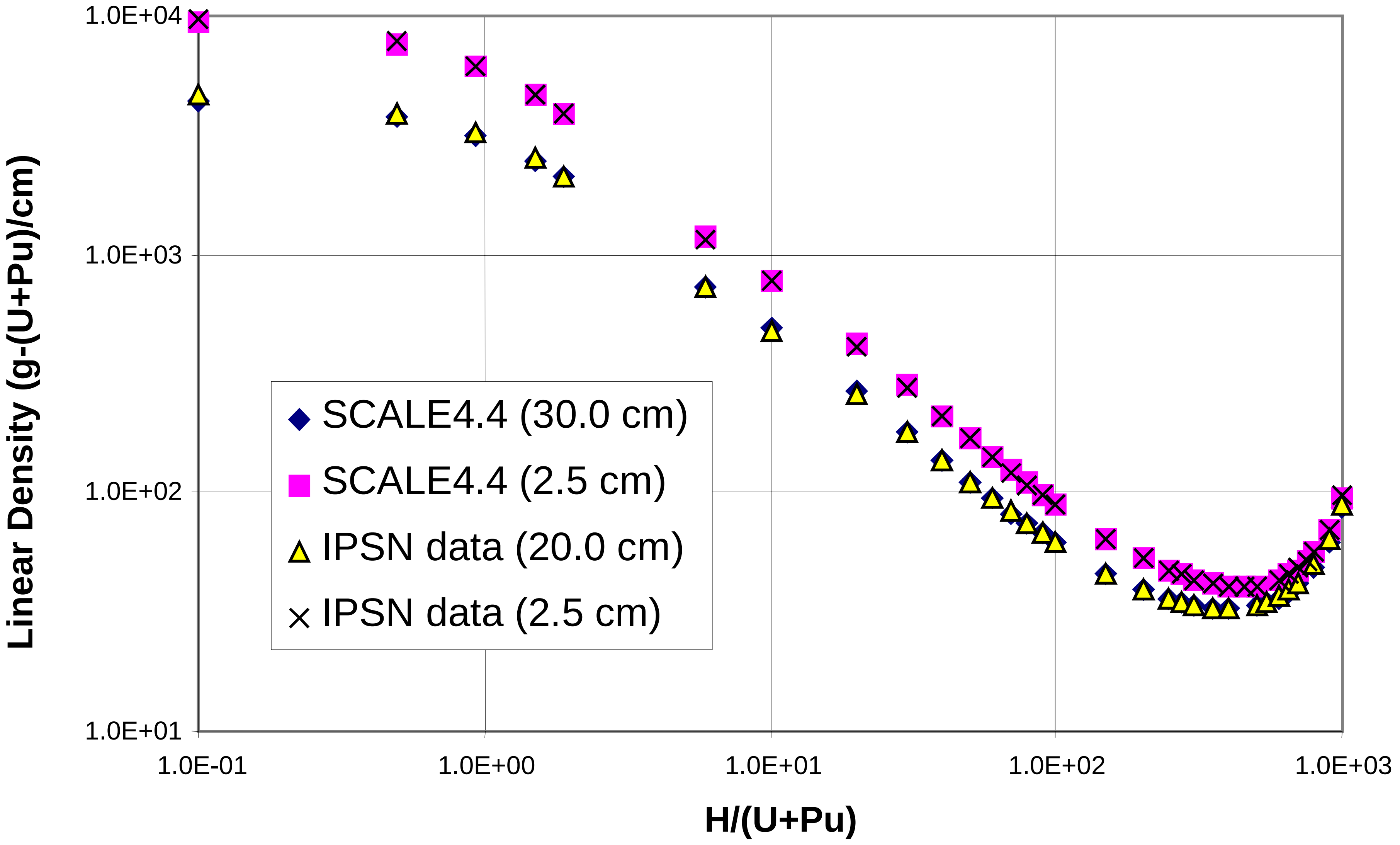

Fig. A.1.a.8. Linear density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

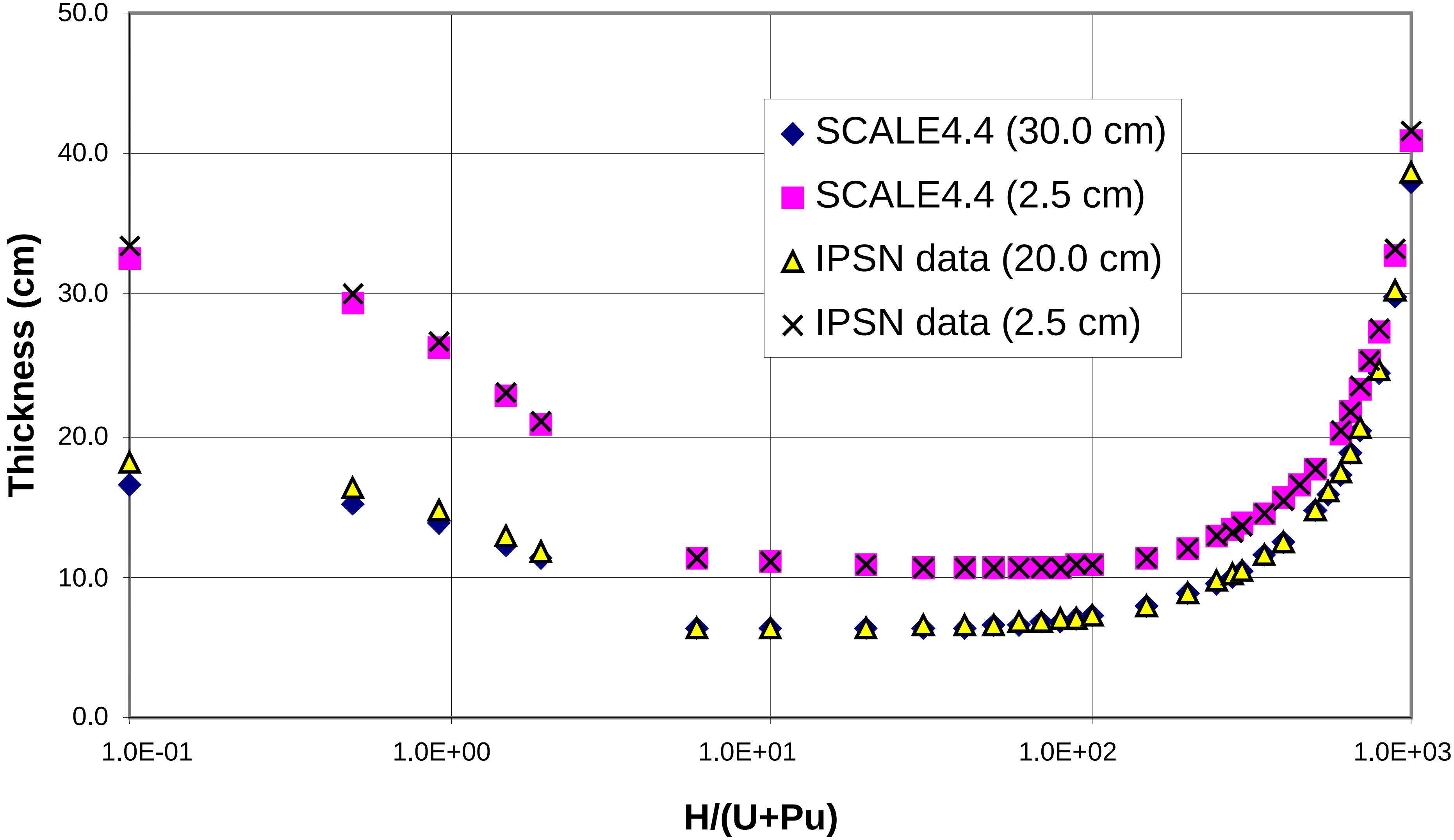

Fig. A.1.a.9. Slab thickness [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

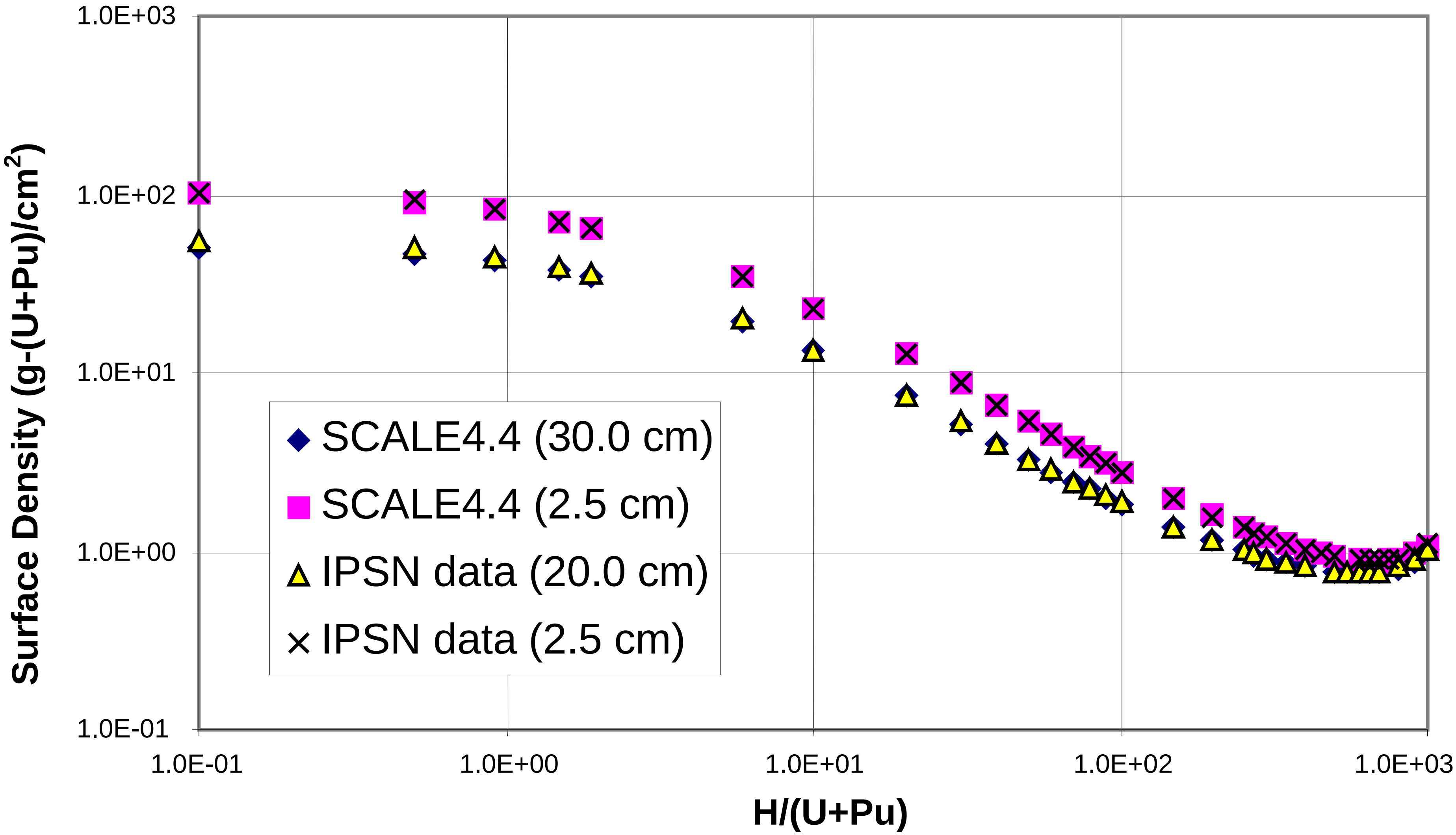

Fig. A.1.a.10. Surface density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

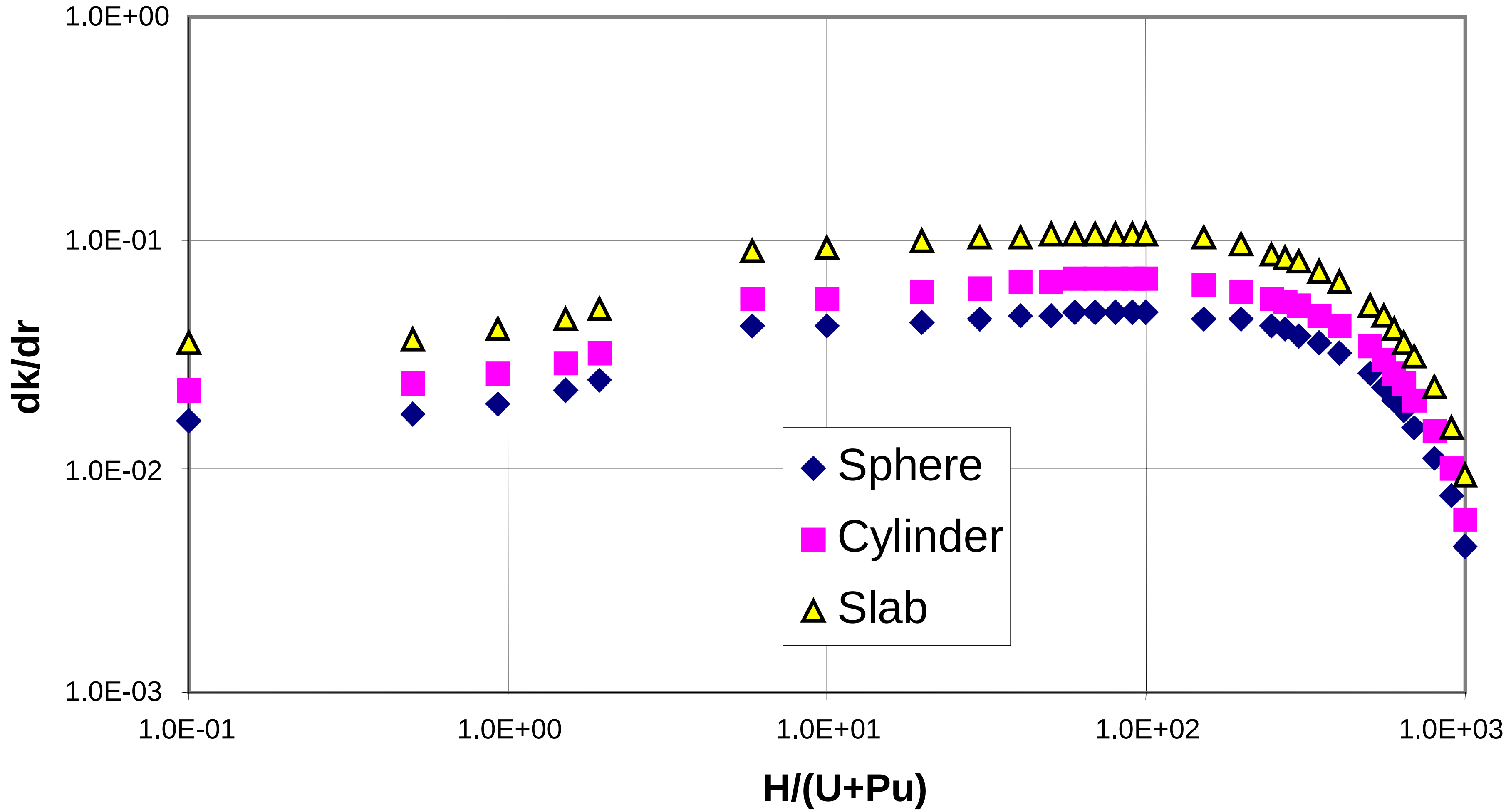

Fig. A.1.a.11. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 30.0 cm].

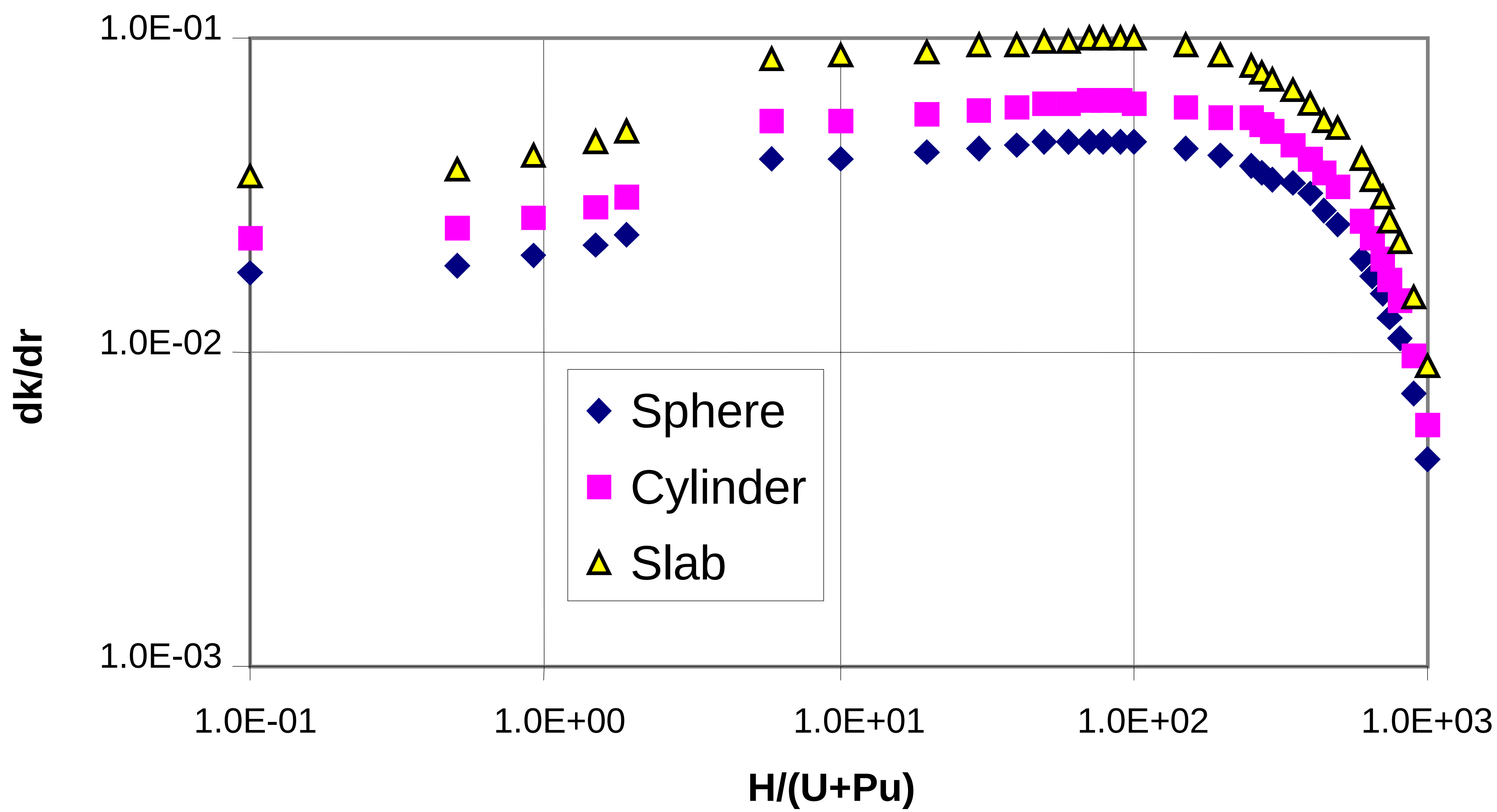

Fig. A.1.a.12. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5g/cm^3, water reflector: 2.5 cm].

Table A.1.b.1. MOX data [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**100.000**	**0.000**	**0.000**	**0.000**

Fissile material oxide density void-free

Water reflector 30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	9.37816	10.63694	1.44211	7.942E-03	25.528	1.711E-02	69.687	653.540	741.261	34.336	2.199E-02	8683.540	15.083	3.234E-02	141.446
0.5	1.64	8.21295	9.31533	1.41429	9.294E-03	23.778	1.846E-02	56.312	462.490	524.568	32.039	2.381E-02	6621.191	14.186	3.481E-02	116.505
0.928	3.00	7.24921	8.22224	1.41748	1.056E-02	22.212	2.021E-02	45.904	332.769	377.434	29.857	2.616E-02	5075.567	13.125	3.855E-02	95.145
1.5	4.76	6.26648	7.10760	1.42990	1.193E-02	20.748	2.085E-02	37.411	234.435	265.902	27.786	2.892E-02	3799.733	12.063	4.303E-02	75.595
1.916	6.00	5.70410	6.46973	1.43998	1.275E-02	19.965	2.207E-02	33.332	190.130	215.650	26.671	3.068E-02	3186.710	11.481	4.589E-02	65.491
5	14.29	3.42523	3.88498	1.50283	1.661E-02	17.074	2.838E-02	20.848	71.410	80.995	22.556	3.757E-02	1368.710	9.345	6.097E-02	32.010
10	25.00	2.07877	2.35779	1.56444	1.961E-02	15.509	3.392E-02	15.626	32.482	36.842	20.374	4.515E-02	677.718	8.300	7.448E-02	17.254
20	40.01	1.16380	1.32001	1.62277	2.205E-02	14.606	3.890E-02	13.052	15.190	17.229	19.196	5.487E-02	336.804	**7.891**	8.638E-02	9.184
30	50.01	0.80811	0.91658	1.64390	2.280E-02	**14.465**	4.062E-02	**12.677**	10.245	11.620	**19.090**	5.735E-02	231.298	8.008	9.067E-02	6.472
40	57.15	0.61894	0.70202	1.64751	2.284E-02	14.583	4.085E-02	12.991	8.041	9.120	19.343	5.772E-02	181.886	8.294	9.135E-02	5.134
50	62.51	0.50154	0.56886	1.64143	2.252E-02	14.828	4.287E-02	13.656	6.849	7.768	19.769	5.695E-02	153.944	8.658	9.013E-02	4.342
60	66.67	0.42157	0.47816	1.62954	2.200E-02	15.148	4.183E-02	14.558	6.137	6.961	20.297	5.555E-02	136.397	9.067	8.781E-02	3.822
70	70.00	0.36360	0.41240	1.61402	2.137E-02	15.514	4.050E-02	15.640	5.687	6.450	20.887	5.376E-02	124.590	9.504	8.486E-02	3.456
80	72.73	0.31964	0.36254	1.59617	2.065E-02	15.927	3.897E-02	16.924	5.409	6.136	21.543	5.170E-02	116.506	9.971	8.153E-02	3.187
90	75.00	0.28517	0.32345	1.57688	1.990E-02	16.368	3.736E-02	18.367	5.238	5.941	22.235	4.952E-02	110.733	10.457	7.795E-02	2.982
100	76.93	0.25741	0.29196	1.55668	1.914E-02	16.836	3.568E-02	19.990	**5.146**	**5.836**	22.968	4.726E-02	106.646	10.962	7.429E-02	2.822
125	80.65	0.20702	0.23481	1.50448	1.720E-02	18.123	3.143E-02	24.933	5.162	5.854	24.963	4.157E-02	101.319	12.317	6.506E-02	2.550
150	83.34	0.17313	0.19637	1.45229	1.532E-02	19.574	2.729E-02	31.415	5.439	6.169	27.198	3.512E-02	**100.584**	13.813	5.613E-02	2.392
175	85.37	0.14878	0.16875	1.40162	1.352E-02	21.211	2.336E-02	39.974	5.947	6.746	29.711	3.080E-02	103.151	15.433	4.801E-02	2.296
200	86.96	0.13043	0.14794	1.35315	1.183E-02	23.073	1.972E-02	51.455	6.711	7.612	32.563	2.596E-02	108.622	17.281	4.039E-02	**2.254**
225	88.24	0.11611	0.13169	1.30710	1.024E-02	25.219	1.636E-02	67.185	7.801	8.848	35.845	2.152E-02	117.167	19.426	3.336E-02	2.256
250	89.29	0.10462	0.11866	1.26351	8.749E-03	27.737	1.331E-02	89.385	9.351	10.607	39.692	1.749E-02	129.455	21.903	2.708E-02	2.292
275	90.17	0.09521	0.10799	1.22236	7.356E-03	30.753	1.056E-02	121.828	11.599	13.156	44.301	1.386E-02	146.755	24.893	2.141E-02	2.370
300	90.91	0.08734	0.09906	1.18352	6.048E-03	34.487	8.096E-03	171.808	15.006	17.020	50.005	1.061E-02	171.523	28.595	1.636E-02	2.498
350	92.11	0.07496	0.08502	1.11224	3.674E-03	45.845	4.045E-03	403.605	30.254	34.315	67.363	5.271E-03	267.151	39.867	8.123E-03	2.988
400	93.02	0.06566	0.07447	1.04858	1.580E-03	72.965	1.099E-03	1627.175	106.840	121.181	108.846	1.558E-03	610.960	66.881	2.213E-03	4.391
430	93.480	0.06100	0.06919	1.01363												
435	93.550	0.06031	0.06841	1.00800												
440	93.618	0.05962	0.06762	1.00245												
441	93.632	0.05949	0.06748	1.00135												
442	93.645	0.05935	0.06732	1.00025												
443	**93.659**	**0.05922**	**0.06717**	**0.99915**												
444	93.672	0.05909	0.06702	0.99805												
445	93.686	0.05896	0.06687	0.99695												
450	93.751	0.05840	0.06624	0.99153												

Table A.1.b.2. MOX data [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**100.000**	**0.000**	**0.000**	**0.000**

Fissile material oxide density void-free

Water reflector 2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	9.37816	10.63694	1.44211	7.942E-03	30.338	1.792E-02	116.968	1096.944	1244.181	44.070	2.328E-02	14305.190	25.252	3.517E-02	236.821
0.5	1.64	8.21295	9.31533	1.41429	9.294E-03	27.847	1.902E-02	90.457	742.919	842.638	40.328	2.479E-02	10490.443	22.912	3.762E-02	188.173
0.928	3.00	7.24921	8.22224	1.41748	1.056E-02	25.891	2.062E-02	72.700	527.018	597.757	37.365	2.691E-02	7949.134	21.031	4.098E-02	152.455
1.5	4.76	6.26648	7.10760	1.42990	1.193E-02	24.128	2.087E-02	58.834	368.684	418.171	34.690	2.740E-02	5922.664	19.324	4.499E-02	121.094
1.916	6.00	5.70410	6.46973	1.43998	1.275E-02	23.199	2.201E-02	52.299	298.321	338.363	33.279	2.891E-02	4961.671	18.423	4.473E-02	105.088
5	14.29	3.42523	3.88498	1.50283	1.661E-02	19.794	2.792E-02	32.484	111.267	126.202	28.107	3.684E-02	2125.243	15.133	5.757E-02	51.833
10	25.00	2.07877	2.35779	1.56444	1.961E-02	17.904	3.316E-02	24.041	49.976	56.684	25.255	4.388E-02	1041.303	13.352	6.902E-02	27.756
20	40.01	1.16380	1.32001	1.62277	2.205E-02	16.709	3.792E-02	19.539	22.739	25.792	23.475	5.031E-02	503.726	12.309	7.936E-02	14.325
30	50.01	0.80811	0.91658	1.64390	2.280E-02	**16.414**	3.960E-02	**18.525**	14.970	16.980	**23.057**	5.259E-02	337.422	**12.126**	8.279E-02	9.799
40	57.15	0.61894	0.70202	1.64751	2.284E-02	16.435	3.986E-02	18.593	11.508	13.053	23.110	5.296E-02	259.611	12.196	8.343E-02	7.548
50	62.51	0.50154	0.56886	1.64143	2.252E-02	16.609	3.937E-02	19.193	9.626	10.918	23.392	5.229E-02	215.549	12.408	8.236E-02	6.223
60	66.67	0.42157	0.47816	1.62954	2.200E-02	16.877	3.842E-02	20.135	8.488	9.628	23.813	5.103E-02	187.747	12.703	8.033E-02	5.355
70	70.00	0.36360	0.41240	1.61402	2.137E-02	17.201	3.721E-02	21.319	7.752	8.792	24.318	5.269E-02	168.874	13.050	7.771E-02	4.745
80	72.73	0.31964	0.36254	1.59617	2.065E-02	17.582	3.581E-02	22.767	7.277	8.254	24.906	5.074E-02	155.723	13.448	7.470E-02	4.298
90	75.00	0.28517	0.32345	1.57688	1.990E-02	17.996	3.682E-02	24.411	6.961	7.896	25.542	4.867E-02	146.120	13.875	7.147E-02	3.957
100	76.93	0.25741	0.29196	1.55668	1.914E-02	18.441	3.277E-02	26.271	6.762	7.670	26.227	4.651E-02	139.065	14.332	6.815E-02	3.689
125	80.65	0.20702	0.23481	1.50448	1.720E-02	19.685	3.109E-02	31.952	**6.615**	**7.503**	28.132	4.102E-02	128.680	15.533	6.002E-02	3.216
150	83.34	0.17313	0.19637	1.45229	1.532E-02	21.106	2.703E-02	39.383	6.818	7.734	30.303	3.564E-02	**124.863**	16.957	5.182E-02	2.936
175	85.37	0.14878	0.16875	1.40162	1.352E-02	22.722	2.319E-02	49.136	7.310	8.292	32.769	3.054E-02	125.475	18.531	4.747E-02	2.757
200	86.96	0.13043	0.14794	1.35315	1.183E-02	24.568	1.960E-02	62.115	8.102	9.189	35.586	2.578E-02	129.724	20.341	4.003E-02	2.653
225	88.24	0.11611	0.13169	1.30710	1.024E-02	26.702	1.629E-02	79.749	9.260	10.503	38.841	2.140E-02	137.575	22.439	3.318E-02	**2.605**
250	89.29	0.10462	0.11866	1.26351	8.749E-03	29.212	1.326E-02	104.412	10.924	12.390	42.669	1.742E-02	149.599	24.912	2.695E-02	2.606
275	90.17	0.09521	0.10799	1.22236	7.356E-03	32.221	1.054E-02	140.117	13.340	15.131	47.262	1.382E-02	167.031	27.884	2.133E-02	2.655
300	90.91	0.08734	0.09906	1.18352	6.048E-03	35.950	8.085E-03	194.626	16.999	19.280	52.955	1.060E-02	192.364	31.567	1.633E-02	2.757
350	92.11	0.07496	0.08502	1.11224	3.674E-03	47.305	4.034E-03	443.403	33.237	37.699	70.301	5.288E-03	290.969	42.825	8.122E-03	3.210
400	93.02	0.06566	0.07447	1.04858	1.580E-03	74.428	1.123E-03	1727.049	113.398	128.619	111.783	1.553E-03	644.380	69.835	2.396E-03	4.585
430	93.480	0.06100	0.06919	1.01363												
435	93.550	0.06031	0.06841	1.00800												
440	93.618	0.05962	0.06762	1.00245												
441	93.632	0.05949	0.06748	1.00135												
442	93.645	0.05935	0.06732	1.00025												
443	**93.659**	**0.05922**	**0.06717**	**0.99915**												
444	93.672	0.05909	0.06702	0.99805												
445	93.686	0.05896	0.06687	0.99695												
450	93.751	0.05840	0.06624	0.99153												

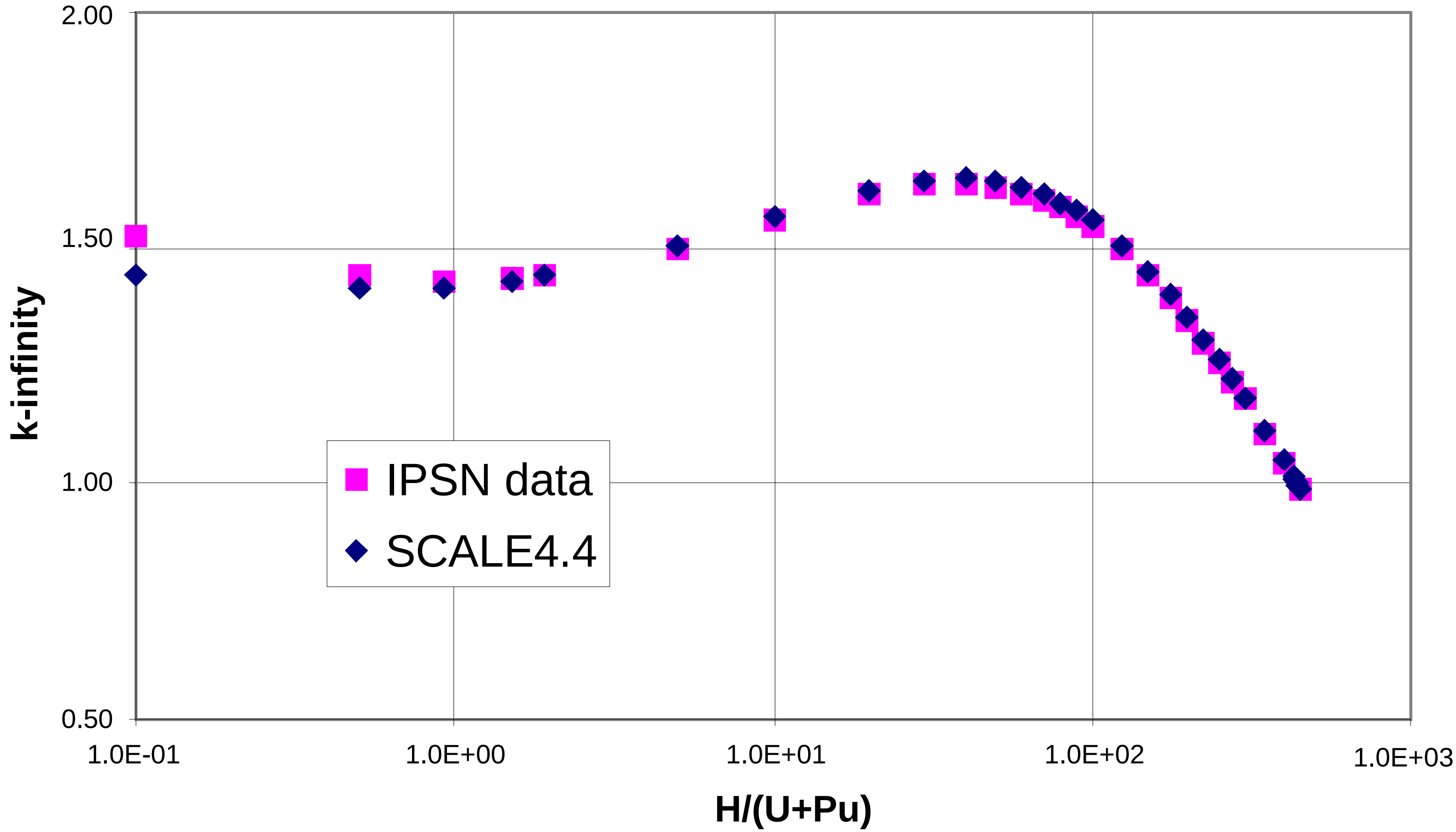

Fig. A.1.b.1. ***k*-infinity [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].**

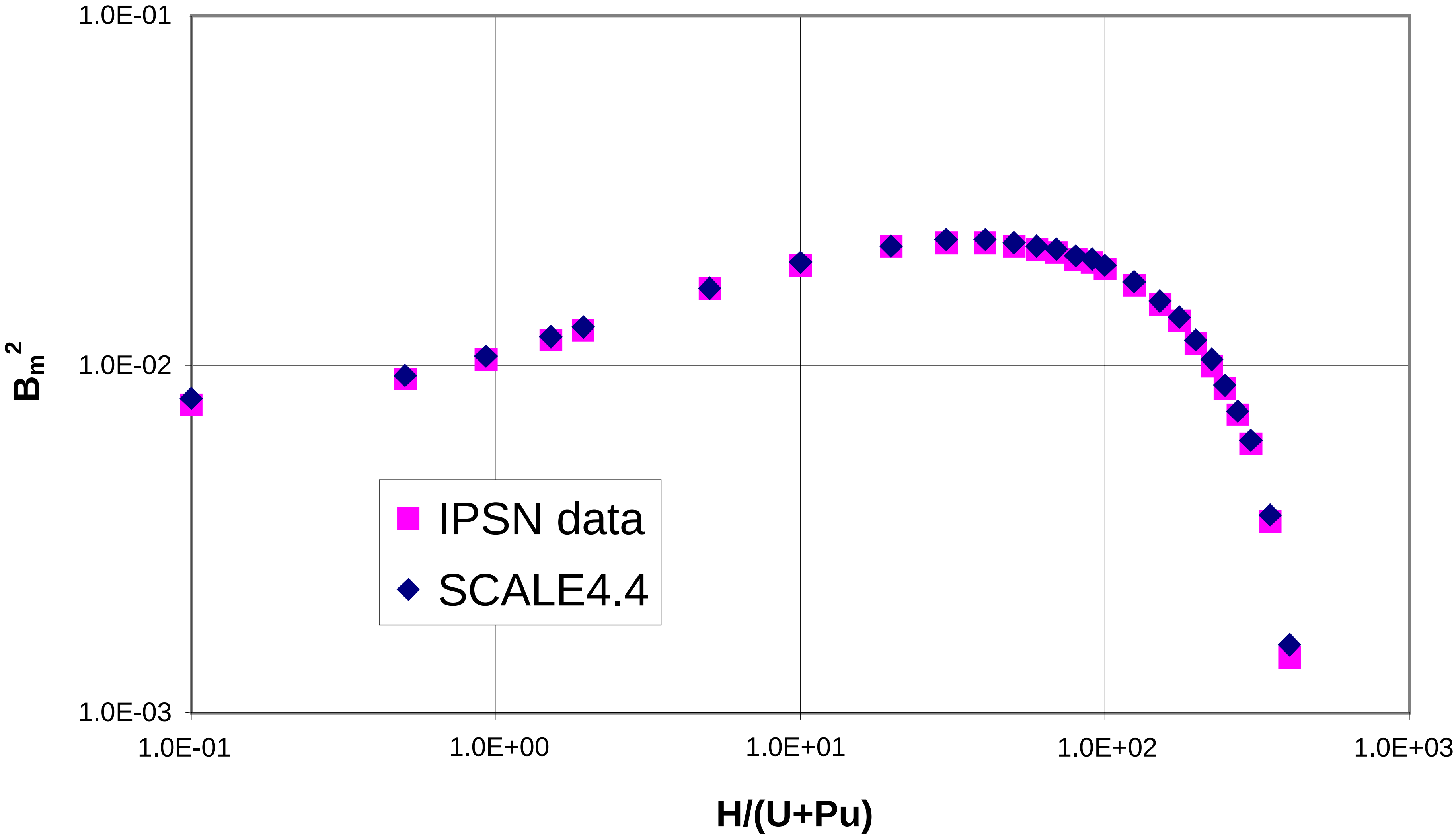

Fig. A.1.b.2. B_m^2 [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, void-free].

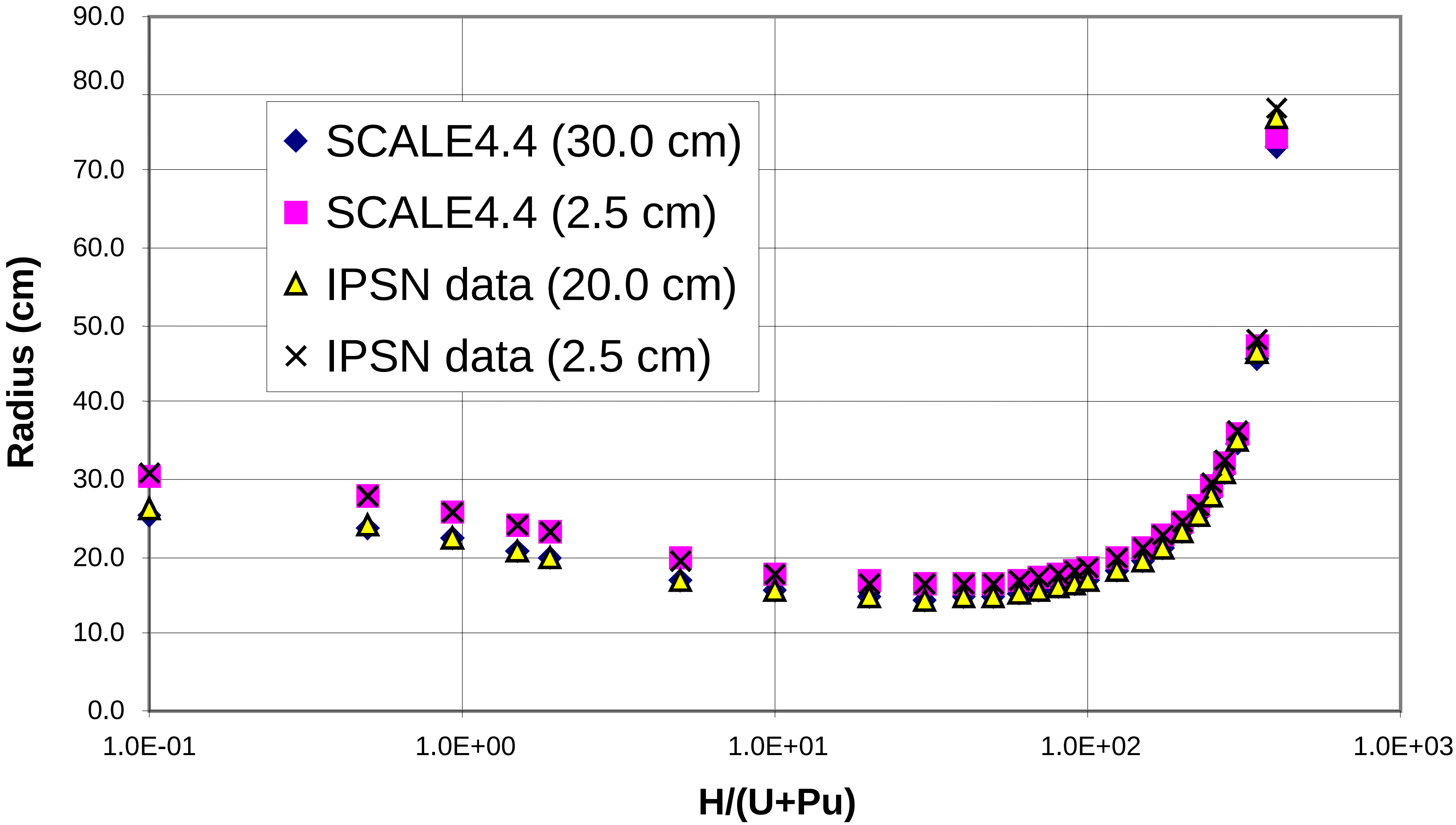

Fig. A.1.b.3-1. Sphere radius [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) =12.5%, void-free].

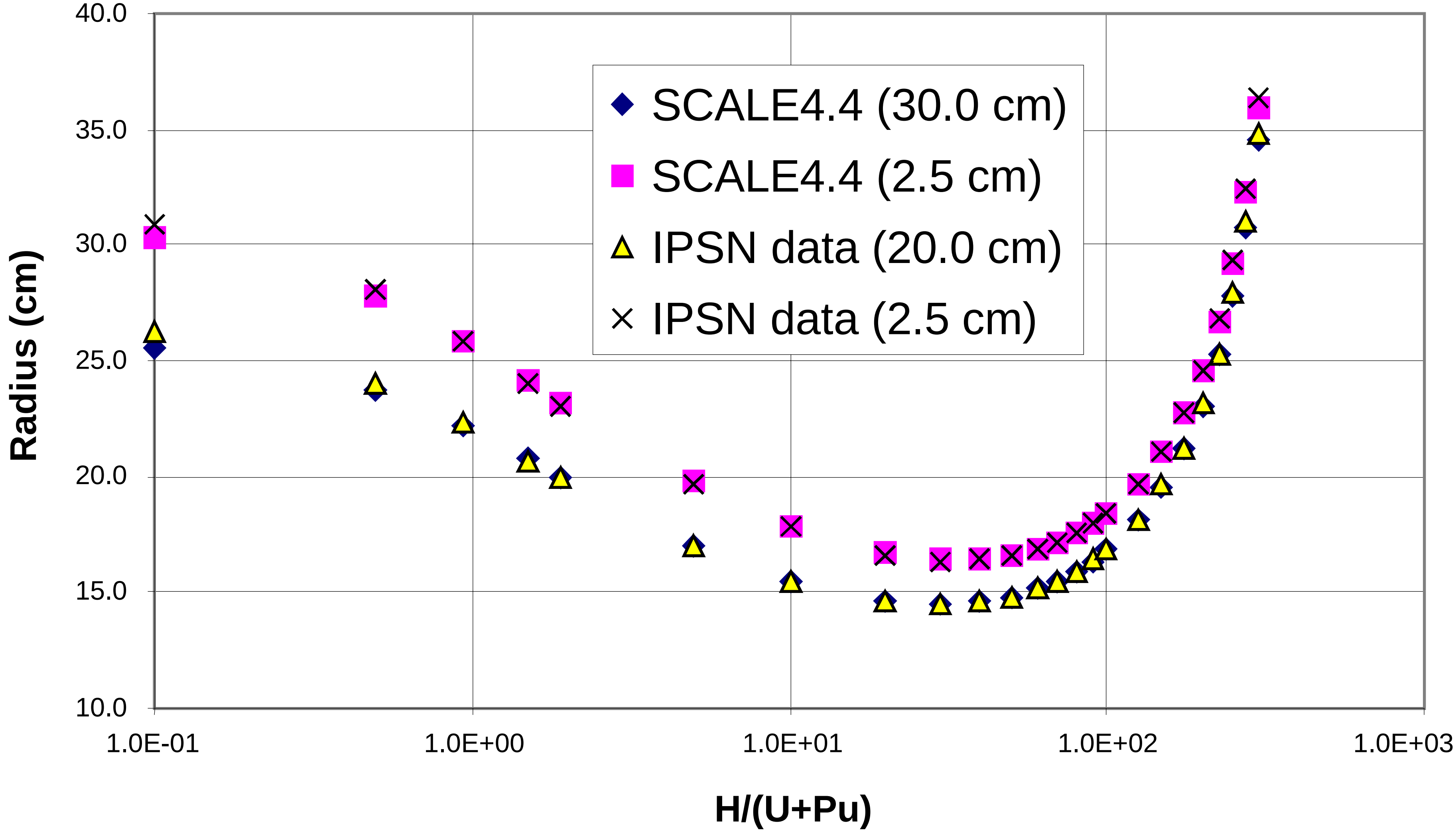

Fig. A.1.b.3-2. Sphere radius [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, void-free].

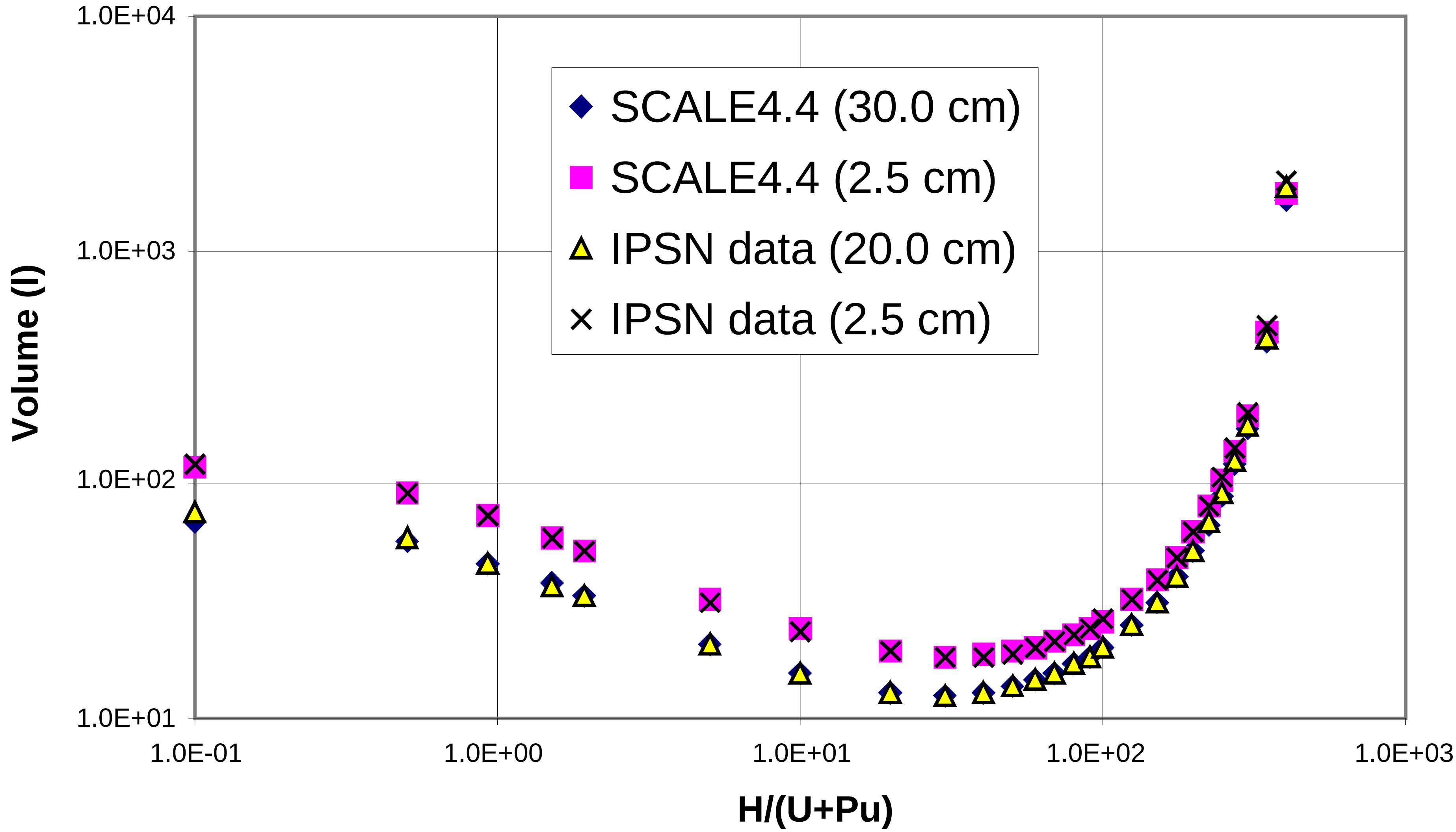

Fig. A.1.b.4. Sphere volume [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

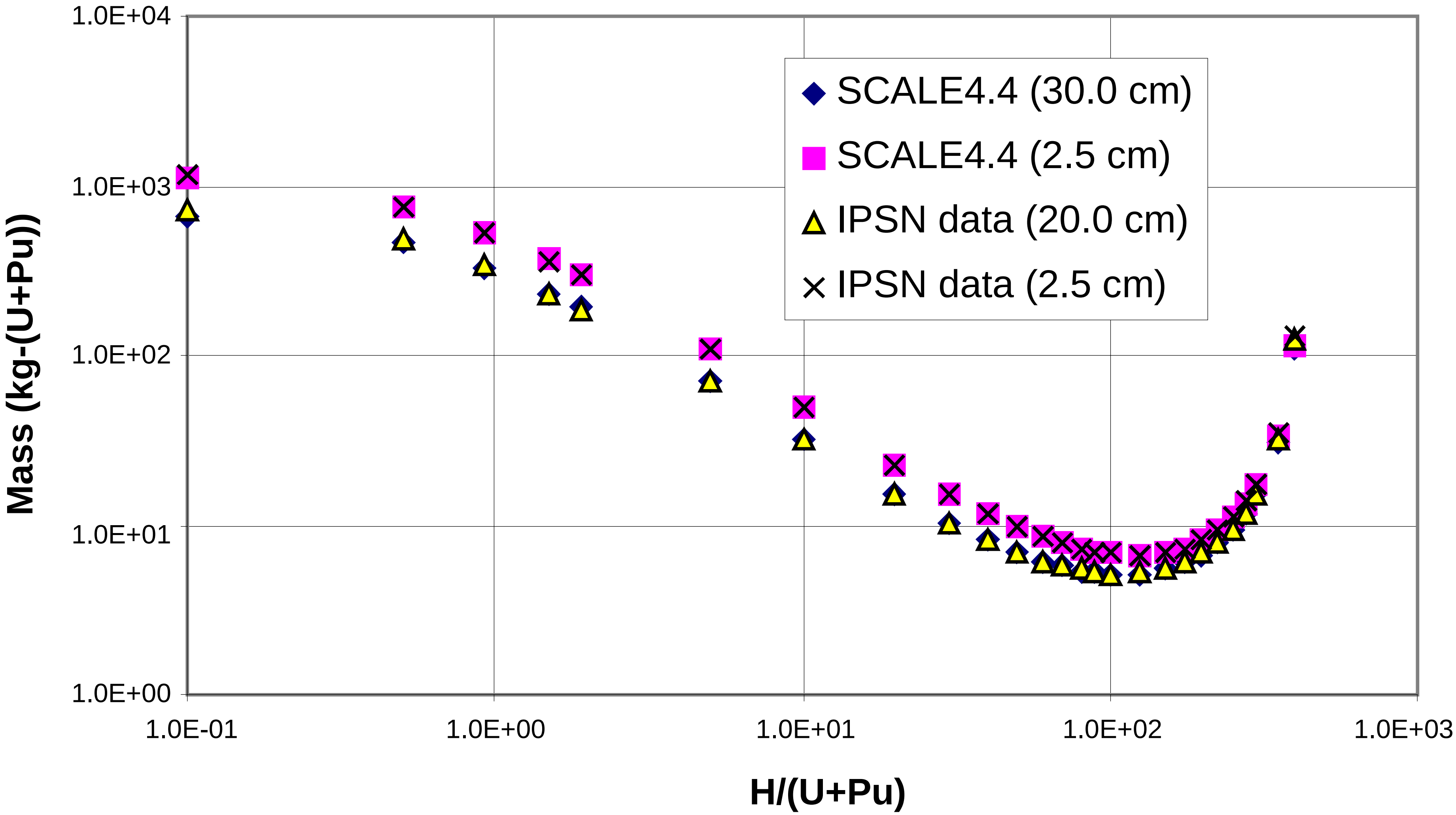

Fig. A.1.b.5. U + Pu mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

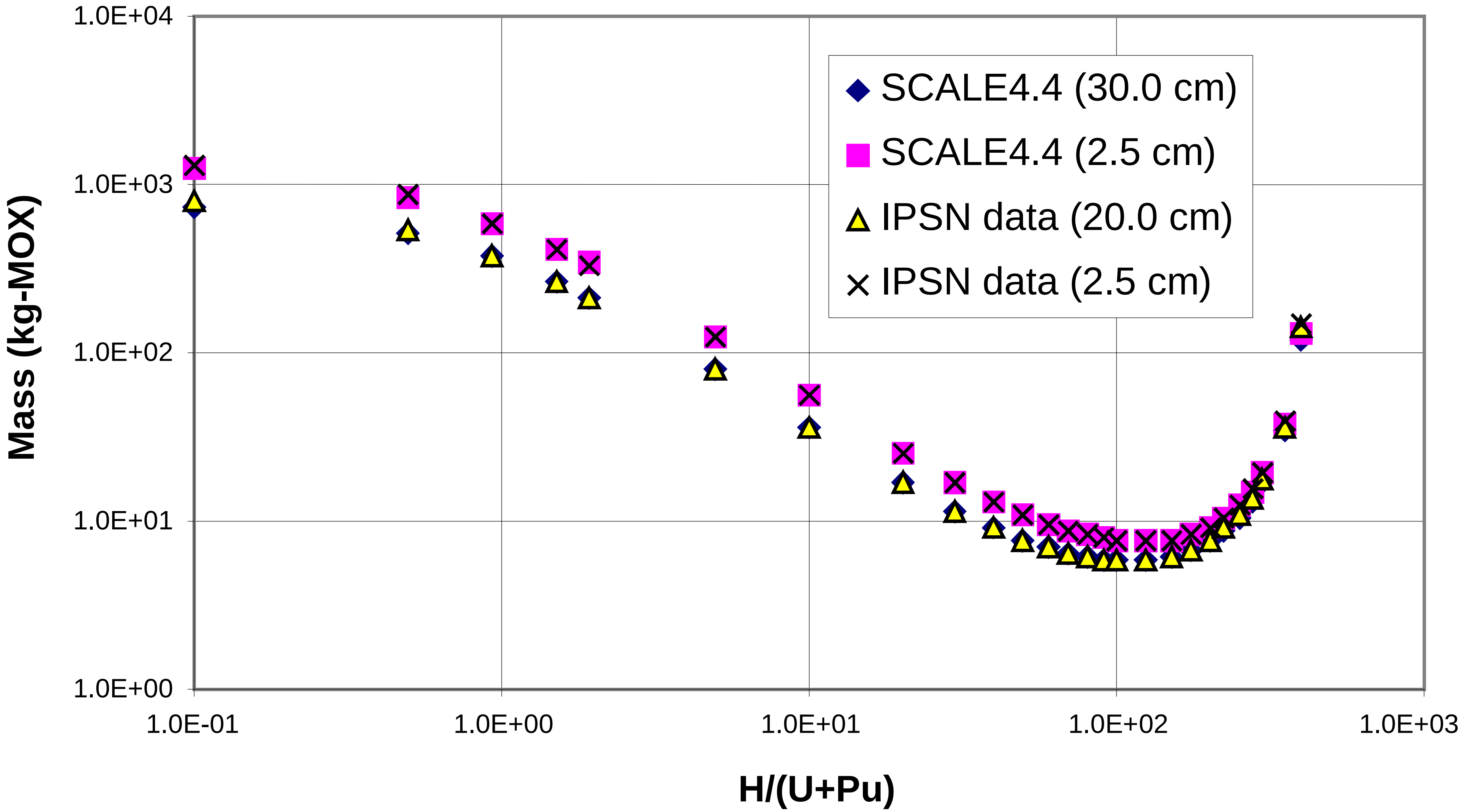

Fig. A.1.b.6. MOX mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

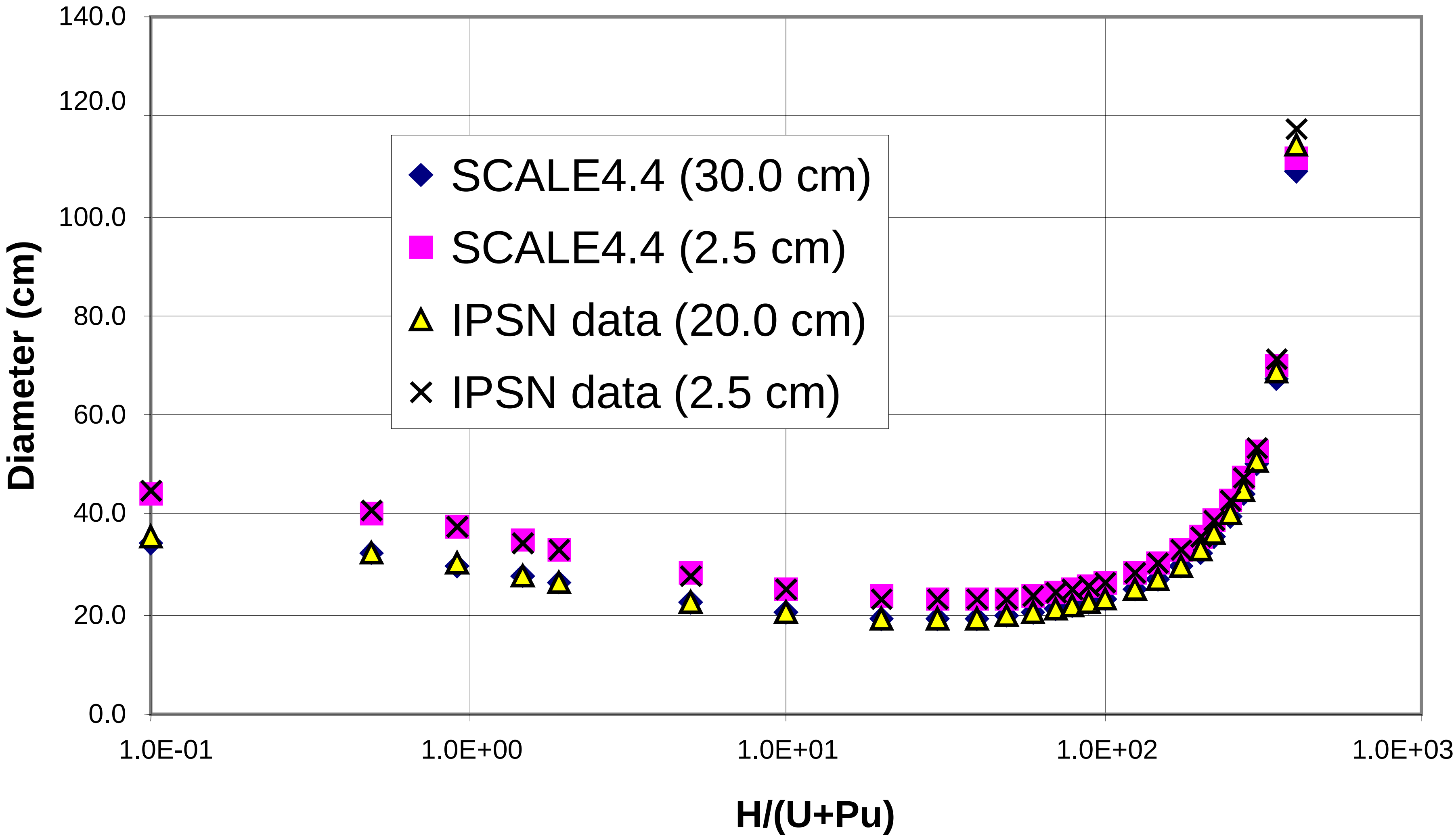

Fig. A.1.b.7-1. Cylinder diameter [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

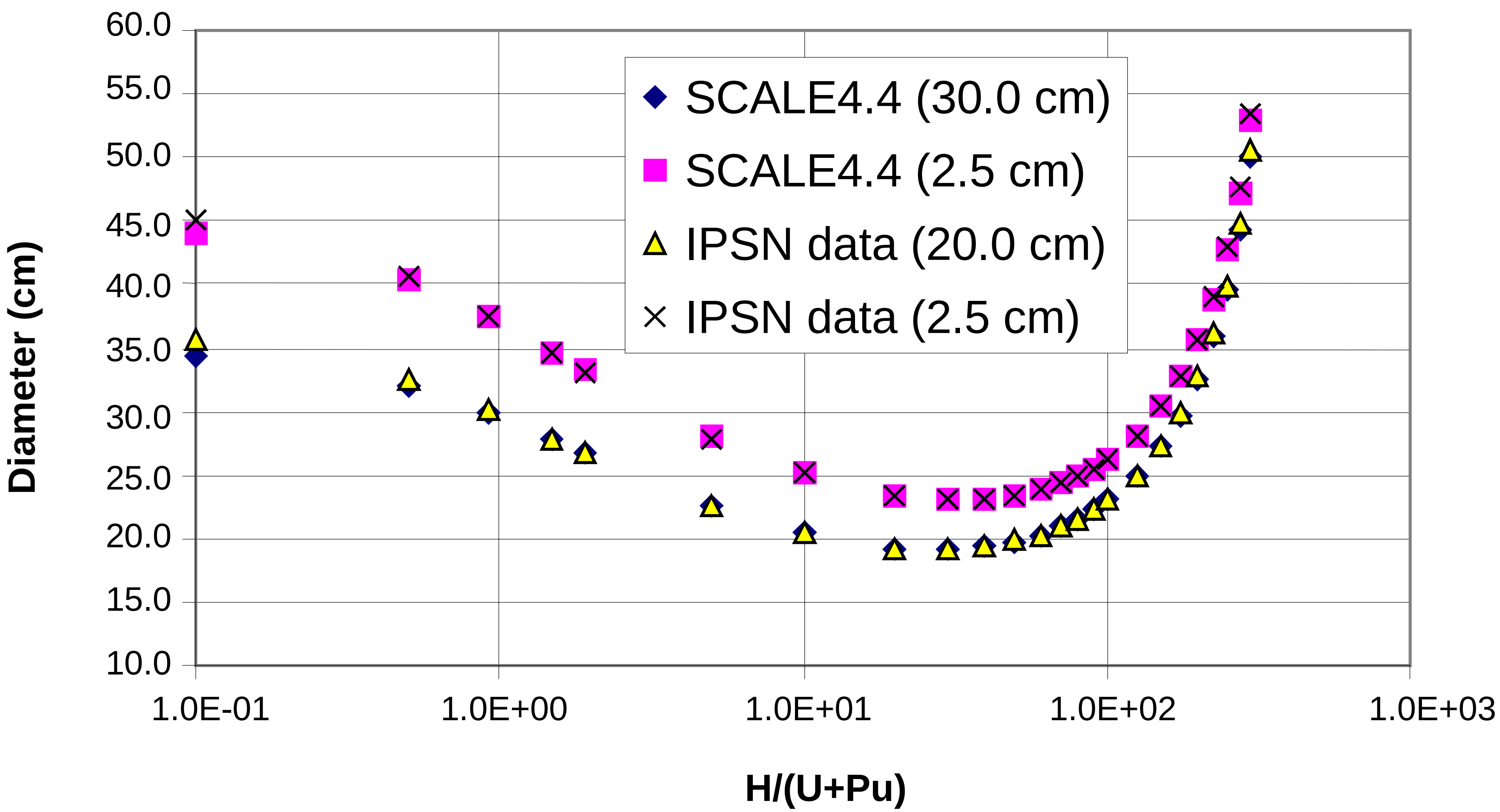

Fig. A.1.b.7-2. Cylinder diameter infinity [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

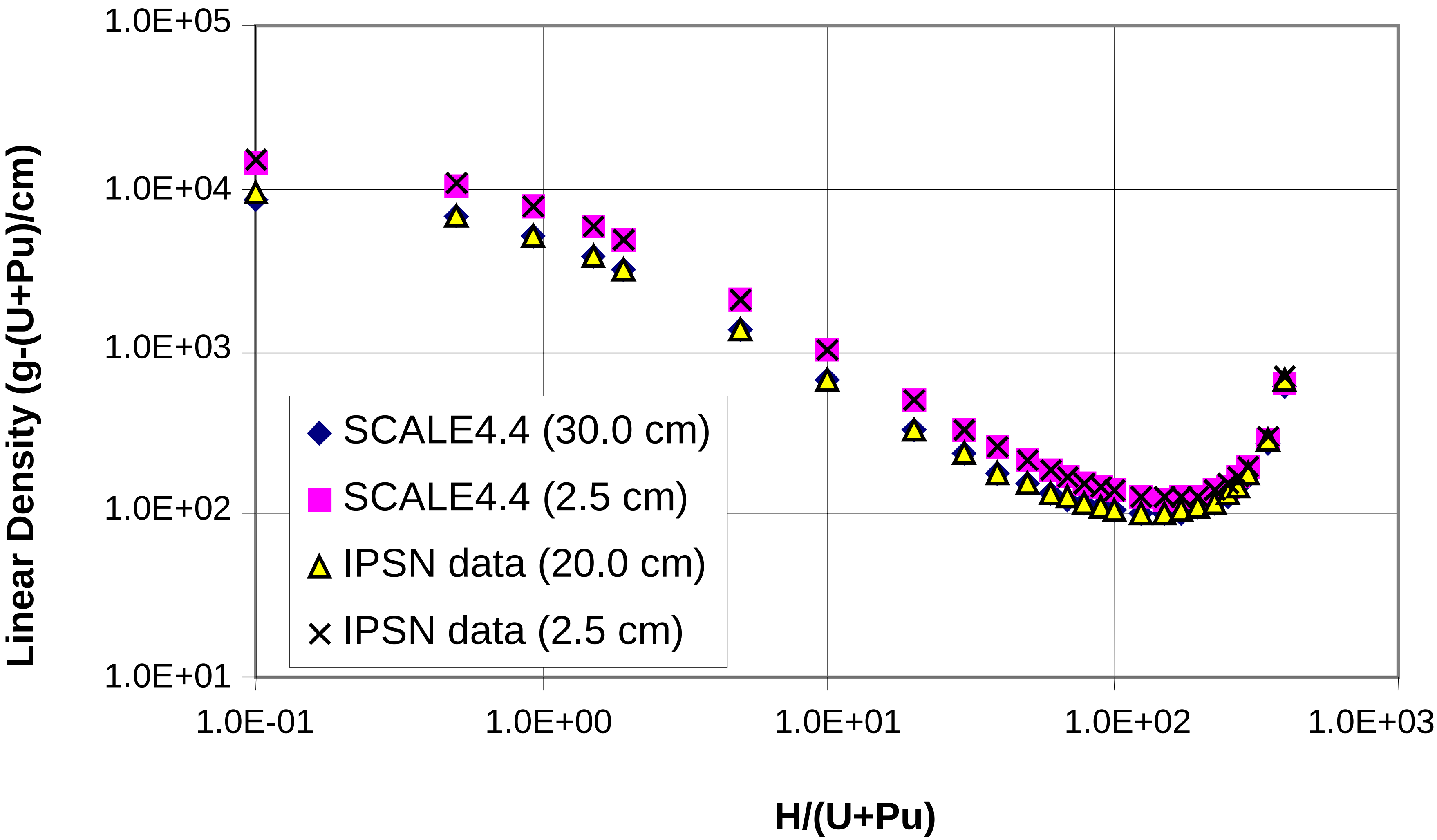

Fig. A.1.b.8. Linear density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

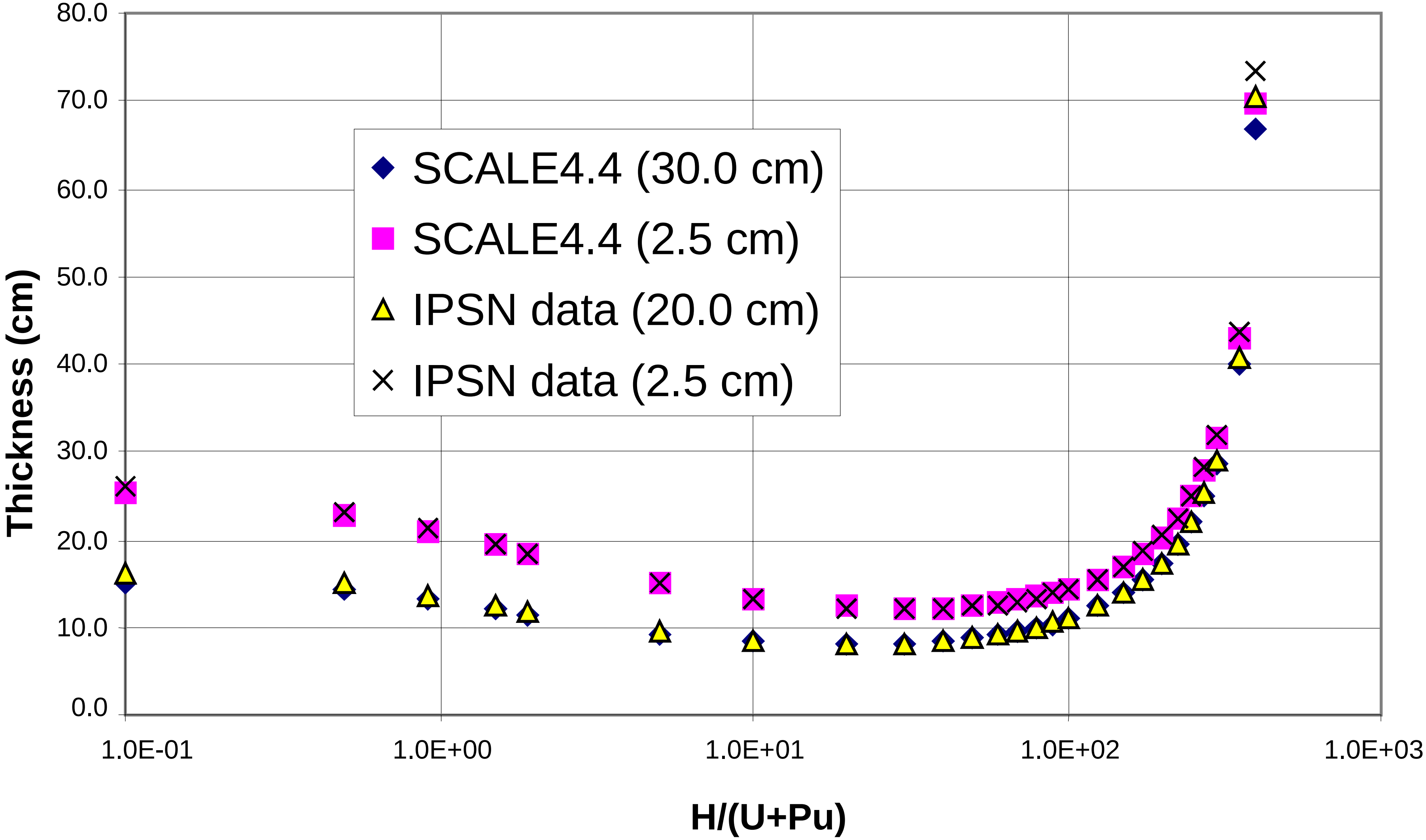

Fig. A.1.b.9-1. Slab thickness [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

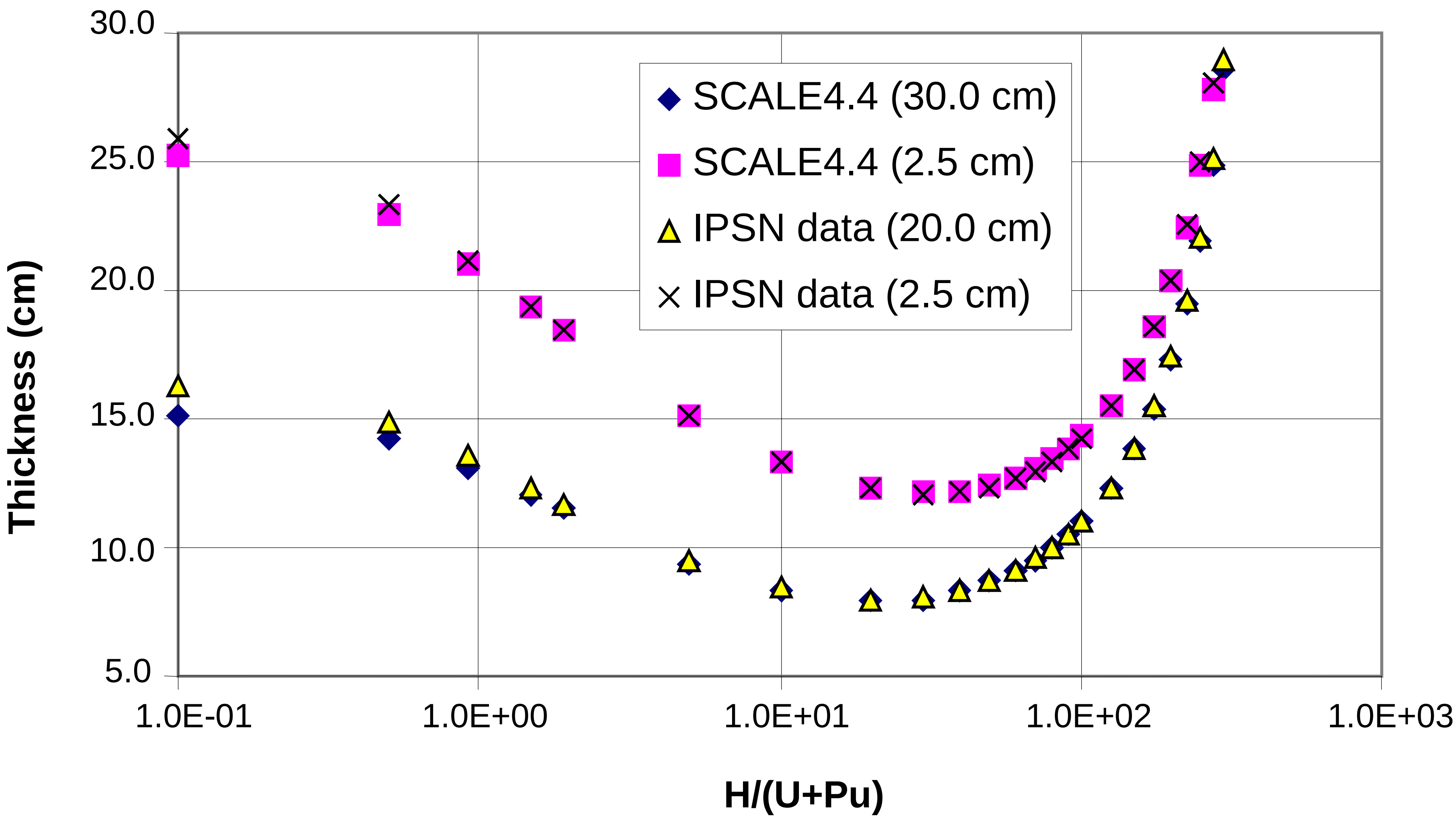

Fig. A.1.b.9-2. Slab thickness [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

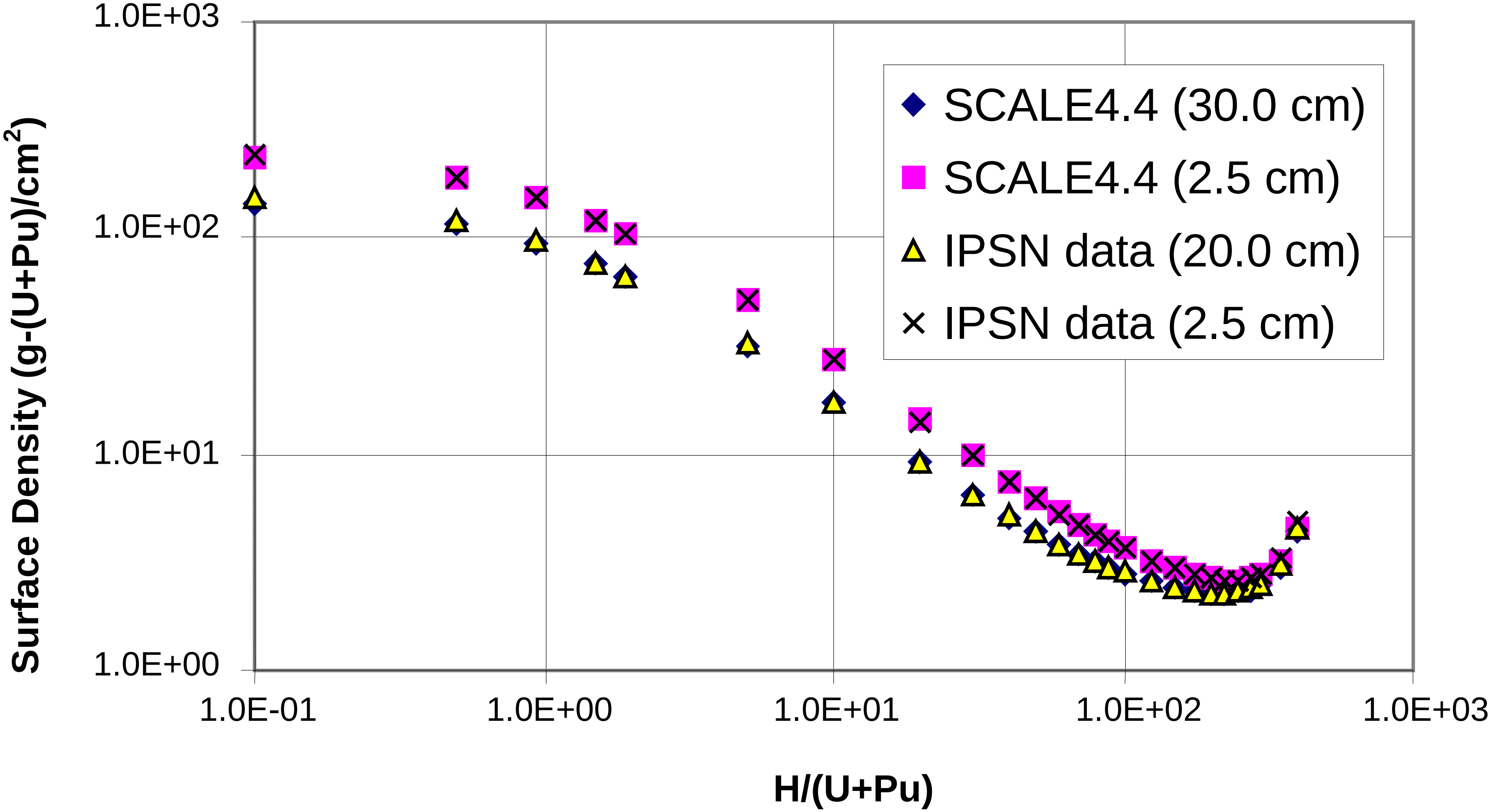

Fig. A.1.b.10. Surface density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

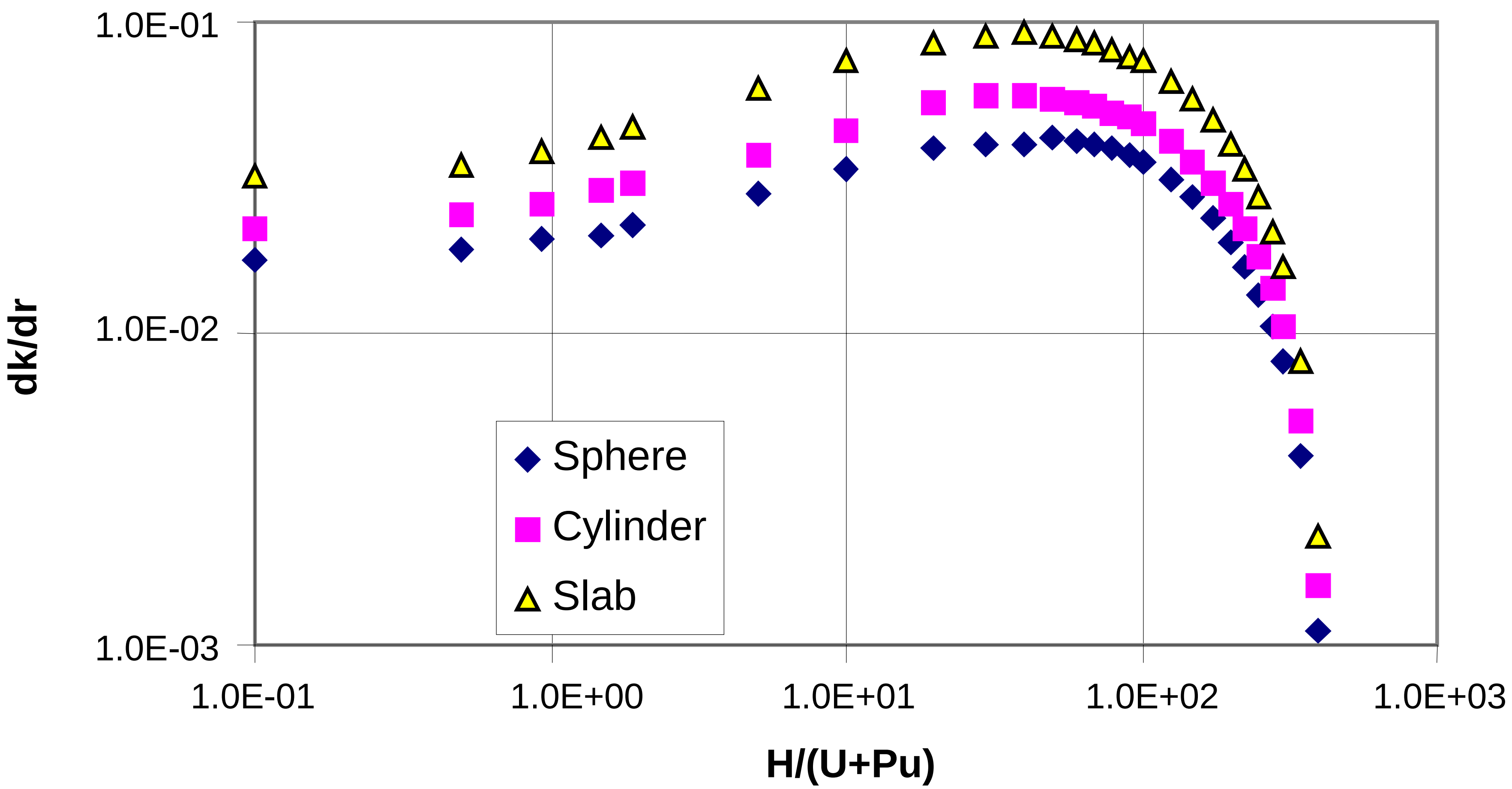

Fig. A.1.b.11. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 30.0 cm].

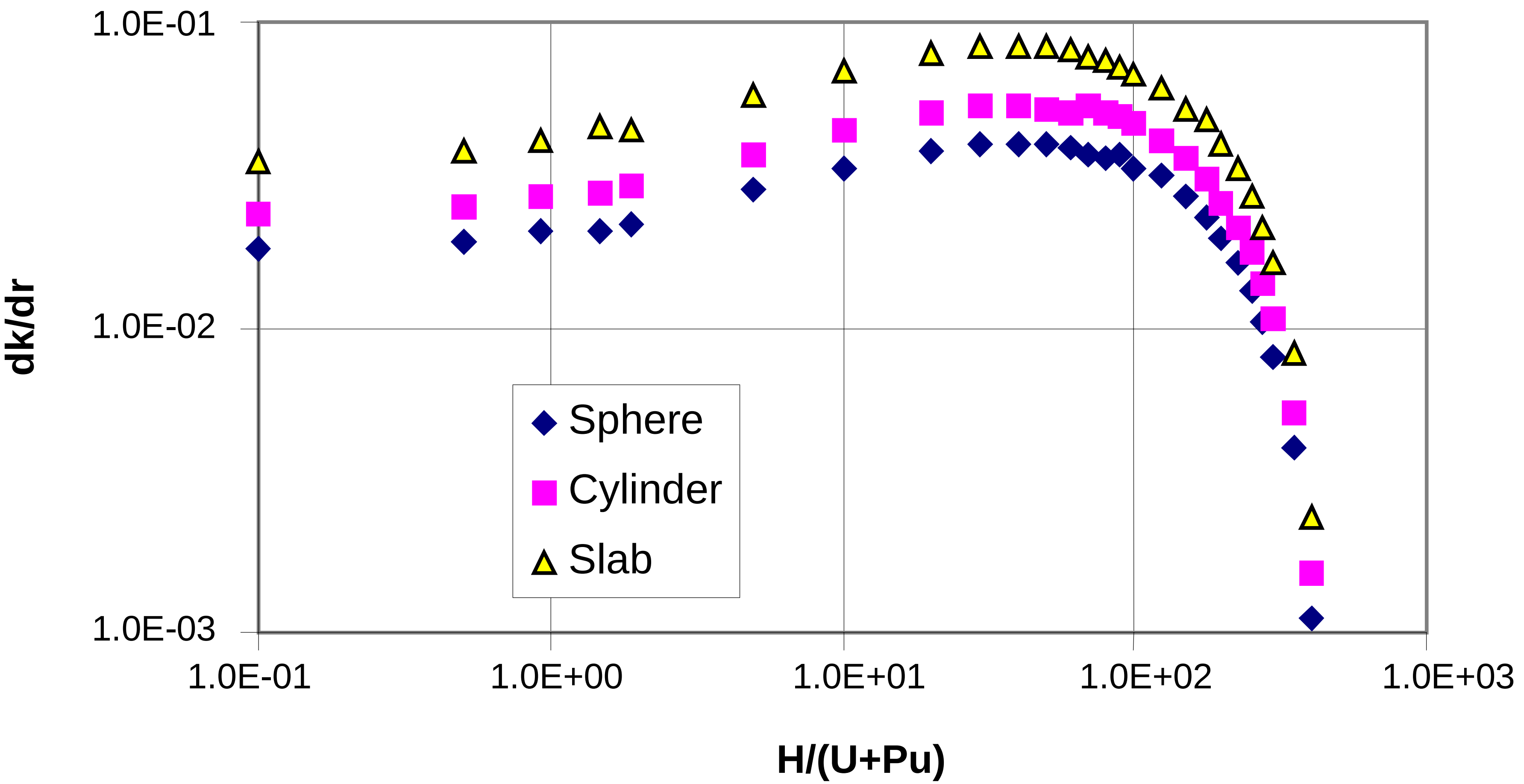

Fig. A.1.b.12. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 2.5 cm].

Table A.1.c.1. MOX data [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**100.000**	**0.000**	**0.000**	**0.000**

Fissile material oxide density
3.5 g ($UO_2 + PuO_2$)/cm^3

Water reflector
30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08546	3.50000	1.44221	8.594E-04	71.123	5.082E-03	1507.026	4649.865	5274.590	96.350	6.748E-03	22496.214	45.953	1.062E-02	141.787
0.5	1.64	3.08546	3.50000	1.41430	1.312E-03	58.599	6.416E-03	842.867	2600.632	2950.036	79.479	8.329E-03	15307.934	37.823	1.322E-02	116.702
0.928	3.00	3.08546	3.50000	1.41747	1.913E-03	48.653	8.072E-03	482.408	1488.451	1688.429	65.766	1.047E-02	10481.363	30.884	1.651E-02	95.292
1.5	4.76	3.08546	3.50000	1.42991	2.891E-03	39.605	1.026E-02	260.223	802.906	910.780	53.275	1.363E-02	6877.962	24.499	2.120E-02	75.592
1.916	6.00	3.08546	3.50000	1.43998	3.730E-03	34.894	1.218E-02	177.961	549.093	622.865	46.810	1.593E-02	5309.997	21.235	2.439E-02	65.520
5.84	16.30	3.08546	3.50000	1.51591	1.725E-02	16.680	3.096E-02	19.438	59.976	68.034	22.002	4.084E-02	1173.140	9.056	6.348E-02	27.942
10	25.00	2.07877	2.35779	1.56444	1.961E-02	15.509	3.392E-02	15.626	32.482	36.842	20.374	4.515E-02	677.718	8.300	7.448E-02	17.254
20	40.01	1.16380	1.32001	1.62277	2.205E-02	14.606	3.890E-02	13.052	15.190	17.229	19.196	5.487E-02	336.804	7.891	8.638E-02	9.184
30	50.01	0.80811	0.91658	1.64390	2.280E-02	14.465	4.062E-02	12.677	10.245	11.620	19.090	5.735E-02	231.298	**8.008**	9.067E-02	6.472
40	57.15	0.61894	0.70202	1.64751	2.284E-02	**14.583**	4.085E-02	**12.991**	8.041	9.120	**19.343**	5.772E-02	181.886	8.294	9.135E-02	5.134
50	62.51	0.50154	0.56886	1.64143	2.252E-02	14.828	4.287E-02	13.656	6.849	7.768	19.769	5.695E-02	153.944	8.658	9.013E-02	4.342
60	66.67	0.42157	0.47816	1.62954	2.200E-02	15.148	4.183E-02	14.558	6.137	6.961	20.297	5.555E-02	136.397	9.067	8.781E-02	3.822
70	70.00	0.36360	0.41240	1.61402	2.137E-02	15.514	4.050E-02	15.640	5.687	6.450	20.887	5.376E-02	124.590	9.504	8.486E-02	3.456
80	72.73	0.31964	0.36254	1.59617	2.065E-02	15.927	3.897E-02	16.924	5.409	6.136	21.543	5.170E-02	116.506	9.971	8.153E-02	3.187
90	75.00	0.28517	0.32345	1.57688	1.990E-02	16.368	3.736E-02	18.367	5.238	5.941	22.235	4.952E-02	110.733	10.457	7.795E-02	2.982
100	76.93	0.25741	0.29196	1.55668	1.914E-02	16.836	3.568E-02	19.990	**5.146**	**5.836**	22.968	4.726E-02	106.646	10.962	7.429E-02	2.822
125	80.65	0.20702	0.23481	1.50448	1.720E-02	18.123	3.143E-02	24.933	5.162	5.854	24.963	4.157E-02	**101.319**	12.317	6.506E-02	2.550
150	83.34	0.17313	0.19637	1.45229	1.532E-02	19.574	2.729E-02	31.415	5.439	6.169	27.198	3.512E-02	100.584	13.813	5.613E-02	2.392
175	85.37	0.14878	0.16875	1.40162	1.352E-02	21.211	2.336E-02	39.974	5.947	6.746	29.711	3.080E-02	103.151	15.433	4.801E-02	**2.296**
200	86.96	0.13043	0.14794	1.35315	1.183E-02	23.073	1.972E-02	51.455	6.711	7.612	32.563	2.596E-02	108.622	17.281	4.039E-02	2.254
225	88.24	0.11611	0.13169	1.30710	1.024E-02	25.219	1.636E-02	67.185	7.801	8.848	35.845	2.152E-02	117.167	19.426	3.336E-02	2.256
250	89.29	0.10462	0.11866	1.26351	8.749E-03	27.737	1.331E-02	89.385	9.351	10.607	39.692	1.749E-02	129.455	21.903	2.708E-02	2.292
275	90.17	0.09521	0.10799	1.22236	7.356E-03	30.753	1.056E-02	121.828	11.599	13.156	44.301	1.386E-02	146.755	24.893	2.141E-02	2.370
300	90.91	0.08734	0.09906	1.18352	6.048E-03	34.487	8.096E-03	171.808	15.006	17.020	50.005	1.061E-02	171.523	28.595	1.636E-02	2.498
350	92.11	0.07496	0.08502	1.11224	3.674E-03	45.845	4.045E-03	403.605	30.254	34.315	67.363	5.271E-03	267.151	39.867	8.123E-03	2.988
400	93.02	0.06566	0.07447	1.04858	1.580E-03	72.965	1.099E-03	1627.175	106.840	121.181	108.846	1.558E-03	610.960	66.881	2.213E-03	**4.391**
430	93.480	0.06100	0.06919	1.01363												
435	93.550	0.06031	0.06841	1.00800												
440	93.618	0.05962	0.06762	1.00245												
441	93.632	0.05949	0.06748	1.00135												
442	93.645	0.05935	0.06732	1.00025												
443	**93.659**	**0.05922**	**0.06717**	**0.99915**												
444	93.672	0.05909	0.06702	0.99805												
445	93.686	0.05896	0.06687	0.99695												
450	93.751	0.05840	0.06624	0.99153												

* [grey shading] means the data are the same as the data of Table A.1.b.1.

Table A.1.c.2. MOX data [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**100.000**	**0.000**	**0.000**	**0.000**

Fissile material oxide density
5.5 g (UO_2 + PuO_2)/cm^3

Water reflector
30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	4.84858	5.50000	1.44212	2.123E-03	46.676	8.390E-03	425.952	2065.264	2342.739	63.030	1.107E-02	15128.413	29.202	1.683E-02	141.588
0.5	1.64	4.84858	5.50000	1.41431	3.239E-03	38.495	1.037E-02	238.945	1158.544	1314.198	52.028	1.322E-02	10307.939	24.029	2.059E-02	116.506
0.928	3.00	4.84858	5.50000	1.41748	4.725E-03	32.022	1.285E-02	137.542	666.881	756.479	43.139	1.670E-02	7086.640	19.603	2.536E-02	95.047
1.5	4.76	4.84858	5.50000	1.42992	7.140E-03	26.160	1.653E-02	74.987	363.581	412.429	35.066	2.171E-02	4682.595	15.560	3.318E-02	75.442
1.916	6.00	4.84858	5.50000	1.43998	9.211E-03	23.099	1.956E-02	51.629	250.325	283.958	30.873	2.572E-02	3629.579	13.475	3.910E-02	65.332
2.73	8.34	4.84858	5.50000	1.45906	1.405E-02	18.831	2.531E-02	27.971	135.622	153.843	25.044	3.321E-02	2388.349	10.616	5.065E-02	51.475
5	14.29	3.42523	3.88498	1.50283	1.661E-02	17.074	2.838E-02	20.848	71.410	80.995	22.556	3.757E-02	1368.710	9.345	6.097E-02	32.010
10	25.00	2.07877	2.35779	1.56444	1.961E-02	15.509	3.392E-02	15.626	32.482	36.842	20.374	4.515E-02	677.718	8.300	7.448E-02	17.254
20	40.01	1.16380	1.32001	1.62277	2.205E-02	14.606	3.890E-02	13.052	15.190	17.229	19.196	5.487E-02	336.804	7.891	8.638E-02	9.184
30	50.01	0.80811	0.91658	1.64390	2.280E-02	14.465	4.062E-02	12.677	10.245	11.620	19.090	5.735E-02	231.298	**8.008**	9.067E-02	6.472
40	57.15	0.61894	0.70202	1.64751	2.284E-02	**14.583**	4.085E-02	**12.991**	8.041	9.120	**19.343**	5.772E-02	181.886	8.294	9.135E-02	5.134
50	62.51	0.50154	0.56886	1.64143	2.252E-02	14.828	4.287E-02	13.656	6.849	7.768	19.769	5.695E-02	153.944	8.658	9.013E-02	4.342
60	66.67	0.42157	0.47816	1.62954	2.200E-02	15.148	4.183E-02	14.558	6.137	6.961	20.297	5.555E-02	136.397	9.067	8.781E-02	3.822
70	70.00	0.36360	0.41240	1.61402	2.137E-02	15.514	4.050E-02	15.640	5.687	6.450	20.887	5.376E-02	124.590	9.504	8.486E-02	3.456
80	72.73	0.31964	0.36254	1.59617	2.065E-02	15.927	3.897E-02	16.924	5.409	6.136	21.543	5.170E-02	116.506	9.971	8.153E-02	3.187
90	75.00	0.28517	0.32345	1.57688	1.990E-02	16.368	3.736E-02	18.367	5.238	5.941	22.235	4.952E-02	110.733	10.457	7.795E-02	2.982
100	76.93	0.25741	0.29196	1.55668	1.914E-02	16.836	3.568E-02	19.990	**5.146**	**5.836**	22.968	4.726E-02	106.646	10.962	7.429E-02	2.822
125	80.65	0.20702	0.23481	1.50448	1.720E-02	18.123	3.143E-02	24.933	5.162	5.854	24.963	4.157E-02	**101.319**	12.317	6.506E-02	2.550
150	83.34	0.17313	0.19637	1.45229	1.532E-02	19.574	2.729E-02	31.415	5.439	6.169	27.198	3.512E-02	100.584	13.813	5.613E-02	2.392
175	85.37	0.14878	0.16875	1.40162	1.352E-02	21.211	2.336E-02	39.974	5.947	6.746	29.711	3.080E-02	103.151	15.433	4.801E-02	**2.296**
200	86.96	0.13043	0.14794	1.35315	1.183E-02	23.073	1.972E-02	51.455	6.711	7.612	32.563	2.596E-02	108.622	17.281	4.039E-02	2.254
225	88.24	0.11611	0.13169	1.30710	1.024E-02	25.219	1.636E-02	67.185	7.801	8.848	35.845	2.152E-02	117.167	19.426	3.336E-02	2.256
250	89.29	0.10462	0.11866	1.26351	8.749E-03	27.737	1.331E-02	89.385	9.351	10.607	39.692	1.749E-02	129.455	21.903	2.708E-02	2.292
275	90.17	0.09521	0.10799	1.22236	7.356E-03	30.753	1.056E-02	121.828	11.599	13.156	44.301	1.386E-02	146.755	24.893	2.141E-02	2.370
300	90.91	0.08734	0.09906	1.18352	6.048E-03	34.487	8.096E-03	171.808	15.006	17.020	50.005	1.061E-02	171.523	28.595	1.636E-02	2.498
350	92.11	0.07496	0.08502	1.11224	3.674E-03	45.845	4.045E-03	403.605	30.254	34.315	67.363	5.271E-03	267.151	39.867	8.123E-03	2.988
400	93.02	0.06566	0.07447	1.04858	1.580E-03	72.965	1.099E-03	1627.175	106.840	121.181	108.846	1.558E-03	610.960	66.881	2.213E-03	**4.391**
430	93.480	0.06100	0.06919	1.01363												
435	93.550	0.06031	0.06841	1.00800												
440	93.618	0.05962	0.06762	1.00245												
441	93.632	0.05949	0.06748	1.00135												
442	93.645	0.05935	0.06732	1.00025												
443	**93.659**	**0.05922**	**0.06717**	**0.99915**												
444	93.672	0.05909	0.06702	0.99805												
445	93.686	0.05896	0.06687	0.99695												
450	93.751	0.05840	0.06624	0.99153												

* [grey shading] means the data are the same as the data of Table A.1.b.1.

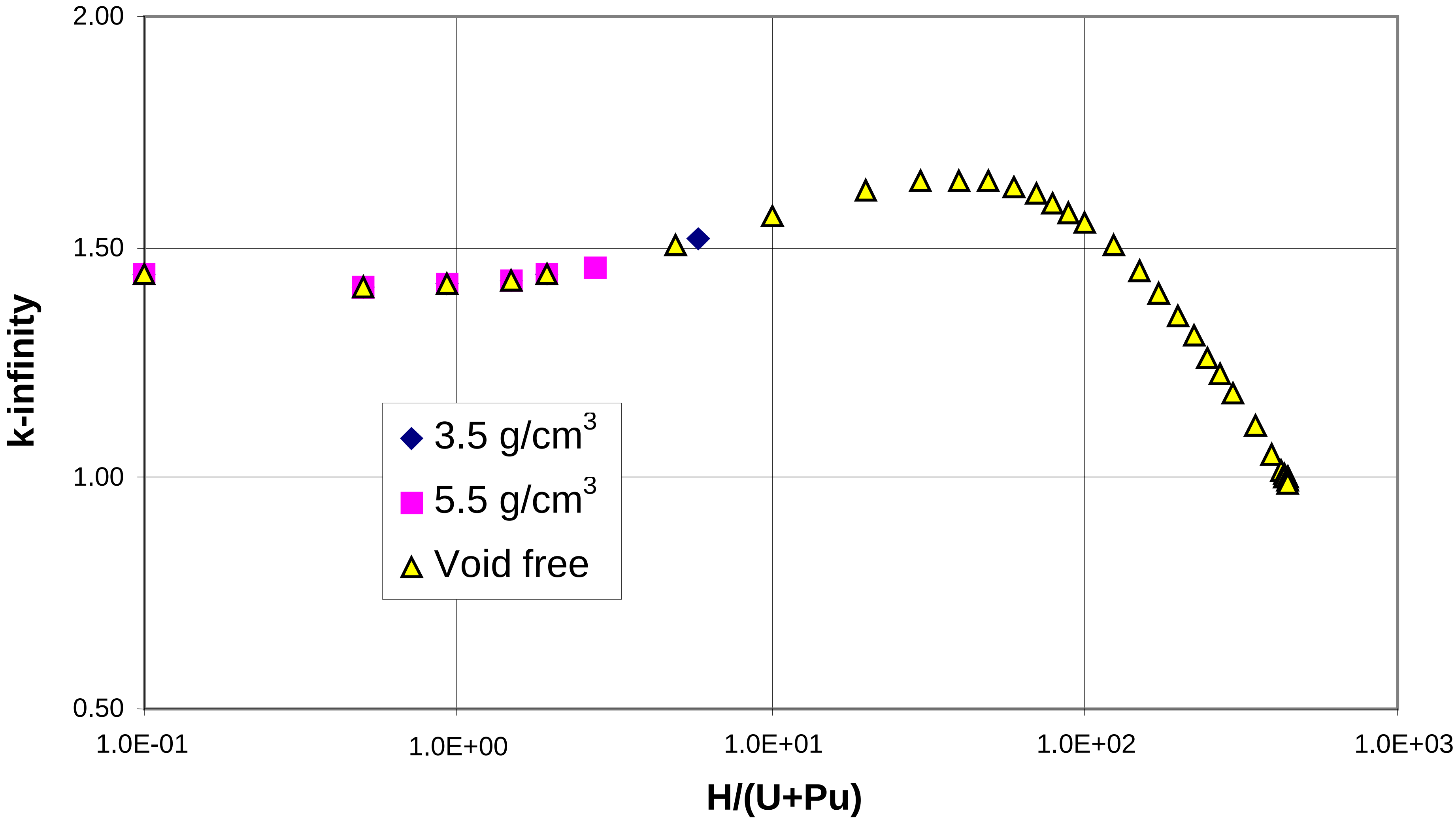

Fig. A.1.c.1. *k*-infinity [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%].

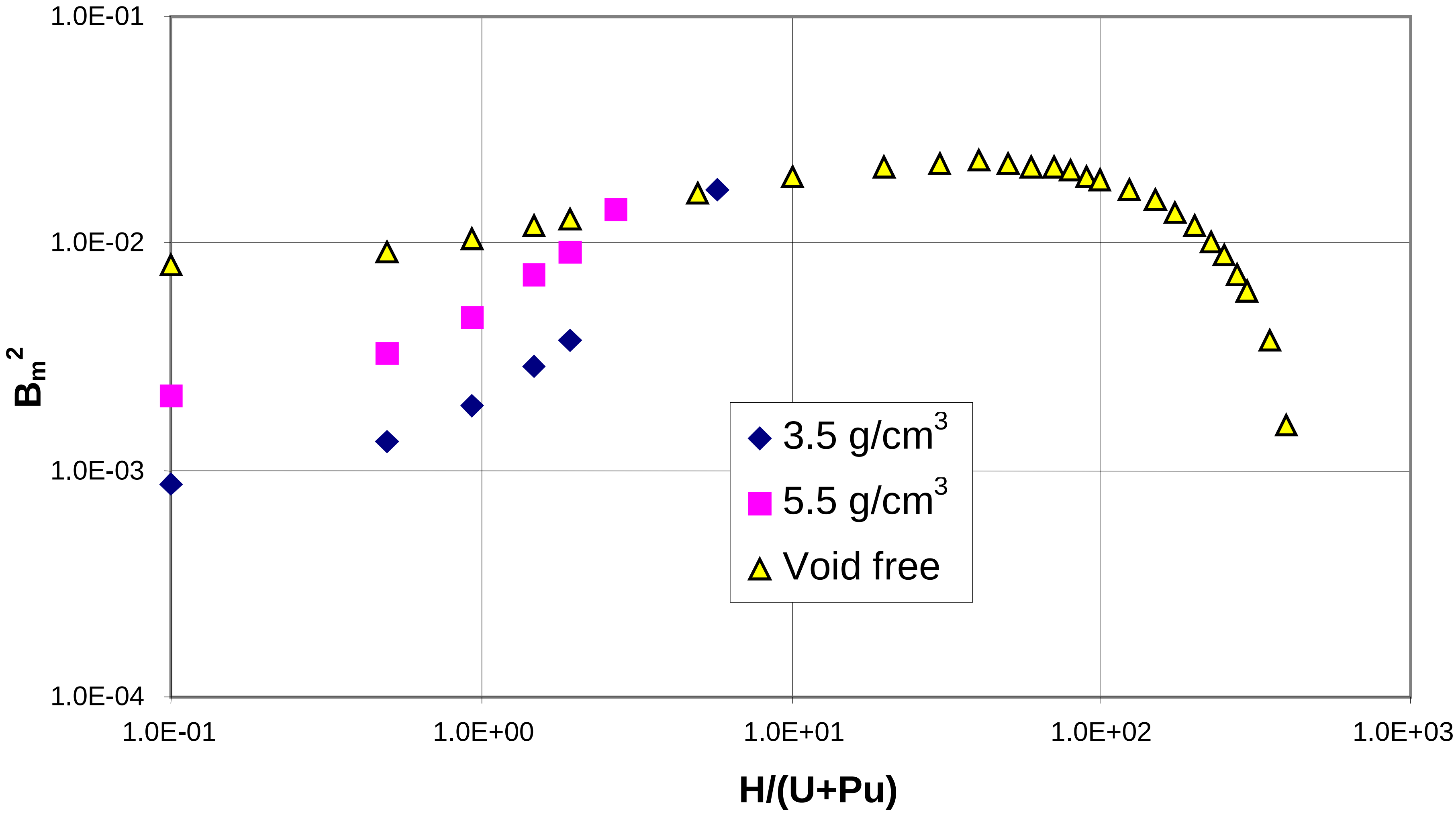

Fig. A.1.c.2. B_m^2 [${}^{235}U/U$ = 0.3%, ${}^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%].

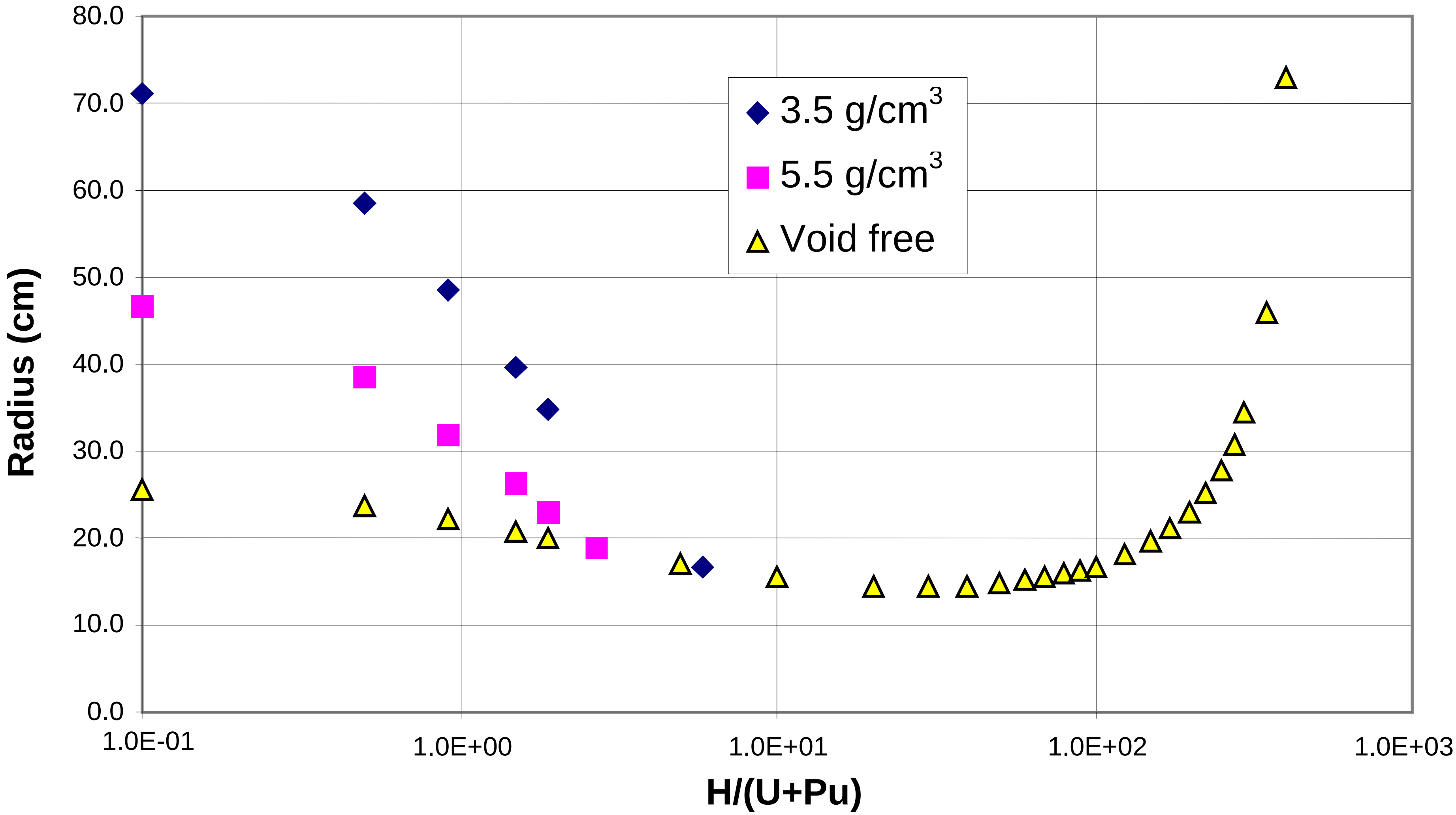

Fig. A.1.c.3. Sphere radius [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

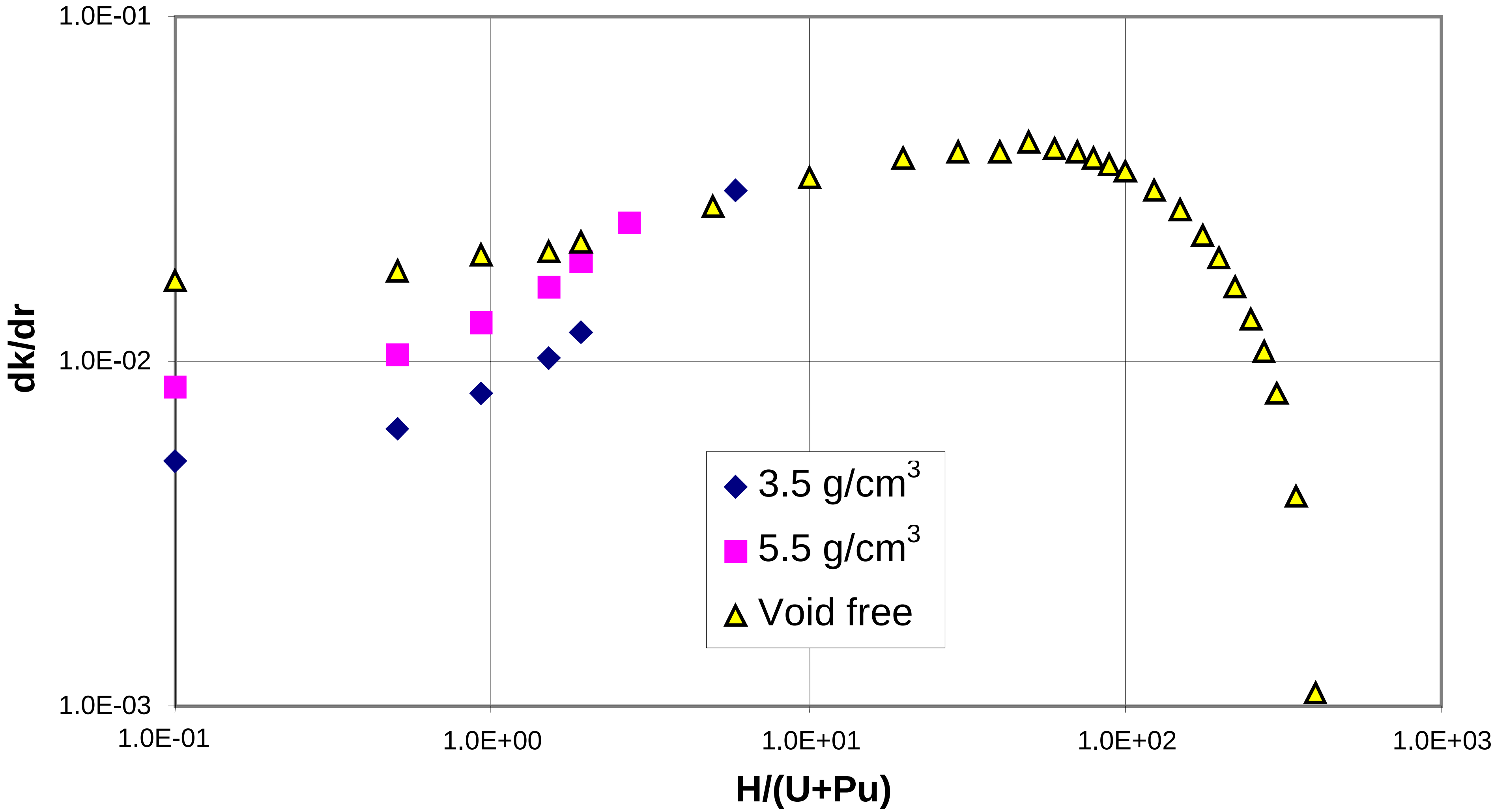

Fig. A.1.c.4. Delta lambda divided by delta dimension [sphere, $^{235}U/U = 0.3\%$, $^{239}Pu/Pu = 100\%$, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

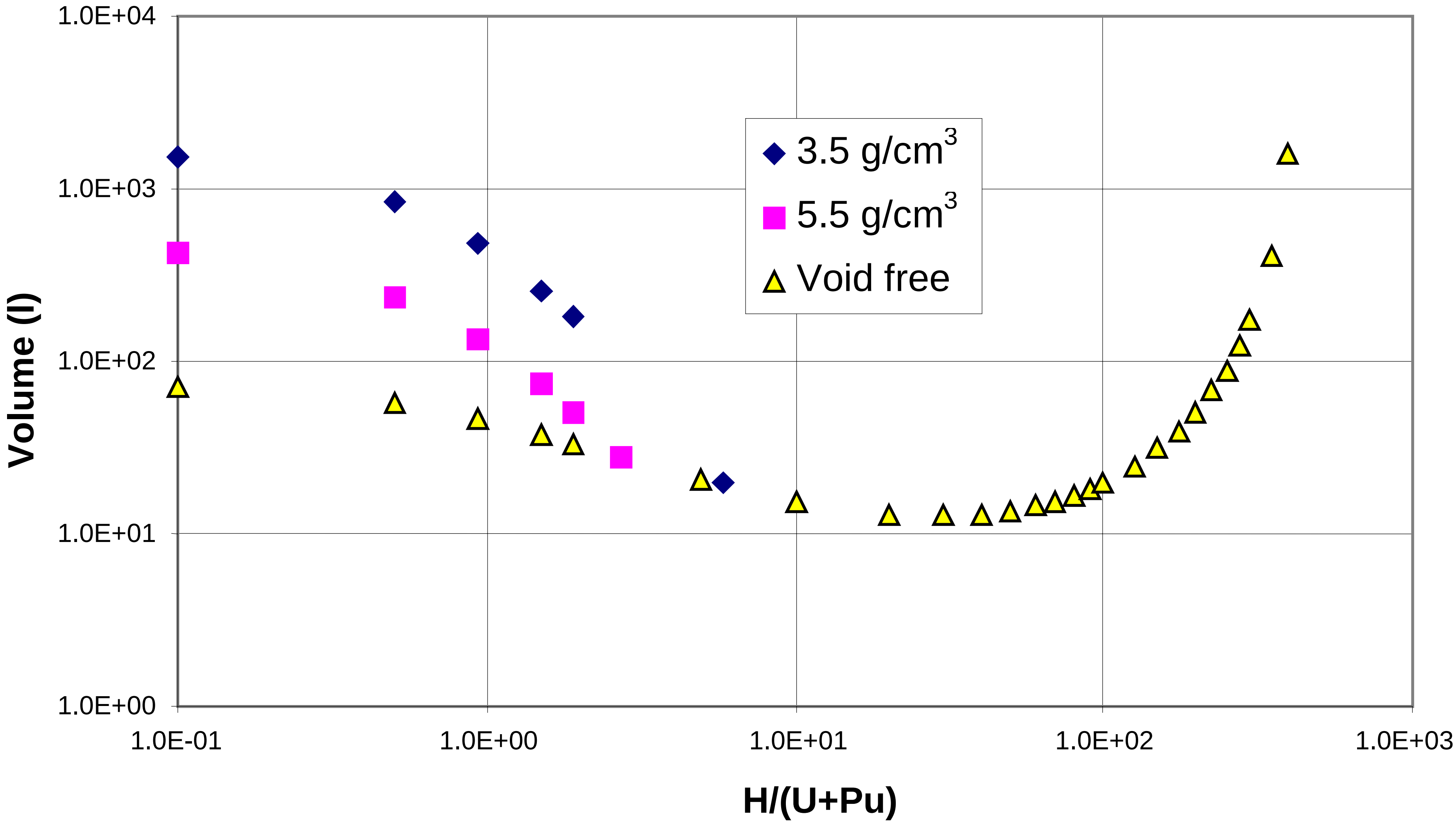

Fig. A.1.c.5. Sphere volume [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

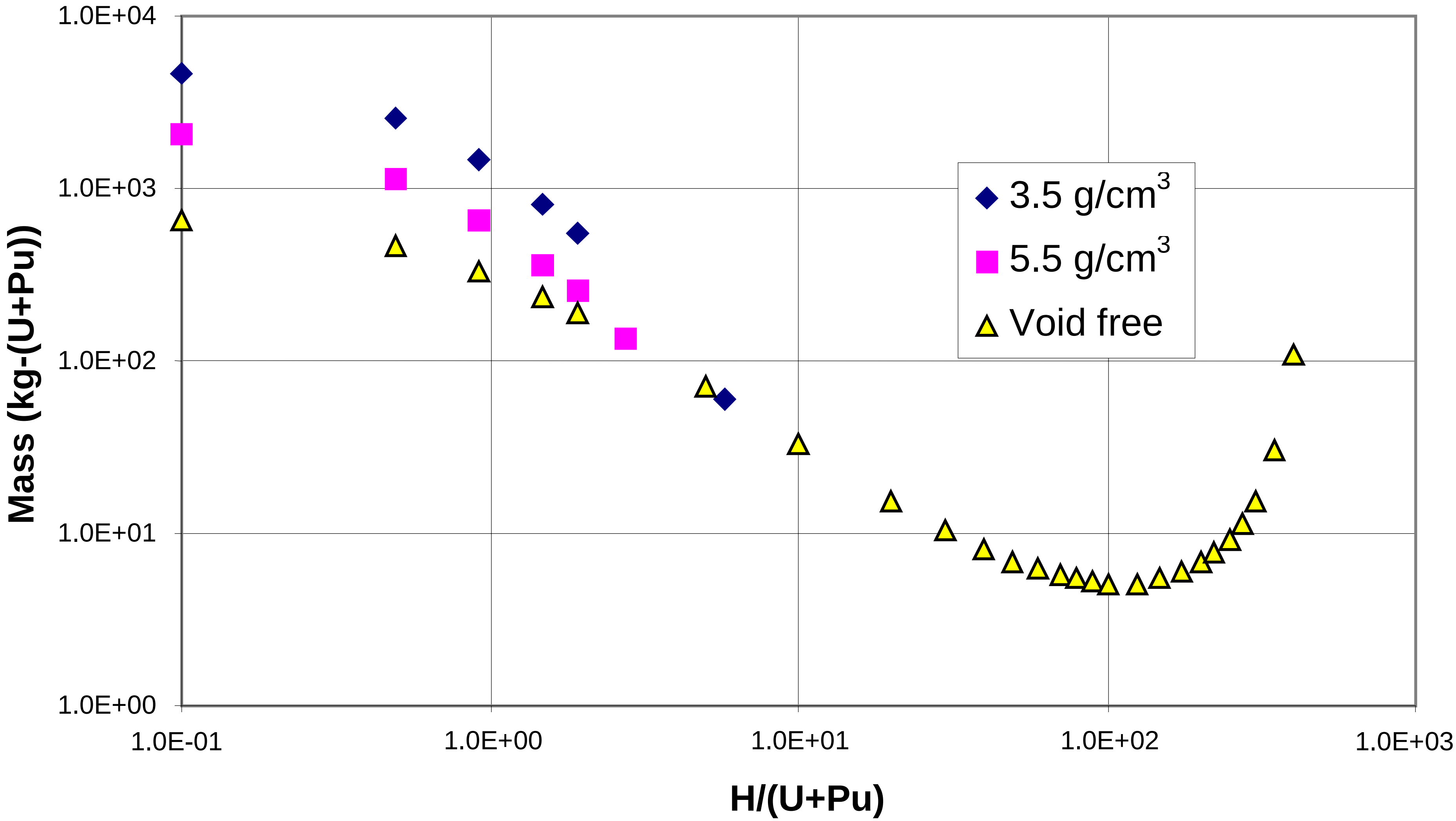

Fig. A.1.c.6. U + Pu mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

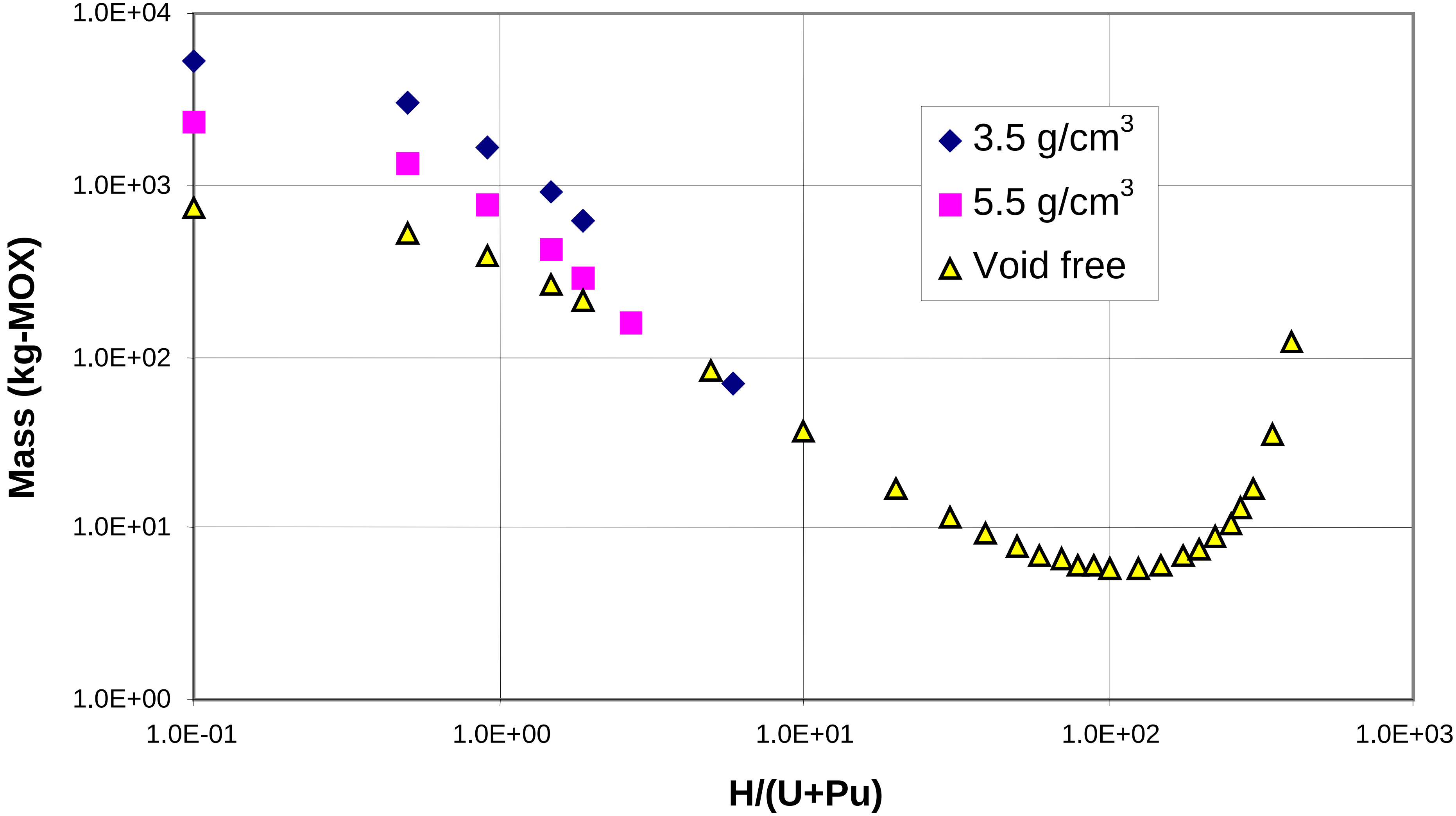

Fig. A.1.c.7. MOX mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

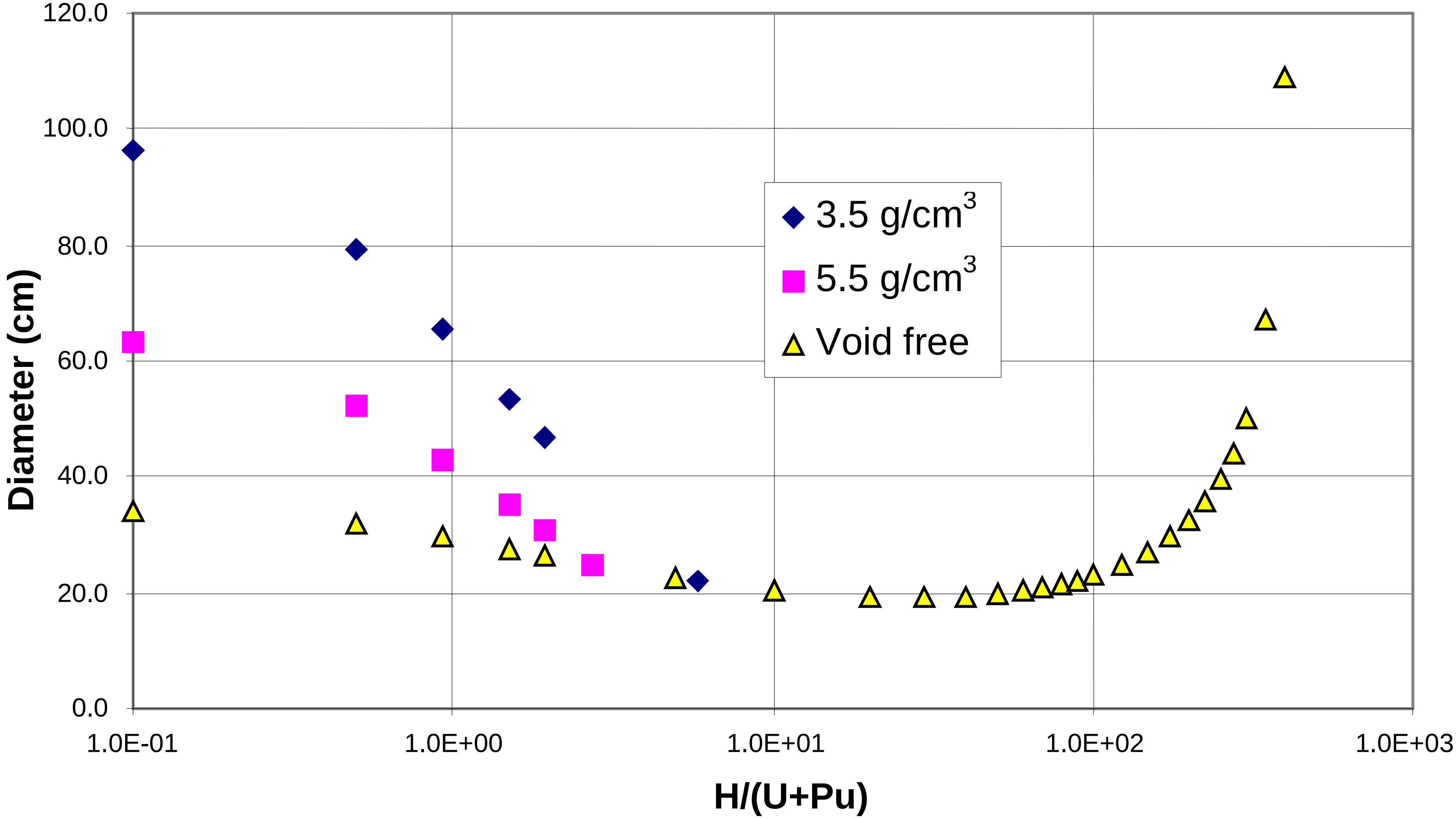

Fig. A.1.c.8. Cylinder diameter [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector 30.0 cm].

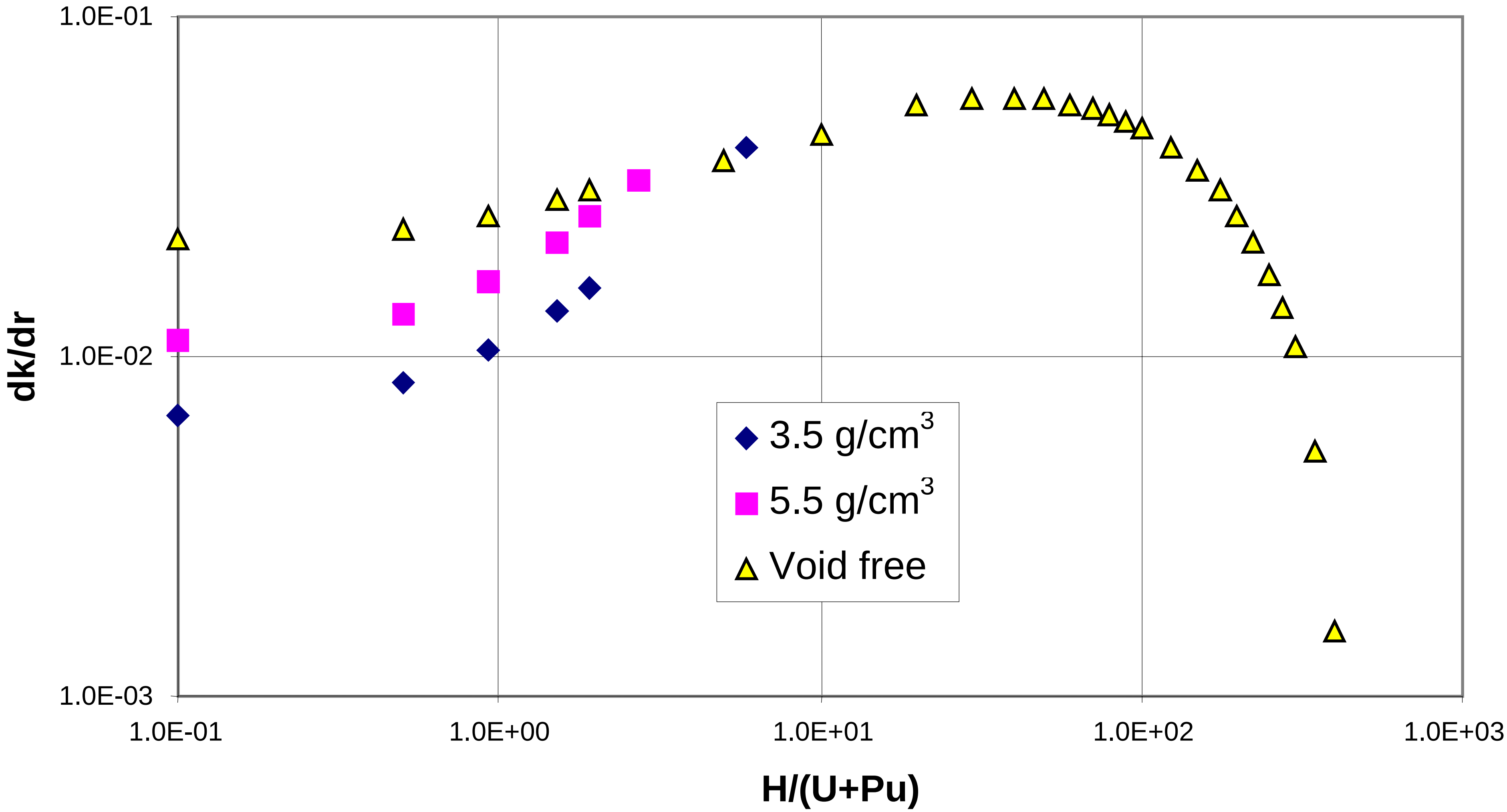

Fig. A.1.c.9. Delta lambda divided by delta dimension [cylinder, ^{235}U/U = 0.3 %, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

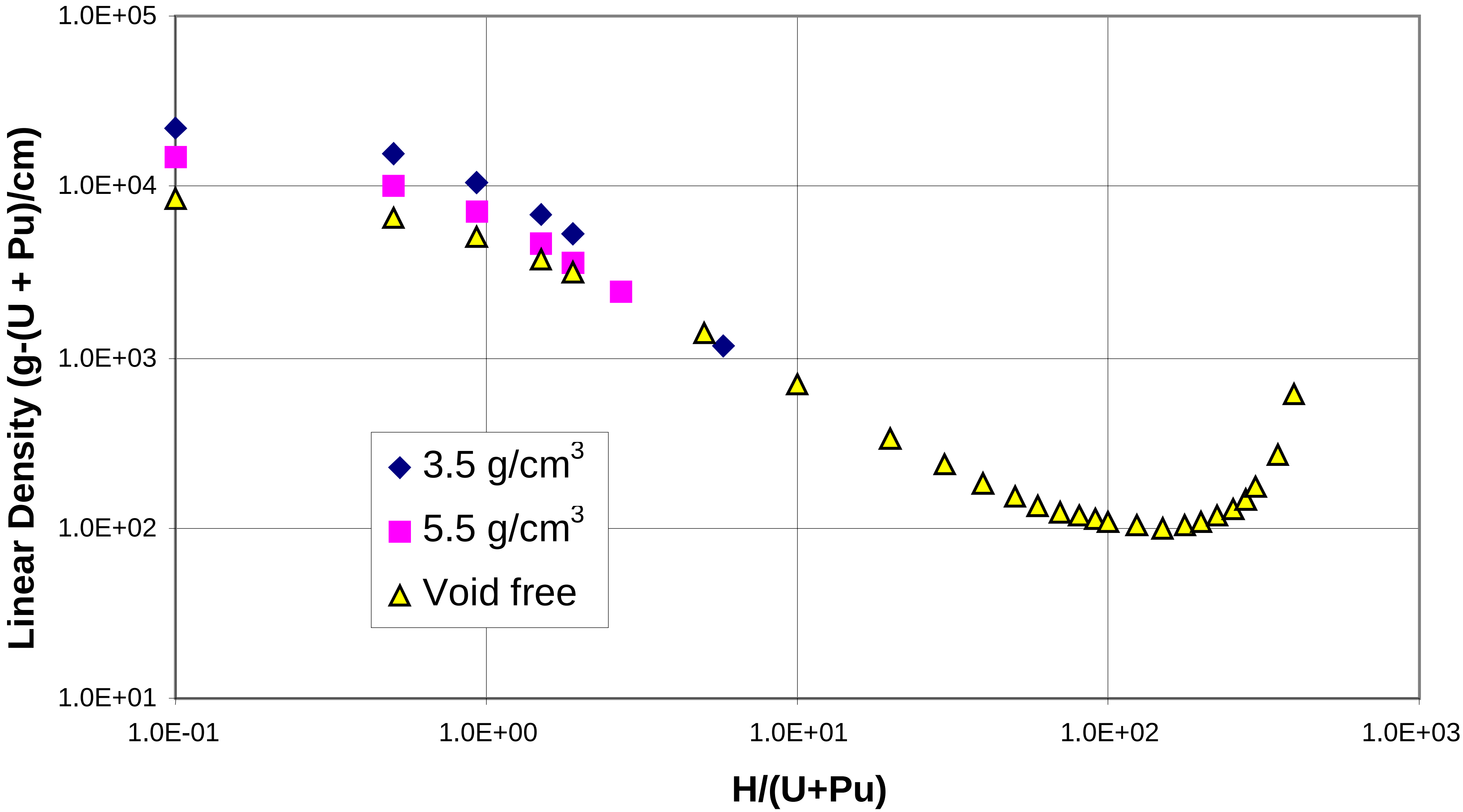

Fig. A.1.c.10. Linear density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

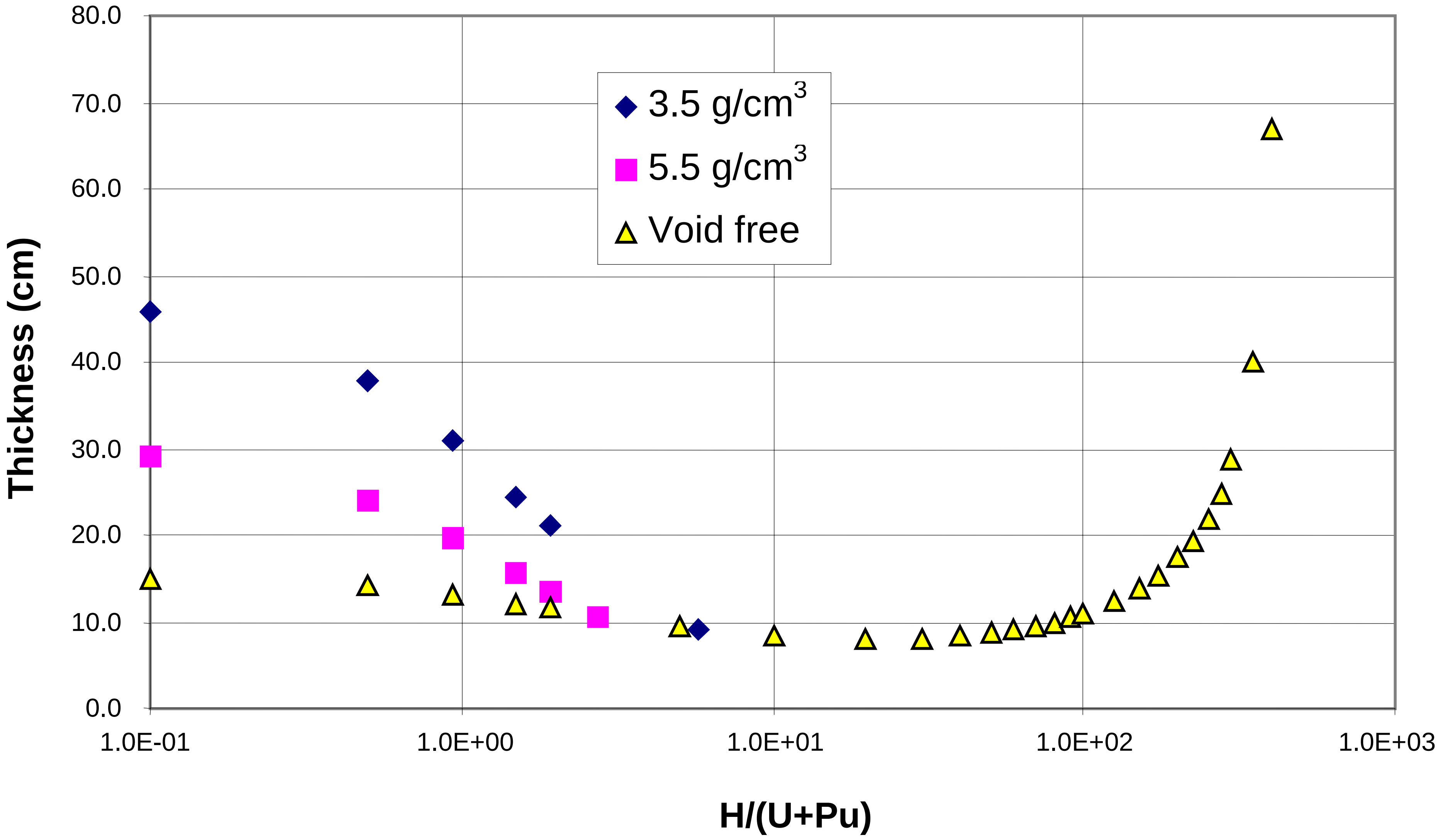

Fig. A.1.c.11. Slab thickness [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

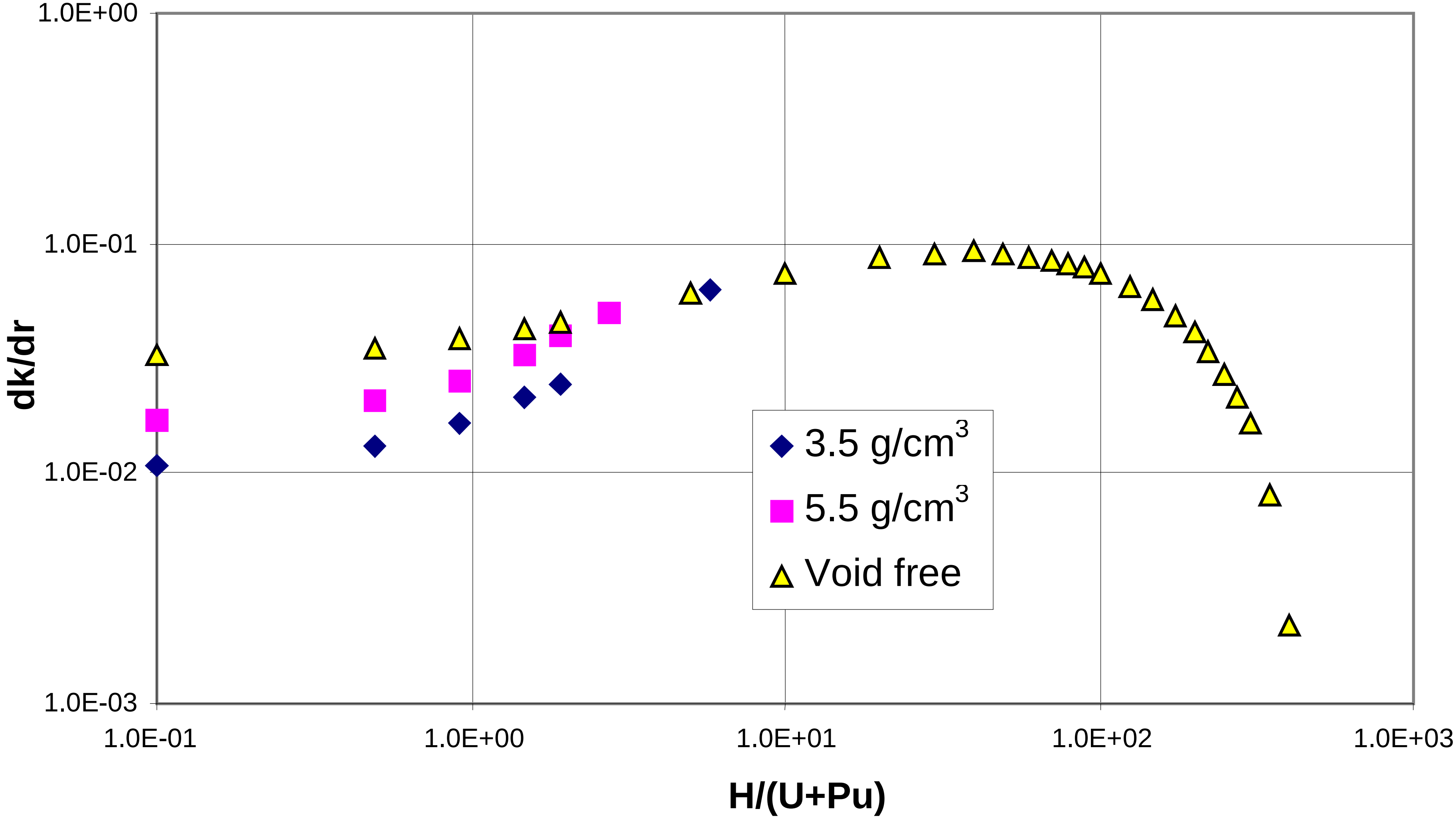

Fig. A.1.c.12. Delta lambda divided by delta dimension [slab, $^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

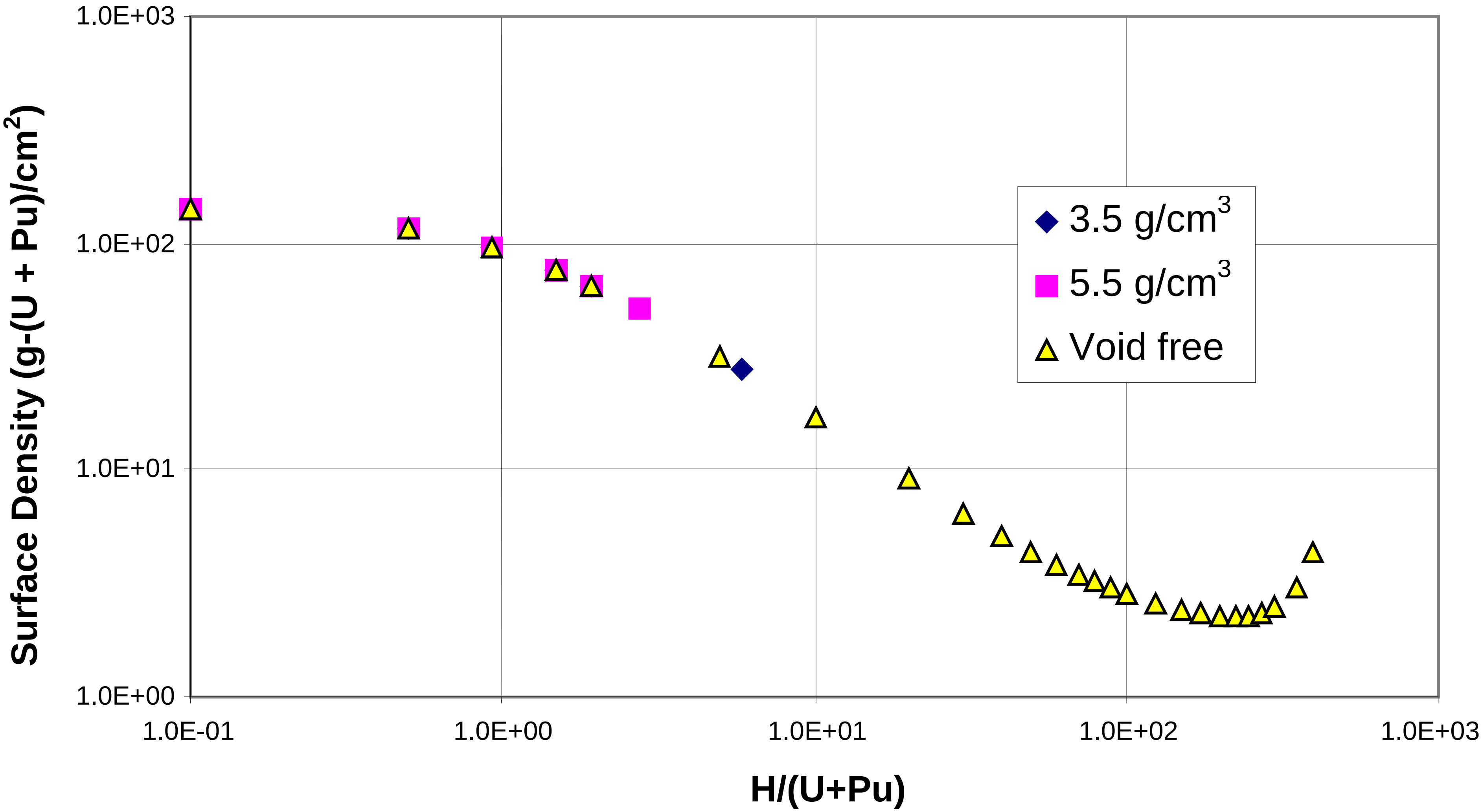

Fig. A.1.c.13. Surface density [$^{235}U/U = 0.3\%$, $^{239}Pu/Pu = 100\%$, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

Table A.1.d.1. MOX data [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**100.000**	**0.000**	**0.000**	**0.000**

Fissile material oxide density
3.5 g (UO_2 + PuO_2)/cm^3

Water reflector
2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08546	3.50000	1.44221	8.594E-04	91.244	5.860E-03	3181.968	9817.832	11136.889	132.776	7.460E-03	42721.596	76.830	1.145E-02	237.056
0.5	1.64	3.08546	3.50000	1.41430	1.312E-03	73.336	6.943E-03	1652.122	5097.553	5782.426	106.382	9.023E-03	27424.851	61.032	1.422E-02	188.311
0.928	3.00	3.08546	3.50000	1.41747	1.913E-03	60.159	8.056E-03	911.968	2813.840	3191.888	86.972	1.101E-02	18330.424	49.451	1.708E-02	152.579
1.5	4.76	3.08546	3.50000	1.42991	2.891E-03	48.463	1.057E-02	476.788	1471.108	1668.756	69.783	1.382E-02	11800.595	39.261	2.177E-02	121.139
1.916	6.00	3.08546	3.50000	1.43998	3.730E-03	42.439	1.221E-02	320.166	987.858	1120.580	60.959	1.561E-02	9005.032	34.075	2.533E-02	105.136
5.84	16.30	3.08546	3.50000	1.51591	1.725E-02	19.329	3.052E-02	30.249	93.333	105.873	27.407	4.014E-02	1820.203	14.683	6.231E-02	45.305
10	25.00	2.07877	2.35779	1.56444	1.961E-02	17.904	3.316E-02	24.041	49.976	56.684	25.255	4.388E-02	1041.303	13.352	6.902E-02	27.756
20	40.01	1.16380	1.32001	1.62277	2.205E-02	16.709	3.792E-02	19.539	22.739	25.792	23.475	5.031E-02	503.726	12.309	7.936E-02	14.325
30	50.01	0.80811	0.91658	1.64390	2.280E-02	**16.414**	3.960E-02	**18.525**	14.970	16.980	**23.057**	5.259E-02	337.422	**12.126**	8.279E-02	9.799
40	57.15	0.61894	0.70202	1.64751	2.284E-02	16.435	3.986E-02	18.593	11.508	13.053	23.110	5.296E-02	259.611	12.196	8.343E-02	7.548
50	62.51	0.50154	0.56886	1.64143	2.252E-02	16.609	3.937E-02	19.193	9.626	10.918	23.392	5.229E-02	215.549	12.408	8.236E-02	6.223
60	66.67	0.42157	0.47816	1.62954	2.200E-02	16.877	3.842E-02	20.135	8.488	9.628	23.813	5.103E-02	187.747	12.703	8.033E-02	5.355
70	70.00	0.36360	0.41240	1.61402	2.137E-02	17.201	3.721E-02	21.319	7.752	8.792	24.318	5.269E-02	168.874	13.050	7.771E-02	4.745
80	72.73	0.31964	0.36254	1.59617	2.065E-02	17.582	3.581E-02	22.767	7.277	8.254	24.906	5.074E-02	155.723	13.448	7.470E-02	4.298
90	75.00	0.28517	0.32345	1.57688	1.990E-02	17.996	3.682E-02	24.411	6.961	7.896	25.542	4.867E-02	146.120	13.875	7.147E-02	3.957
100	76.93	0.25741	0.29196	1.55668	1.914E-02	18.441	3.277E-02	26.271	6.762	7.670	26.227	4.651E-02	139.065	14.332	6.815E-02	3.689
125	80.65	0.20702	0.23481	1.50448	1.720E-02	19.685	3.109E-02	31.952	**6.615**	**7.503**	28.132	4.102E-02	128.680	15.533	6.002E-02	3.216
150	83.34	0.17313	0.19637	1.45229	1.532E-02	21.106	2.703E-02	39.383	6.818	7.734	30.303	3.564E-02	**124.863**	16.957	5.182E-02	2.936
175	85.37	0.14878	0.16875	1.40162	1.352E-02	22.722	2.319E-02	49.136	7.310	8.292	32.769	3.054E-02	125.475	18.531	4.747E-02	2.757
200	86.96	0.13043	0.14794	1.35315	1.183E-02	24.568	1.960E-02	62.115	8.102	9.189	35.586	2.578E-02	129.724	20.341	4.003E-02	2.653
225	88.24	0.11611	0.13169	1.30710	1.024E-02	26.702	1.629E-02	79.749	9.260	10.503	38.841	2.140E-02	137.575	22.439	3.318E-02	**2.605**
250	89.29	0.10462	0.11866	1.26351	8.749E-03	29.212	1.326E-02	104.412	10.924	12.390	42.669	1.742E-02	149.599	24.912	2.695E-02	2.606
275	90.17	0.09521	0.10799	1.22236	7.356E-03	32.221	1.054E-02	140.117	13.340	15.131	47.262	1.382E-02	167.031	27.884	2.133E-02	2.655
300	90.91	0.08734	0.09906	1.18352	6.048E-03	35.950	8.085E-03	194.626	16.999	19.280	52.955	1.060E-02	192.364	31.567	1.633E-02	2.757
350	92.11	0.07496	0.08502	1.11224	3.674E-03	47.305	4.034E-03	443.403	33.237	37.699	70.301	5.288E-03	290.969	42.825	8.122E-03	3.210
400	93.02	0.06566	0.07447	1.04858	1.580E-03	74.428	1.123E-03	1727.049	113.398	128.619	111.783	1.553E-03	644.380	69.835	2.396E-03	4.585
430	93.480	0.06100	0.06919	1.01363												
435	93.550	0.06031	0.06841	1.00800												
440	93.618	0.05962	0.06762	1.00245												
441	93.632	0.05949	0.06748	1.00135												
442	93.645	0.05935	0.06732	1.00025												
443	**93.659**	**0.05922**	**0.06717**	**0.99915**												
444	93.672	0.05909	0.06702	0.99805												
445	93.686	0.05896	0.06687	0.99695												
450	93.751	0.05840	0.06624	0.99153												

* [grey shading] means the data are the same as the data of Table A.1.b.2.

Table A.1.d.2. MOX data [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**100.000**	**0.000**	**0.000**	**0.000**

Fissile material oxide density
5.5 g (UO_2 + PuO_2)/cm^3

Water reflector
2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	4.84858	5.50000	1.44212	2.123E-03	58.254	9.155E-03	828.051	4014.868	4554.279	84.731	1.178E-02	27339.267	48.889	1.800E-02	237.041
0.5	1.64	4.84858	5.50000	1.41431	3.239E-03	46.854	1.059E-02	430.847	2088.995	2369.658	67.930	1.419E-02	17572.461	38.824	2.191E-02	188.243
0.928	3.00	4.84858	5.50000	1.41748	4.725E-03	38.463	1.320E-02	238.357	1155.693	1310.964	55.578	1.751E-02	11762.614	31.449	2.634E-02	152.485
1.5	4.76	4.84858	5.50000	1.42992	7.140E-03	31.028	1.686E-02	125.125	606.681	688.190	44.638	2.194E-02	7587.762	24.975	3.481E-02	121.091
1.916	6.00	4.84858	5.50000	1.43998	9.211E-03	27.189	1.984E-02	84.191	408.205	463.048	39.027	2.537E-02	5800.148	21.665	3.919E-02	105.043
2.73	8.34	4.84858	5.50000	1.45906	1.405E-02	21.873	2.513E-02	43.832	212.525	241.079	31.271	3.287E-02	3723.765	17.142	5.024E-02	83.114
5	14.29	3.42523	3.88498	1.50283	1.661E-02	19.794	2.792E-02	32.484	111.267	126.202	28.107	3.684E-02	2125.243	15.133	5.757E-02	51.833
10	25.00	2.07877	2.35779	1.56444	1.961E-02	17.904	3.316E-02	24.041	49.976	56.684	25.255	4.388E-02	1041.303	13.352	6.902E-02	27.756
20	40.01	1.16380	1.32001	1.62277	2.205E-02	16.709	3.792E-02	19.539	22.739	25.792	23.475	5.031E-02	503.726	12.309	7.936E-02	14.325
30	50.01	0.80811	0.91658	1.64390	2.280E-02	**16.414**	3.960E-02	**18.525**	14.970	16.980	**23.057**	5.259E-02	337.422	**12.126**	8.279E-02	9.799
40	57.15	0.61894	0.70202	1.64751	2.284E-02	16.435	3.986E-02	18.593	11.508	13.053	23.110	5.296E-02	259.611	12.196	8.343E-02	7.548
50	62.51	0.50154	0.56886	1.64143	2.252E-02	16.609	3.937E-02	19.193	9.626	10.918	23.392	5.229E-02	215.549	12.408	8.236E-02	6.223
60	66.67	0.42157	0.47816	1.62954	2.200E-02	16.877	3.842E-02	20.135	8.488	9.628	23.813	5.103E-02	187.747	12.703	8.033E-02	5.355
70	70.00	0.36360	0.41240	1.61402	2.137E-02	17.201	3.721E-02	21.319	7.752	8.792	24.318	5.269E-02	168.874	13.050	7.771E-02	4.745
80	72.73	0.31964	0.36254	1.59617	2.065E-02	17.582	3.581E-02	22.767	7.277	8.254	24.906	5.074E-02	155.723	13.448	7.470E-02	4.298
90	75.00	0.28517	0.32345	1.57688	1.990E-02	17.996	3.682E-02	24.411	6.961	7.896	25.542	4.867E-02	146.120	13.875	7.147E-02	3.957
100	76.93	0.25741	0.29196	1.55668	1.914E-02	18.441	3.277E-02	26.271	6.762	7.670	26.227	4.651E-02	139.065	14.332	6.815E-02	3.689
125	80.65	0.20702	0.23481	1.50448	1.720E-02	19.685	3.109E-02	31.952	**6.615**	**7.503**	28.132	4.102E-02	128.680	15.533	6.002E-02	3.216
150	83.34	0.17313	0.19637	1.45229	1.532E-02	21.106	2.703E-02	39.383	6.818	7.734	30.303	3.564E-02	**124.863**	16.957	5.182E-02	2.936
175	85.37	0.14878	0.16875	1.40162	1.352E-02	22.722	2.319E-02	49.136	7.310	8.292	32.769	3.054E-02	125.475	18.531	4.747E-02	2.757
200	86.96	0.13043	0.14794	1.35315	1.183E-02	24.568	1.960E-02	62.115	8.102	9.189	35.586	2.578E-02	129.724	20.341	4.003E-02	2.653
225	88.24	0.11611	0.13169	1.30710	1.024E-02	26.702	1.629E-02	79.749	9.260	10.503	38.841	2.140E-02	137.575	22.439	3.318E-02	**2.605**
250	89.29	0.10462	0.11866	1.26351	8.749E-03	29.212	1.326E-02	104.412	10.924	12.390	42.669	1.742E-02	149.599	24.912	2.695E-02	2.606
275	90.17	0.09521	0.10799	1.22236	7.356E-03	32.221	1.054E-02	140.117	13.340	15.131	47.262	1.382E-02	167.031	27.884	2.133E-02	2.655
300	90.91	0.08734	0.09906	1.18352	6.048E-03	35.950	8.085E-03	194.626	16.999	19.280	52.955	1.060E-02	192.364	31.567	1.633E-02	2.757
350	92.11	0.07496	0.08502	1.11224	3.674E-03	47.305	4.034E-03	443.403	33.237	37.699	70.301	5.288E-03	290.969	42.825	8.122E-03	3.210
400	93.02	0.06566	0.07447	1.04858	1.580E-03	74.428	1.123E-03	1727.049	113.398	128.619	111.783	1.553E-03	644.380	69.835	2.396E-03	4.585
430	93.480	0.06100	0.06919	1.01363												
435	93.550	0.06031	0.06841	1.00800												
440	93.618	0.05962	0.06762	1.00245												
441	93.632	0.05949	0.06748	1.00135												
442	93.645	0.05935	0.06732	1.00025												
443	**93.659**	**0.05922**	**0.06717**	**0.99915**												
444	93.672	0.05909	0.06702	0.99805												
445	93.686	0.05896	0.06687	0.99695												
450	93.751	0.05840	0.06624	0.99153												

* [grey shading] means the data are the same as the data of Table A.1.b.2.

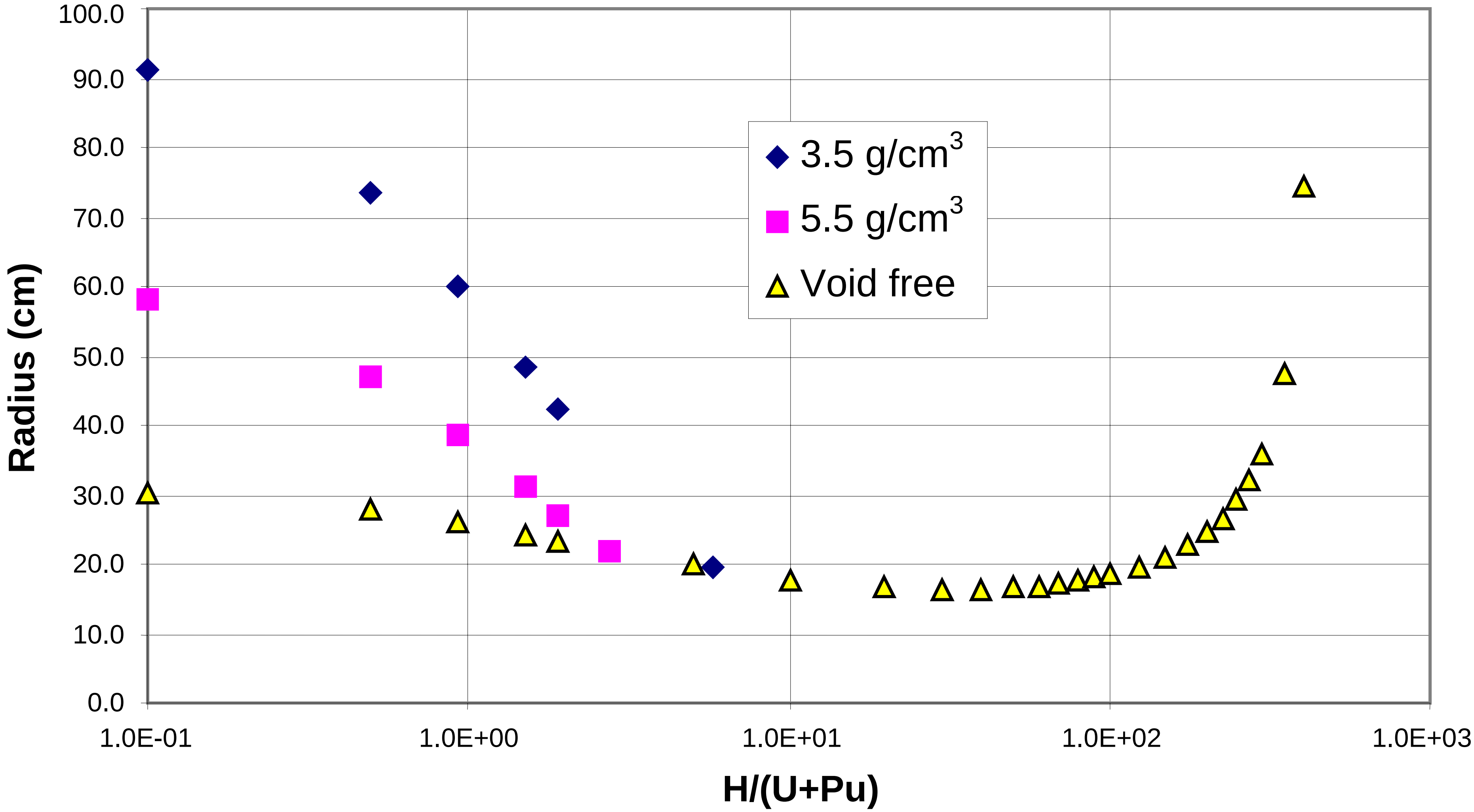

Fig. A.1.d.1. Sphere radius [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

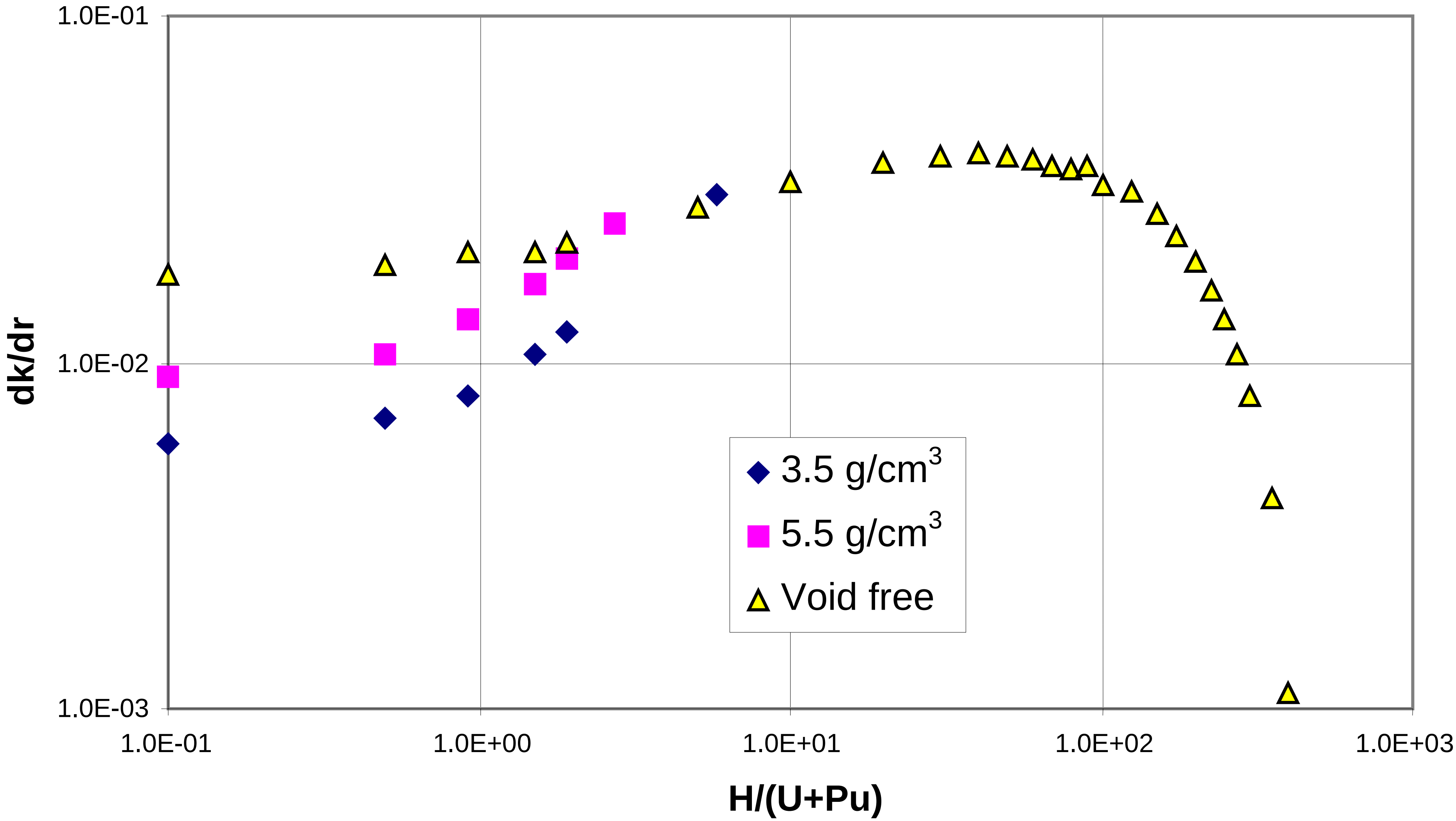

Fig. A.1.d.2. Delta lambda divided by delta dimension [sphere, ^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

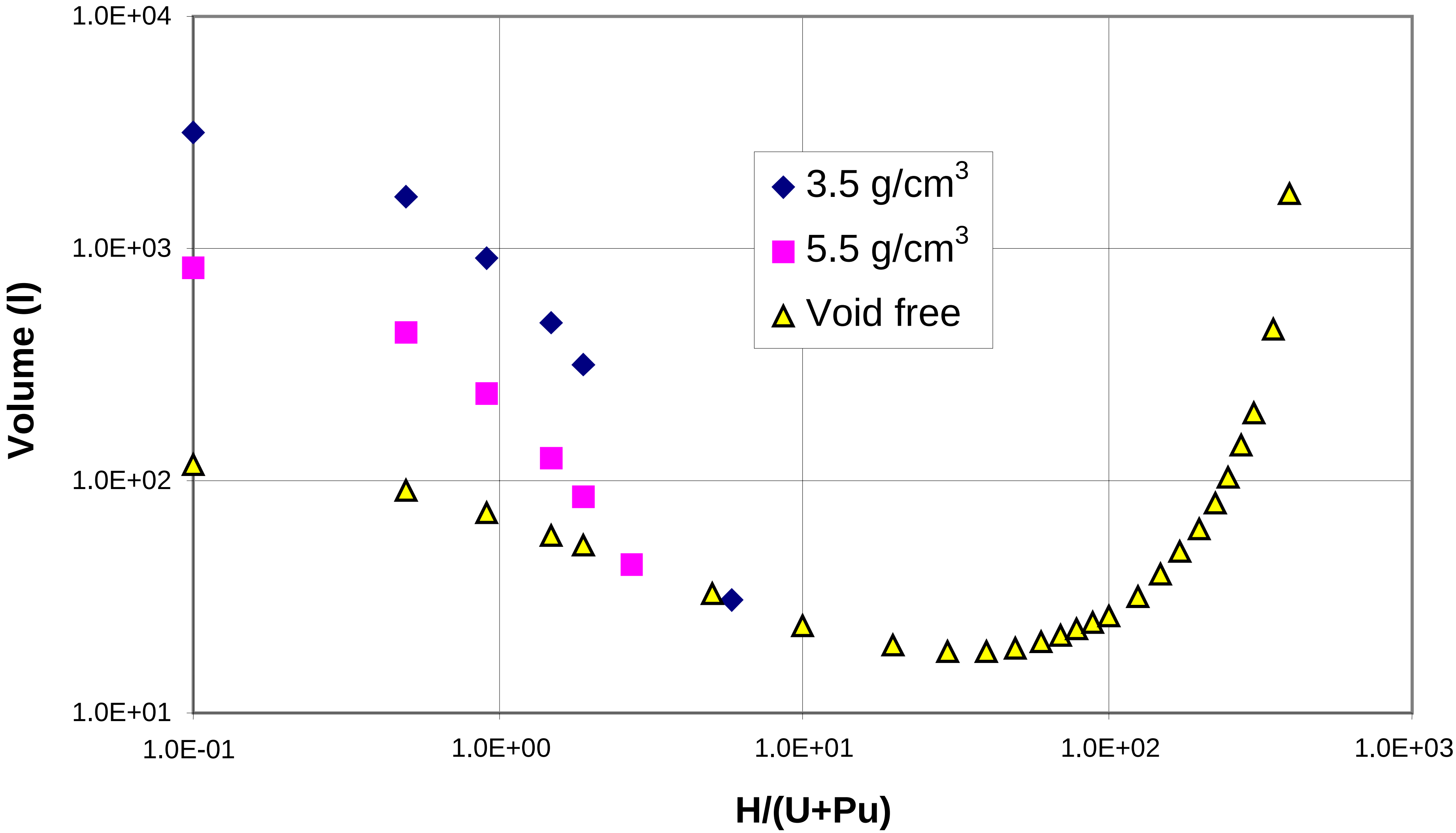

Fig. A.1.d.3. Sphere volume [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

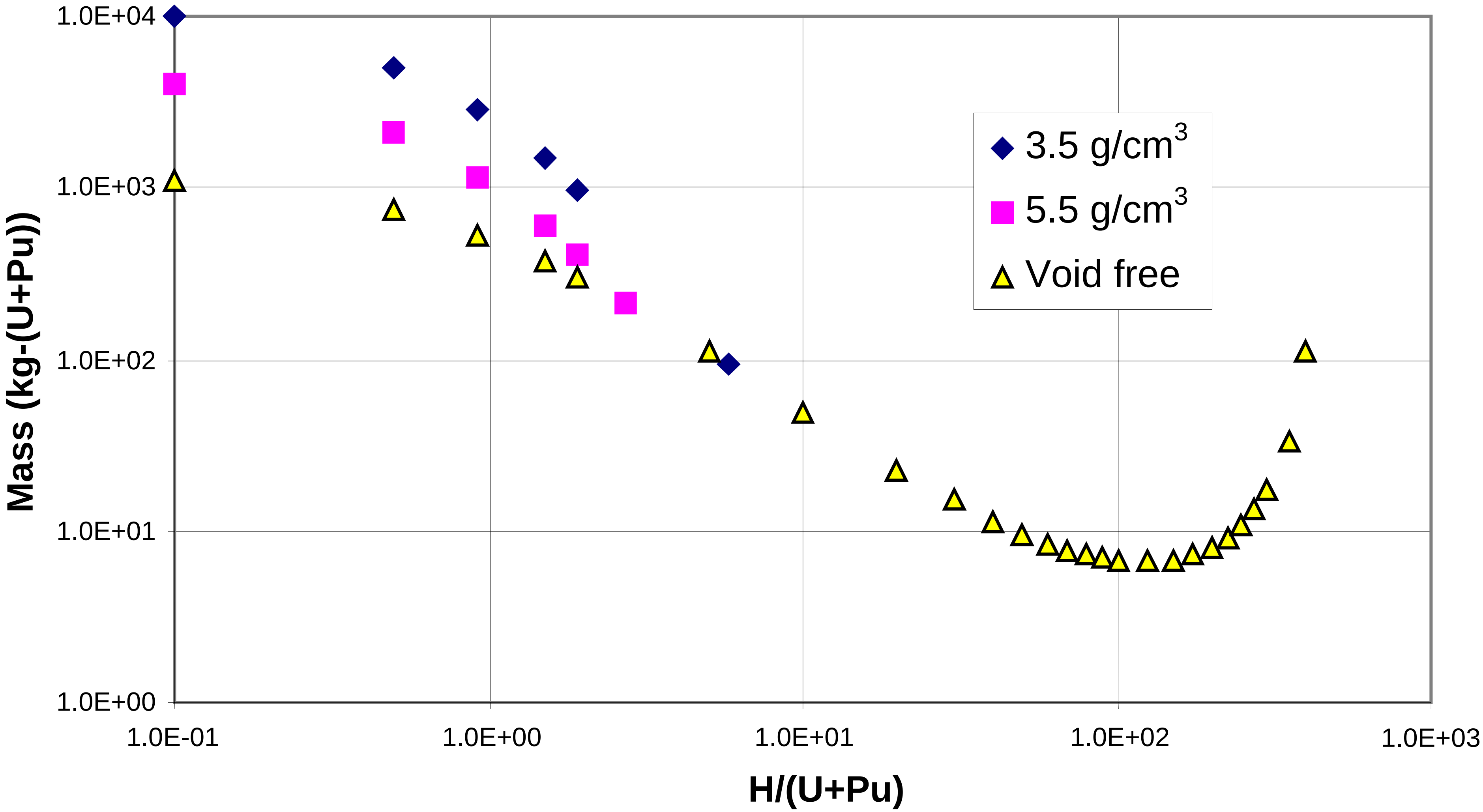

Fig. A.1.d.4. U + Pu mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

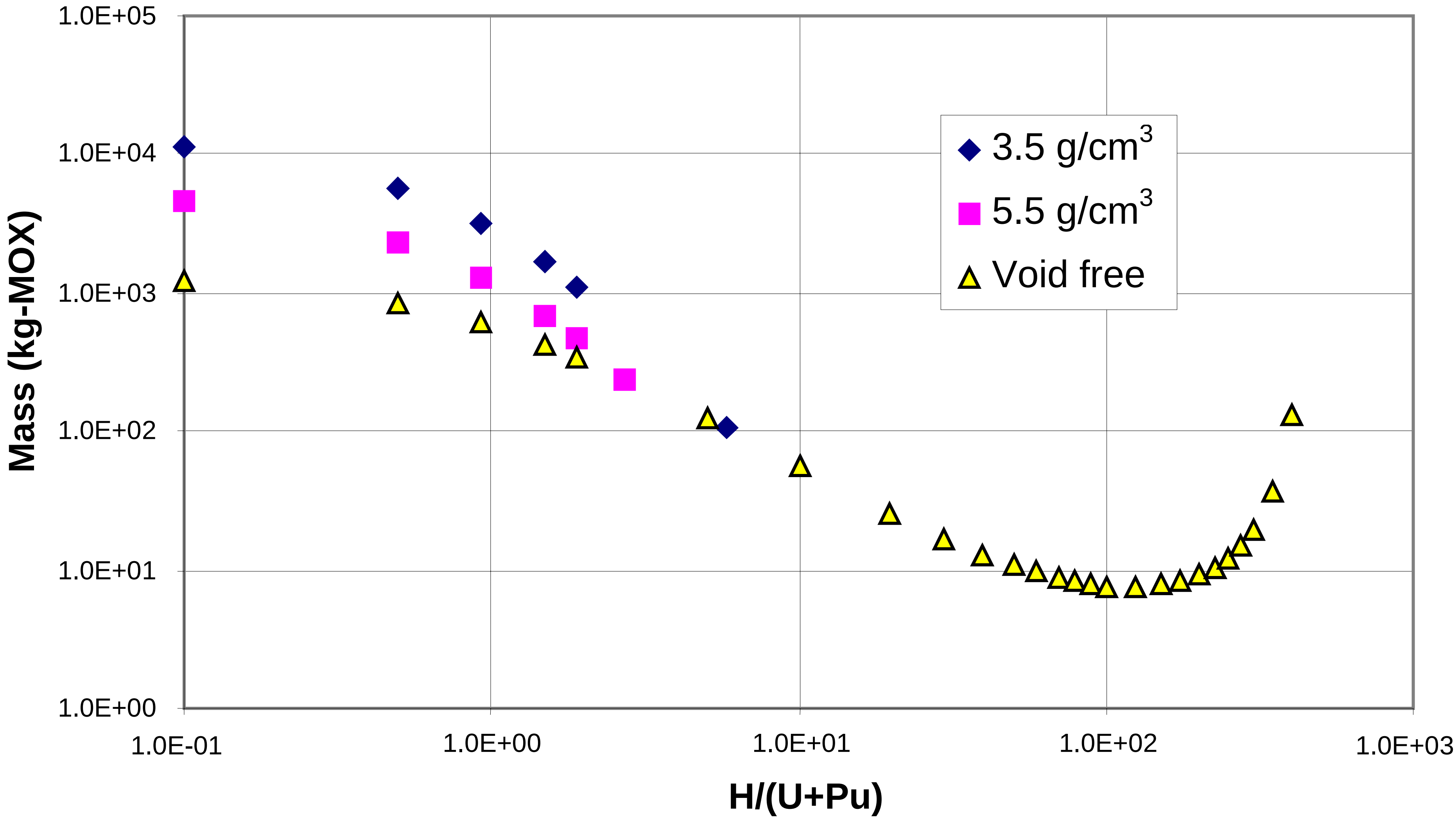

Fig. A.1.d.5. MOX mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

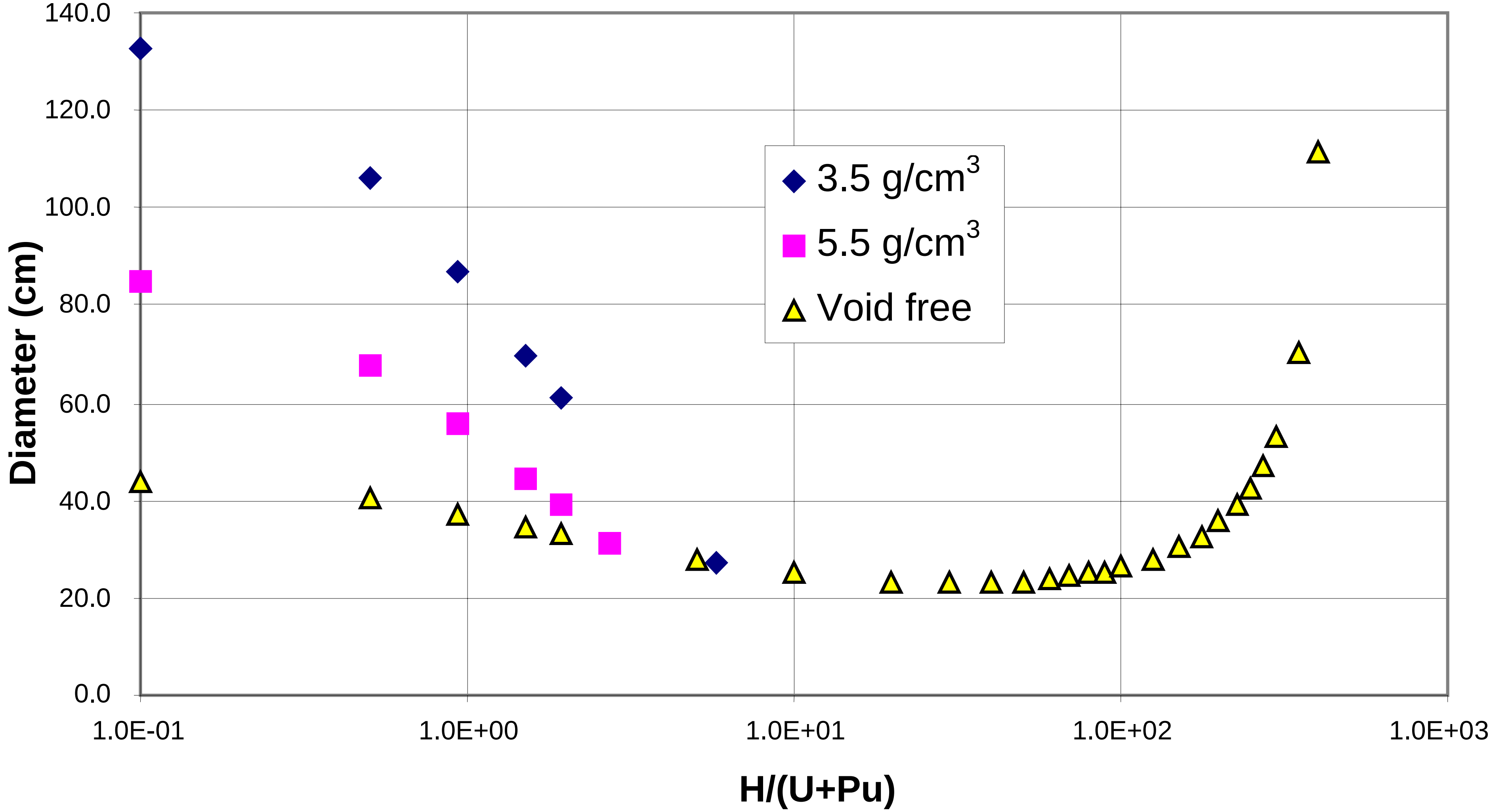

Fig. A.1.d.6. Cylinder diameter [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector : 2.5 cm].

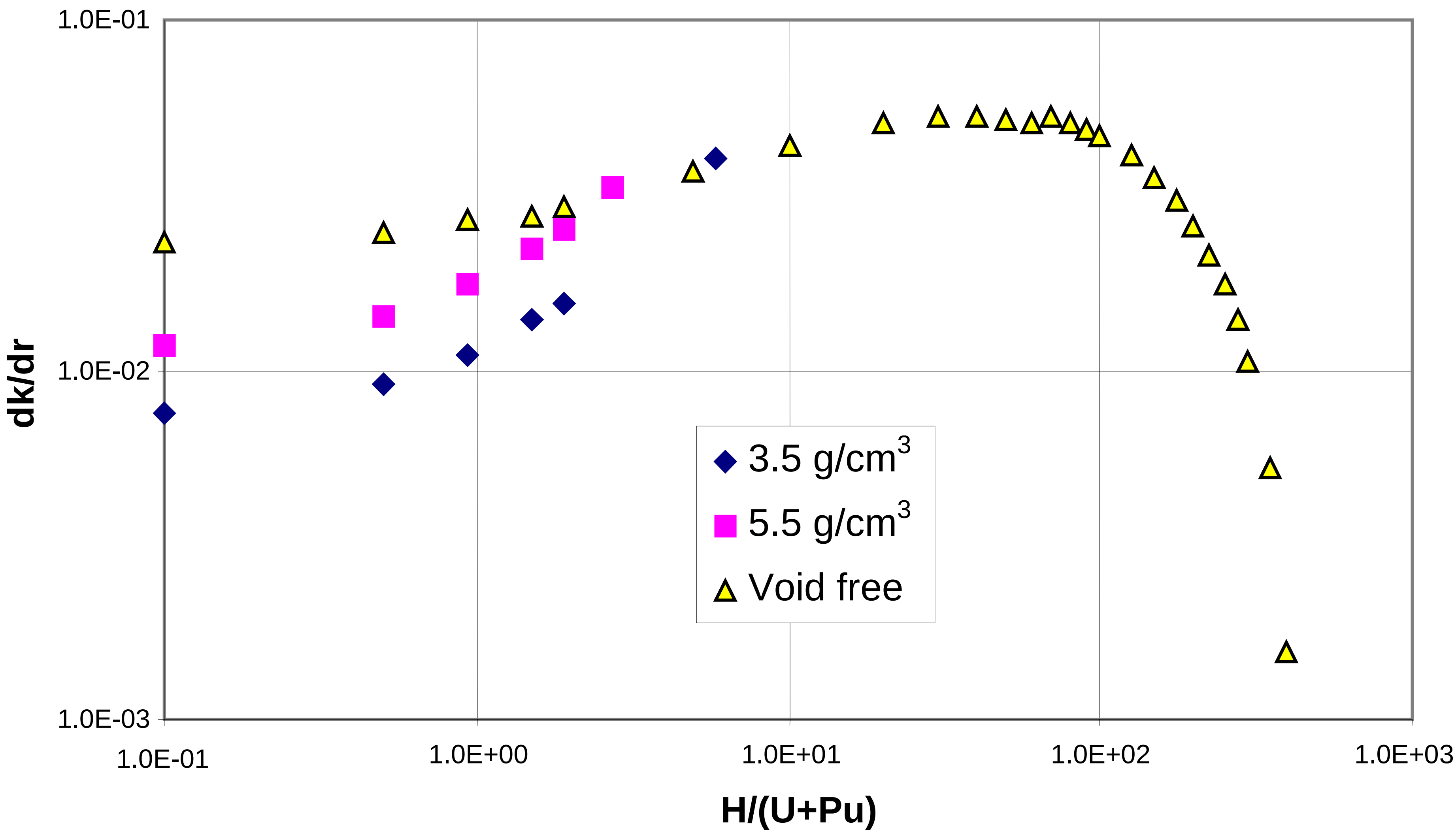

Fig. A.1.d.7. Delta lambda divided by delta dimension [cylinder, ^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

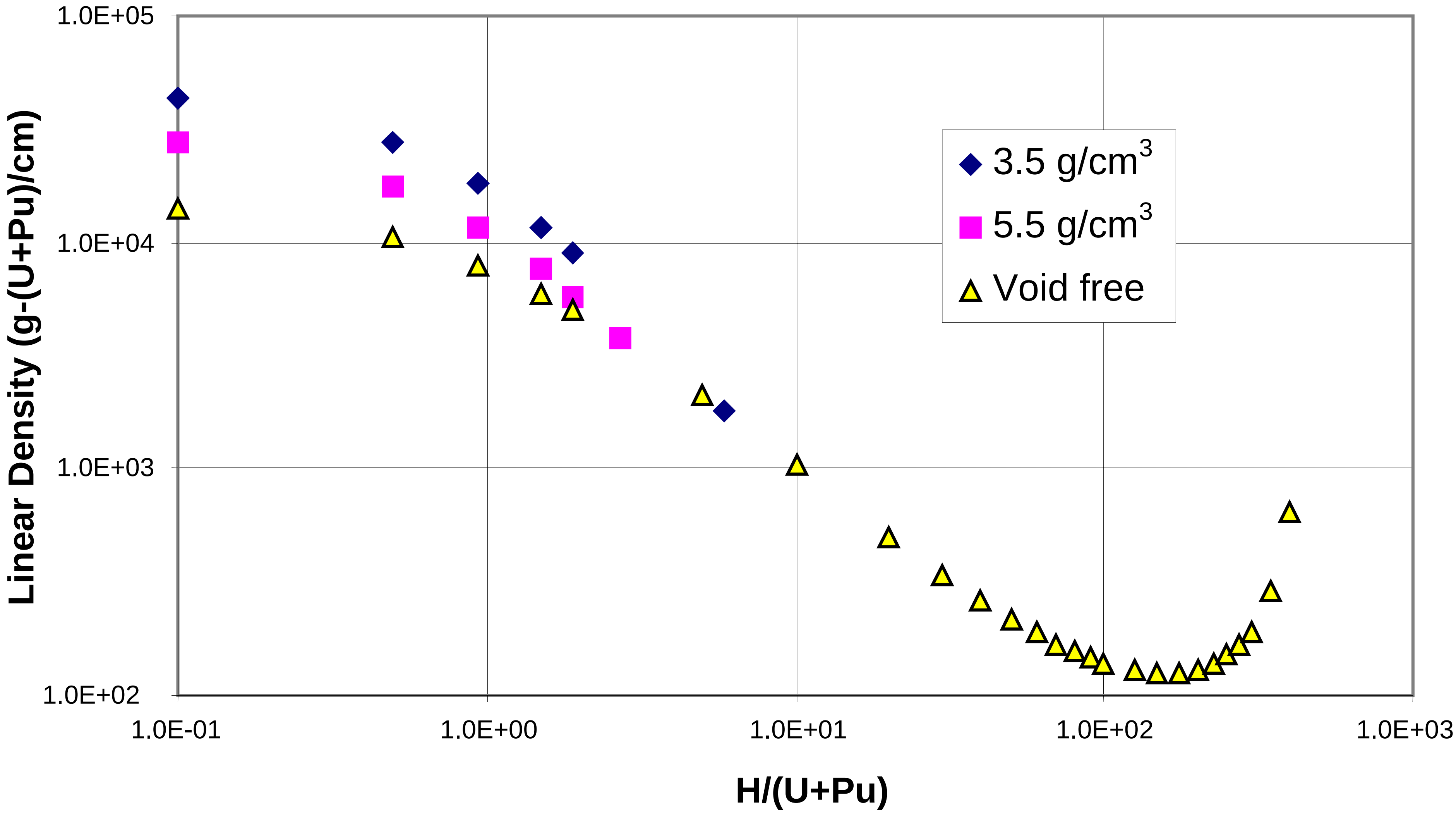

Fig. A.1.d.8. Linear density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

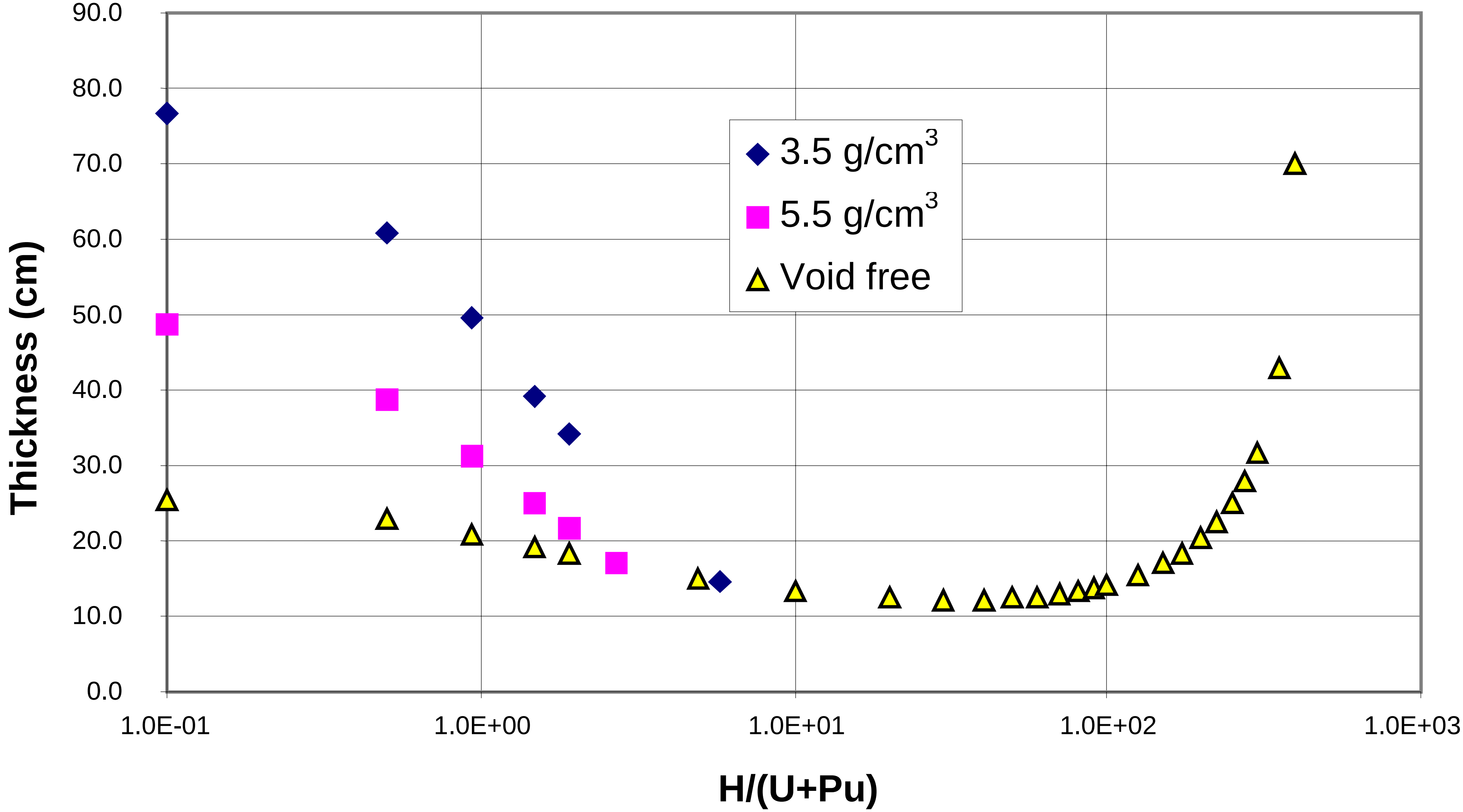

Fig. A.1.d.9. Slab thickness [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

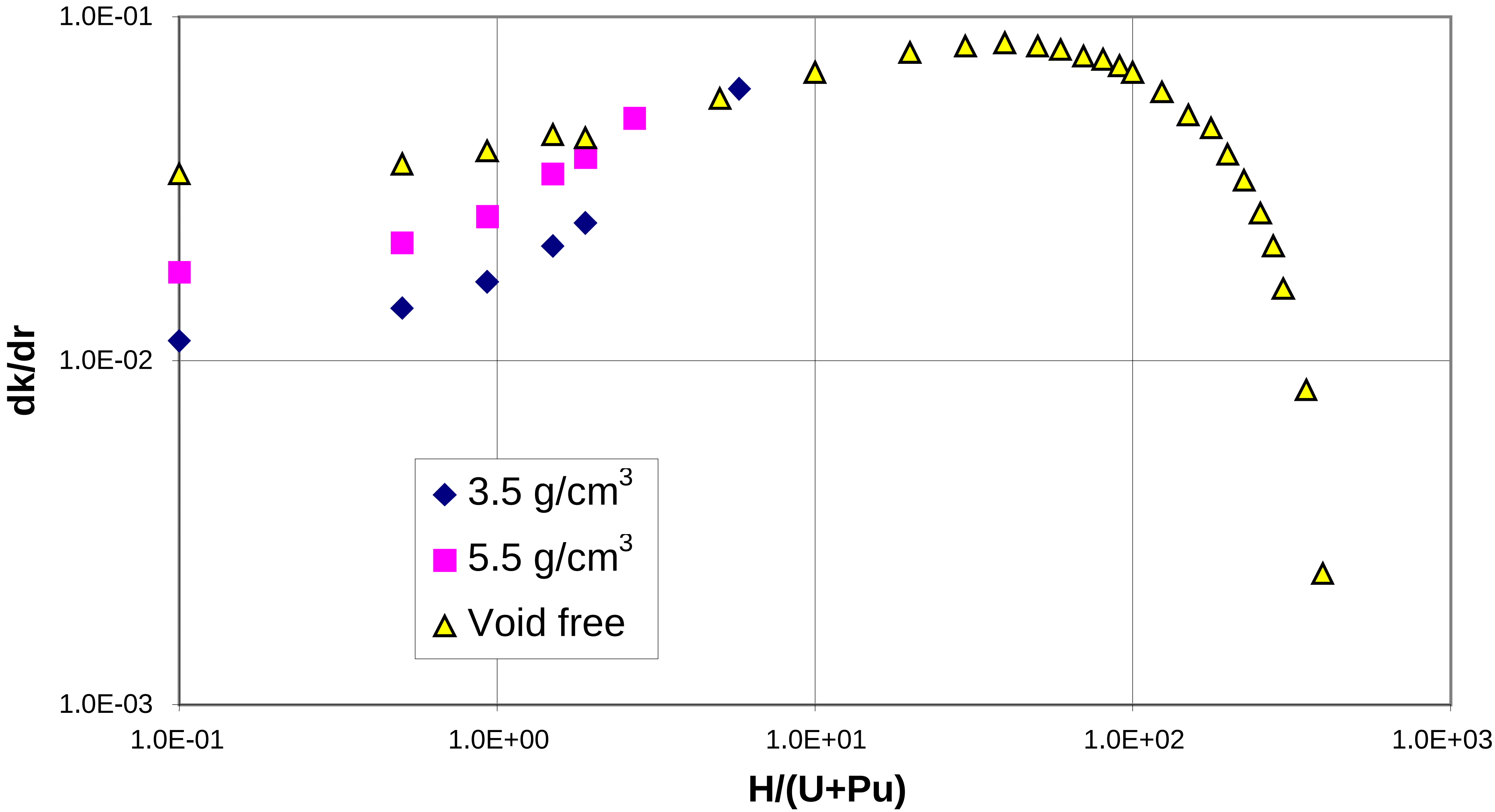

Fig. A.1.d.10. Delta lambda divided by delta dimension [slab, $^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

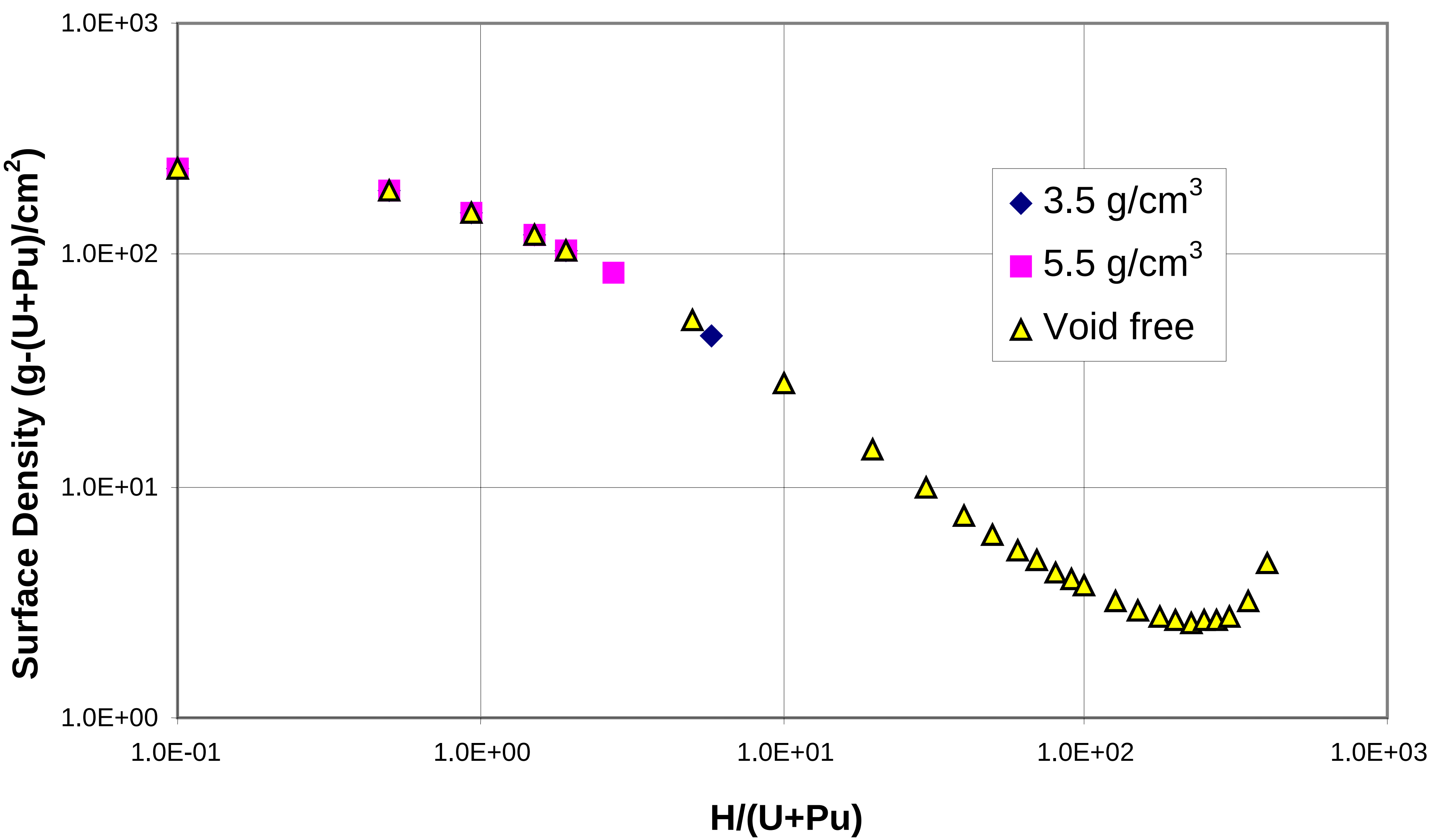

Fig. A.1.d.11. Surface density [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

APPENDIX A.2

DATA PLOTS

(^{235}U/U= 0.3%, ^{239}Pu/Pu = 95%)

APPENDIX A.2

DATA PLOTS (^{235}U/U= <u>0.3%</u>, ^{239}Pu/Pu = <u>95%</u>)

(a) Plutonium weight percentages: <u>35%</u> and density: <u>3.5 g/cm^3</u>

Figure A.2.a.11. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 30.0 cm]

Figure A.2.a.12. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 2.5 cm]

(b) Plutonium weight percentages: <u>12.5%</u> and density: <u>void-free</u>

Table A.2.b.1. MOX data [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Table A.2.b.2. MOX data [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Figure A.2.b.1. *k*-infinity [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.2.b.2. B_m^2 [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.2.b.3-1. Sphere radius [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.2.b.3-2. Sphere radius [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.2.b.4. Sphere volume [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.2.b.5. U + Pu mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.2.b.6. MOX mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.2.b.7-1. Cylinder diameter [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.2.b.7-2. Cylinder diameter infinity [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.2.b.8. Linear density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.2.b.9-1. Slab thickness [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.2.b.9-2. Slab thickness [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.2.b.10. Surface density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.2.b.11. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 30.0 cm]

Figure A.2.b.12. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 2.5 cm]

(c) Plutonium weight percentages: <u>12.5%</u>, density: <u>3.5 and 5.5 g/cm^3</u> and water reflector: <u>30 cm</u>

Table A.2.c.1. MOX data [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Table A.2.c.2. MOX data [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Figure A.2.c.1. *k*-infinity [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%]

Figure A.2.c.2. B_m^2 [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%]

Figure A.2.c.3. Sphere radius [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.2.c.4. Delta lambda divided by delta dimension [sphere, ^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.2.c.5. Sphere volume [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.2.c.6. U + Pu mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.2.c.7. MOX mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) =12.5%, water reflector: 30.0 cm]

Figure A.2.c.8. Cylinder diameter [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.2.c.9. Delta lambda divided by delta dimension [cylinder, ^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.2.c.10. Linear density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.2.c.11. Slab thickness [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.2.c.12. Delta lambda divided by delta dimension [slab, ^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.2.c.13. Surface density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

(d) Plutonium weight percentages: <u>12.5%</u>, density: <u>3.5 and 5.5 g/cm^3</u> and water reflector: <u>2.5 cm</u>

Table A.2.d.1. MOX data [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Table A.2.d.2. MOX data [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Figure A.2.d.1. Sphere radius [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector 2.5 cm]

Figure A.2.d.2. Delta lambda divided by delta dimension [sphere, ^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.2.d.3. Sphere volume [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.2.d.4. U + Pu mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.2.d.5. MOX mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.2.d.6. Cylinder diameter [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.2.d.7. Delta lambda divided by delta dimension [cylinder, ^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.2.d.8. Linear density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.2.d.9. Slab thickness [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.2.d.10. Delta lambda divided by delta dimension [slab, ^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.2.d.11. Surface density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Table A.2.a.1. MOX data [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 95%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 30.0 cm]

Maximum fissile material oxide density = 3.5 g (UO_2 + PuO_2)/cm^3

Water reflector 30.0 cm

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	99.700	95.000	5.000	0.000	0.000

Plutonium weight percentages = 100*gPu/(gU + gPu) = 35 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08583	3.50000	2.10127	2.799E-03	35.104	1.573E-02	181.192	559.129	634.172	45.403	2.094E-02	4996.186	18.481	3.353E-02	57.029
0.5	1.64	3.08583	3.50000	1.88305	3.422E-03	32.686	1.655E-02	146.271	451.367	511.948	42.461	2.195E-02	4369.689	17.424	3.473E-02	53.769
0.928	3.00	3.08583	3.50000	1.77348	4.212E-03	30.163	1.770E-02	114.950	354.715	402.323	39.314	2.344E-02	3745.978	16.234	3.680E-02	50.096
1.5	4.76	3.08583	3.50000	1.68395	5.351E-03	27.375	1.913E-02	85.933	265.175	300.765	35.774	2.531E-02	3101.714	14.817	3.960E-02	45.721
1.916	6.00	3.08583	3.50000	1.63942	6.241E-03	25.684	2.012E-02	70.972	219.007	248.402	33.606	2.661E-02	2737.196	13.918	4.159E-02	42.949
5.88	16.38	3.08583	3.50000	1.49314	1.829E-02	16.143	3.094E-02	17.622	54.378	61.676	21.199	4.080E-02	1089.162	8.543	6.321E-02	26.361
10	24.99	2.08484	2.36466	1.47675	1.795E-02	16.253	2.826E-02	17.983	37.493	42.525	21.353	3.994E-02	746.601	8.654	6.243E-02	18.043
20	39.98	1.16622	1.32274	1.50517	1.905E-02	15.679	3.069E-02	16.146	18.830	21.357	20.566	4.349E-02	387.402	8.309	6.876E-02	9.690
30	49.98	0.80953	0.91818	1.53946	2.023E-02	15.177	3.335E-02	14.643	11.854	13.445	19.894	4.727E-02	251.631	8.053	7.493E-02	6.519
40	57.13	0.61992	0.70312	1.56711	2.113E-02	14.848	3.547E-02	13.712	8.500	9.641	19.470	5.027E-02	184.573	7.919	7.977E-02	4.909
50	62.48	0.50228	0.56969	1.58829	2.179E-02	14.643	3.707E-02	13.151	6.606	7.492	19.221	5.252E-02	145.736	**7.866**	8.335E-02	3.951
60	66.65	0.42217	0.47883	1.60419	2.226E-02	14.522	4.069E-02	12.829	5.416	6.143	19.089	5.417E-02	120.820	7.868	8.604E-02	3.321
70	69.99	0.36409	0.41296	1.61590	2.257E-02	14.462	4.158E-02	12.669	4.613	5.232	**19.041**	5.536E-02	103.672	7.909	8.803E-02	2.880
80	72.71	0.32006	0.36302	1.62426	2.277E-02	**14.445**	4.216E-02	**12.625**	4.041	4.583	19.052	5.614E-02	91.247	7.978	8.928E-02	2.554
90	74.99	0.28554	0.32386	1.62992	2.288E-02	14.460	4.254E-02	12.666	3.617	4.102	19.108	5.663E-02	81.885	8.068	9.007E-02	2.304
100	76.91	0.25773	0.29232	1.63338	2.291E-02	14.502	4.273E-02	12.775	3.293	3.734	19.200	5.689E-02	74.619	8.173	9.044E-02	2.107
150	83.32	0.17334	0.19660	1.62890	2.236E-02	14.947	4.206E-02	13.989	2.425	2.750	19.980	5.593E-02	54.346	8.844	8.871E-02	1.533
200	86.95	0.13058	0.14811	1.60448	2.121E-02	15.619	3.984E-02	15.962	2.084	2.364	21.067	5.291E-02	45.516	9.652	8.367E-02	1.260
250	89.28	0.10474	0.11880	1.57114	1.984E-02	16.424	3.698E-02	18.557	1.944	2.205	22.335	4.904E-02	41.037	10.545	7.731E-02	1.104
275	90.16	0.09531	0.10810	1.55282	1.912E-02	16.865	3.545E-02	20.092	1.915	2.172	23.023	4.697E-02	39.680	11.019	7.391E-02	1.050
300	90.90	0.08744	0.09918	1.53390	1.839E-02	17.329	3.387E-02	21.798	**1.906**	**2.162**	23.745	4.486E-02	38.721	11.512	7.047E-02	1.007
350	92.10	0.07504	0.08511	1.49521	1.693E-02	18.329	3.072E-02	25.791	1.935	2.195	25.291	4.062E-02	37.697	12.555	6.360E-02	0.942
400	93.02	0.06573	0.07455	1.45642	1.552E-02	19.421	2.763E-02	30.683	2.017	2.287	26.973	3.649E-02	**37.559**	13.680	5.691E-02	0.899
450	93.75	0.05847	0.06632	1.41823	1.415E-02	20.620	2.464E-02	36.727	2.147	2.436	28.815	3.251E-02	38.129	14.858	5.075E-02	0.869
500	94.34	0.05265	0.05972	1.38106	1.283E-02	21.942	2.180E-02	44.248	2.330	2.642	30.839	2.873E-02	39.327	16.190	4.472E-02	0.852
550	94.82	0.04789	0.05432	1.34512	1.157E-02	23.401	1.912E-02	53.675	2.570	2.915	33.072	2.516E-02	41.140	17.627	3.914E-02	**0.844**
600	95.24	0.04392	0.04981	1.31050	1.037E-02	25.029	1.660E-02	65.675	2.884	3.272	35.562	2.183E-02	43.623	19.254	3.387E-02	0.846
650	95.59	0.04055	0.04599	1.27728	9.229E-03	26.867	1.426E-02	81.239	3.294	3.736	38.371	1.873E-02	46.892	21.067	2.902E-02	0.854
700	95.89	0.03767	0.04273	1.24538	8.144E-03	28.959	1.208E-02	101.730	3.832	4.346	41.567	1.585E-02	51.120	23.135	2.452E-02	0.872
800	96.383	0.03297	0.03740	1.18558	6.121E-03	34.254	8.206E-03	168.346	5.550	6.295	49.6544	1.077E-02	63.845	28.377	1.660E-02	0.936
900	96.772	0.02932	0.03326	1.13073	4.289E-03	42.010	5.001E-03	310.561	9.106	10.328	61.5072	6.560E-03	87.118	36.067	1.009E-02	1.057
1000	97.085	0.02640	0.02994	1.08039	2.624E-03	55.301	2.477E-03	708.426	18.702	21.213	81.829	3.253E-03	138.837	49.286	4.978E-03	1.301
1050	97.220	0.02510	0.02847	1.05676												
1150	97.456	0.02293	0.02601	1.01235												
1160	97.477	0.02273	0.02578	1.00810												
1170	97.498	0.02253	0.02555	1.00390												
1174	97.507	0.02246	0.02547	1.00221												
1175	97.509	0.02244	0.02545	1.00179												
1176	97.511	0.02242	0.02543	1.00139												
1177	97.513	0.02240	0.02541	1.00096												
1178	97.515	0.02238	0.02538	1.00054												
1179	97.517	0.02236	0.02536	1.00012												
1180	**97.519**	**0.02234**	**0.02534**	**0.99972**												
1190	97.539	0.02216	0.02513	0.99557												
1200	97.559	0.02197	0.02492	0.99146												
1250	97.655	0.02110	0.02393	0.97137												
1500	98.038	0.01759	0.01995	0.88175												

Table A.2.a.2. MOX data [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 95%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**95.000**	**5.000**	**0.000**	**0.000**

Maximum fissile material oxide density = 3.5 g (UO_2 + PuO_2)/cm^3

Water reflector 2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 35 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08583	3.50000	2.10127	2.799E-03	45.738	1.724E-02	400.785	1236.755	1402.746	64.211	2.262E-02	9992.589	33.844	3.527E-02	104.437
0.5	1.64	3.08583	3.50000	1.88305	3.422E-03	41.739	1.786E-02	304.596	939.931	1066.084	58.734	2.346E-02	8360.783	31.130	3.655E-02	96.061
0.928	3.00	3.08583	3.50000	1.77348	4.212E-03	37.866	1.877E-02	227.419	701.776	795.965	53.361	2.467E-02	6901.016	28.373	3.849E-02	87.554
1.5	4.76	3.08583	3.50000	1.68395	5.351E-03	33.804	1.990E-02	161.807	499.308	566.323	47.700	2.618E-02	5514.312	25.425	4.088E-02	78.456
1.916	6.00	3.08583	3.50000	1.63942	6.241E-03	31.418	2.072E-02	129.901	400.852	454.652	44.363	2.726E-02	4769.839	23.672	4.257E-02	73.049
5.88	16.38	3.08583	3.50000	1.49314	1.829E-02	18.706	2.836E-02	27.419	84.609	95.965	26.467	4.007E-02	1697.715	14.093	6.228E-02	43.488
10	24.99	2.08484	2.36466	1.47675	1.795E-02	18.833	2.752E-02	27.981	58.337	66.166	26.632	3.642E-02	1161.386	14.171	6.077E-02	29.544
20	39.98	1.16622	1.32274	1.50517	1.905E-02	18.132	2.980E-02	24.969	29.119	33.027	25.564	3.950E-02	598.579	13.501	6.238E-02	15.745
40	57.13	0.61992	0.70312	1.56711	2.113E-02	17.057	3.442E-02	20.789	12.887	14.617	23.966	4.570E-02	279.656	12.568	7.225E-02	7.791
60	66.65	0.42217	0.47883	1.60419	2.226E-02	16.574	3.715E-02	19.070	8.051	9.131	23.263	4.936E-02	179.429	12.204	7.783E-02	5.152
70	69.99	0.36409	0.41296	1.61590	2.257E-02	16.455	3.799E-02	18.662	6.795	7.706	23.095	5.049E-02	152.520	12.116	7.965E-02	4.411
80	72.71	0.32006	0.36302	1.62426	2.277E-02	16.388	4.120E-02	18.437	5.901	6.693	23.005	5.454E-02	133.040	12.077	8.088E-02	3.865
90	74.99	0.28554	0.32386	1.62992	2.288E-02	**16.361**	4.158E-02	**18.345**	5.238	5.941	**22.975**	5.506E-02	118.375	**12.074**	8.611E-02	3.448
100	76.91	0.25773	0.29232	1.63338	2.291E-02	16.366	4.180E-02	18.361	4.732	5.367	22.991	5.535E-02	107.000	12.100	8.658E-02	3.118
125	80.63	0.20727	0.23509	1.63477	2.275E-02	16.476	4.181E-02	18.733	3.883	4.404	23.178	5.535E-02	87.452	12.252	8.657E-02	2.540
150	83.32	0.17334	0.19660	1.62890	2.236E-02	16.682	4.125E-02	19.445	3.371	3.823	23.507	5.461E-02	75.230	12.491	8.539E-02	2.165
200	86.95	0.13058	0.14811	1.60448	2.121E-02	17.276	3.918E-02	21.597	2.820	3.199	24.433	5.184E-02	61.224	13.131	8.091E-02	1.715
250	89.28	0.10474	0.11880	1.57114	1.984E-02	18.027	3.644E-02	24.541	2.570	2.915	25.593	4.818E-02	53.880	13.912	7.076E-02	1.457
275	90.16	0.09531	0.10810	1.55282	1.912E-02	18.448	3.496E-02	26.300	2.507	2.843	26.239	4.620E-02	51.537	14.343	6.772E-02	1.367
300	90.90	0.08744	0.09918	1.53390	1.839E-02	18.895	3.345E-02	28.258	2.471	2.803	26.924	4.418E-02	49.784	14.741	6.902E-02	1.289
350	92.10	0.07504	0.08511	1.49521	1.693E-02	19.867	3.038E-02	32.846	**2.465**	**2.796**	28.411	4.009E-02	47.572	15.719	6.251E-02	1.180
400	93.02	0.06573	0.07455	1.45642	1.552E-02	20.938	2.736E-02	38.449	2.527	2.866	30.048	3.608E-02	**46.609**	16.792	5.613E-02	1.104
500	94.34	0.05265	0.05972	1.38106	1.283E-02	23.430	2.165E-02	53.874	2.836	3.217	33.850	2.849E-02	47.382	19.238	4.426E-02	1.013
550	94.82	0.04789	0.05432	1.34512	1.157E-02	24.878	1.901E-02	64.499	3.089	3.503	36.061	2.500E-02	48.910	20.652	3.880E-02	0.989
600	95.24	0.04392	0.04981	1.31050	1.037E-02	26.498	1.652E-02	77.938	3.423	3.882	38.532	2.171E-02	51.214	22.241	3.366E-02	0.977
650	95.59	0.04055	0.04599	1.27728	9.229E-03	28.331	1.420E-02	95.256	3.863	4.381	41.327	1.865E-02	54.395	24.055	2.886E-02	**0.975**
700	95.89	0.03767	0.04273	1.24538	8.144E-03	30.417	1.204E-02	117.884	4.441	5.037	44.512	1.580E-02	58.618	26.110	2.441E-02	0.984
750	96.15	0.03516	0.03988	1.21485	7.106E-03	32.846	1.004E-02	148.436	5.219	5.919	48.217	1.316E-02	64.202	28.505	2.032E-02	1.002
800	96.383	0.03297	0.03740	1.18558	6.121E-03	35.706	8.201E-03	190.688	6.287	7.131	52.583	1.075E-02	71.599	31.326	1.657E-02	1.033
900	96.772	0.02932	0.03326	1.13073	4.289E-03	43.461	5.012E-03	343.862	10.082	11.435	64.427	6.562E-03	95.586	39.011	1.008E-02	1.144
1000	97.085	0.02640	0.02994	1.08039	2.624E-03	56.753	2.485E-03	765.682	20.214	22.927	84.746	3.253E-03	148.913	52.223	4.987E-03	1.379
1050	97.220	0.02510	0.02847	1.05676												
1150	97.456	0.02293	0.02601	1.01235												
1160	97.477	0.02273	0.02578	1.00810												
1170	97.498	0.02253	0.02555	1.00390												
1174	97.507	0.02246	0.02547	1.00221												
1175	97.509	0.02244	0.02545	1.00179												
1176	97.511	0.02242	0.02543	1.00139												
1177	97.513	0.02240	0.02541	1.00096												
1178	97.515	0.02238	0.02538	1.00054												
1179	97.517	0.02236	0.02536	1.00012												
1180	**97.519**	**0.02234**	**0.02534**	**0.99972**												
1190	97.539	0.02216	0.02513	0.99557												
1200	97.559	0.02197	0.02492	0.99146												
1250	97.655	0.02110	0.02393	0.97137												
1500	98.038	0.01759	0.01995	0.88175												

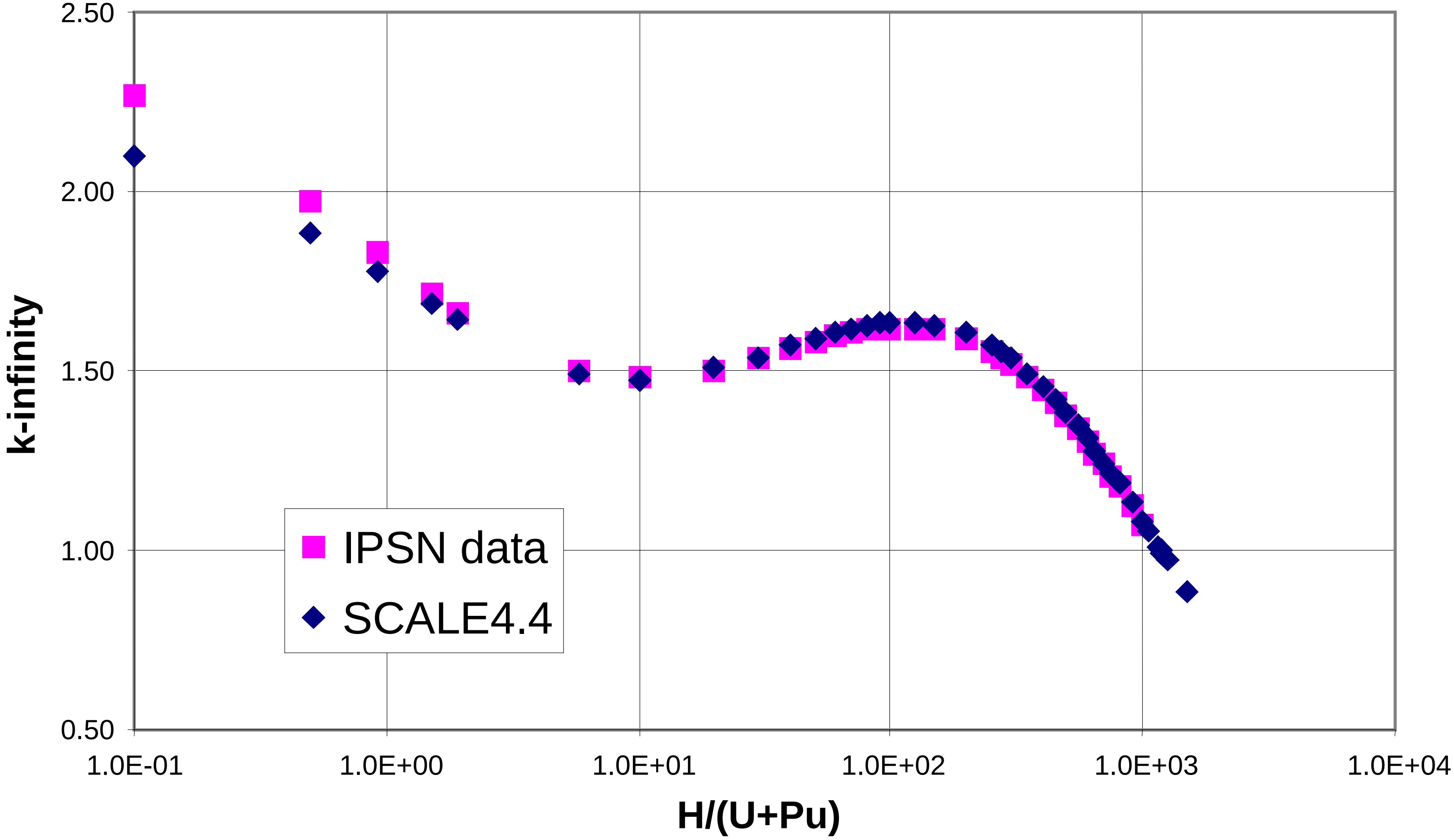

Fig. A.2.a.1. *k*-infinity [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^{3}].

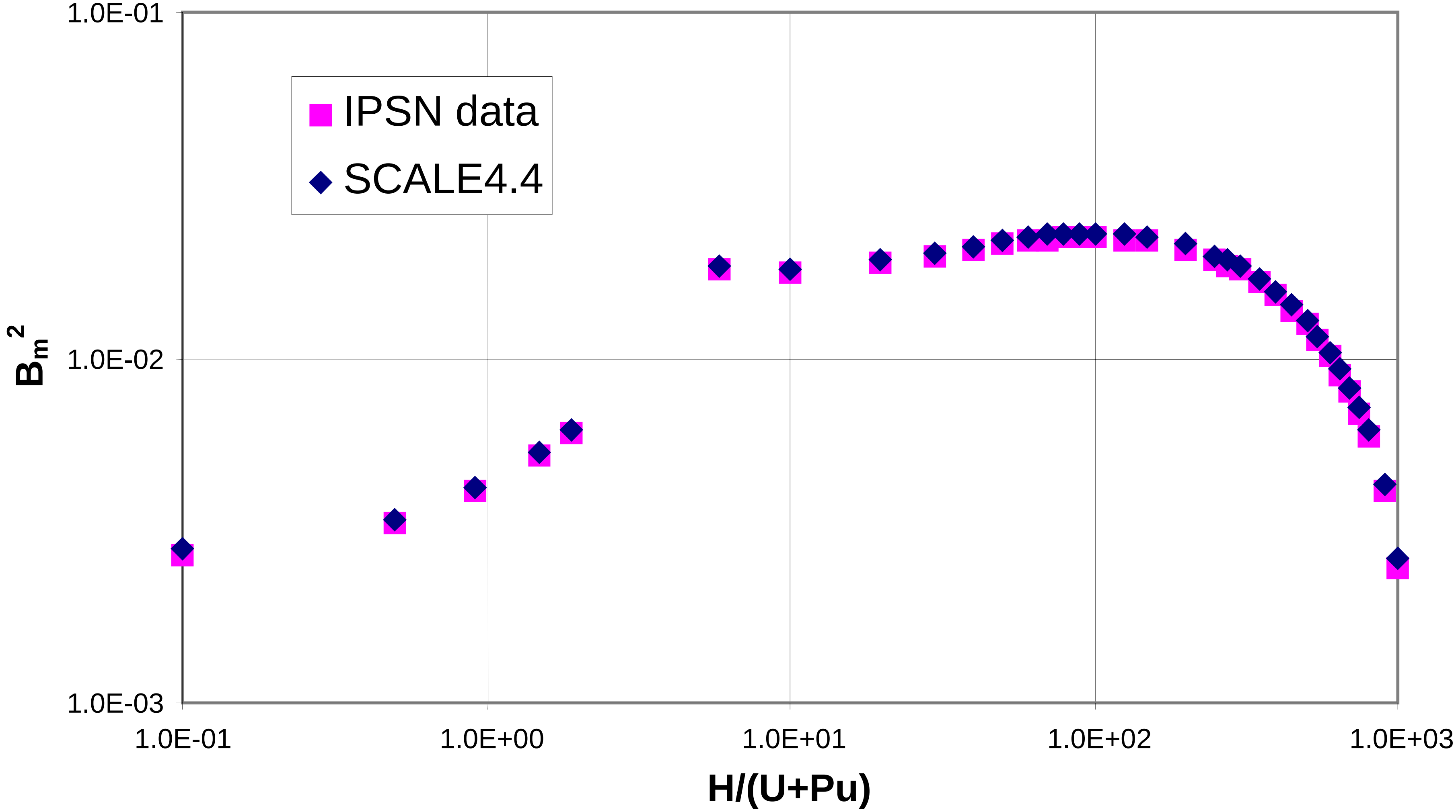

Fig. A.2.a.2. B_m^2 [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

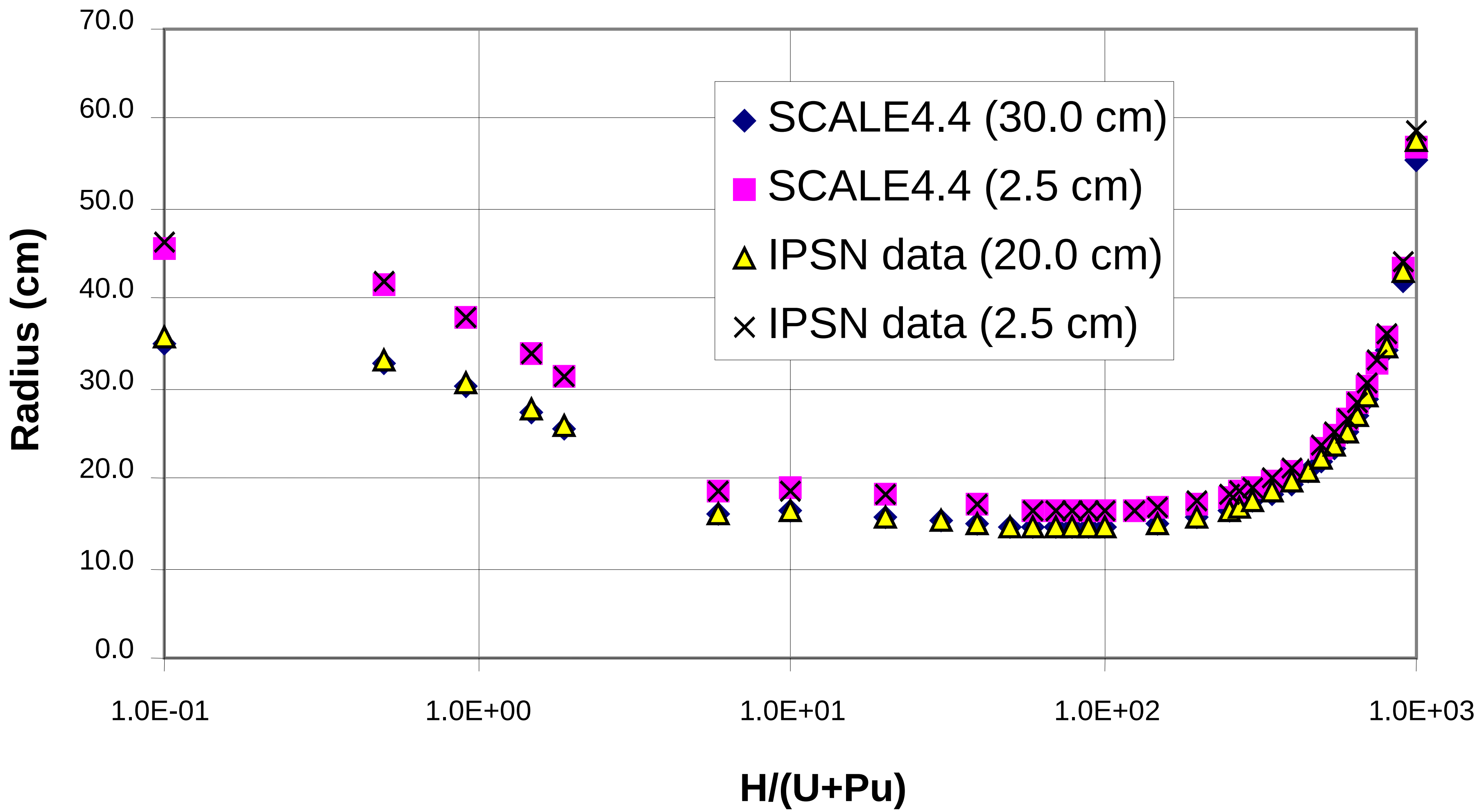

Fig. A.2.a.3-1. Sphere radius [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

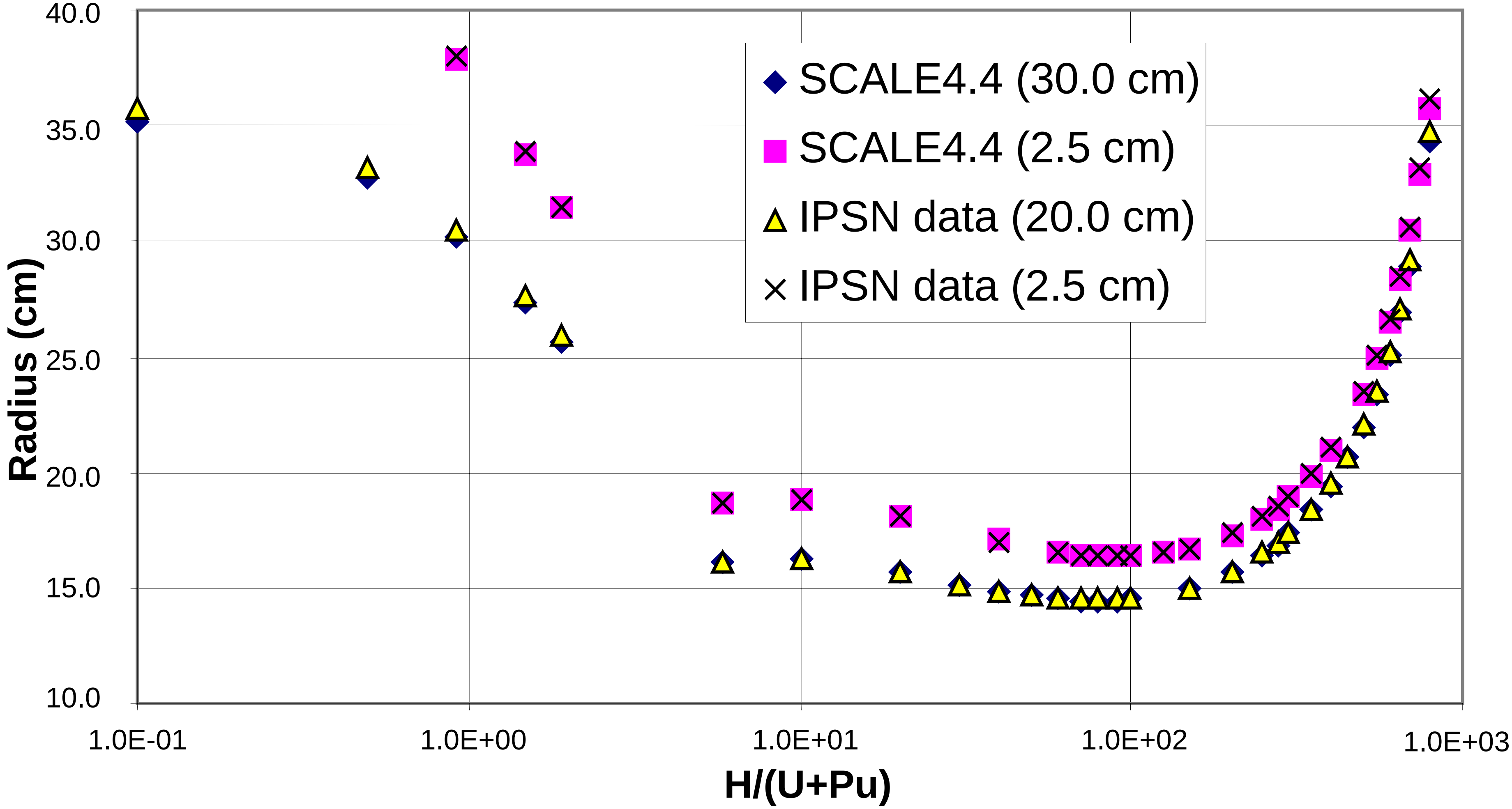

Fig. A.2.a.3-2. Sphere radius [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

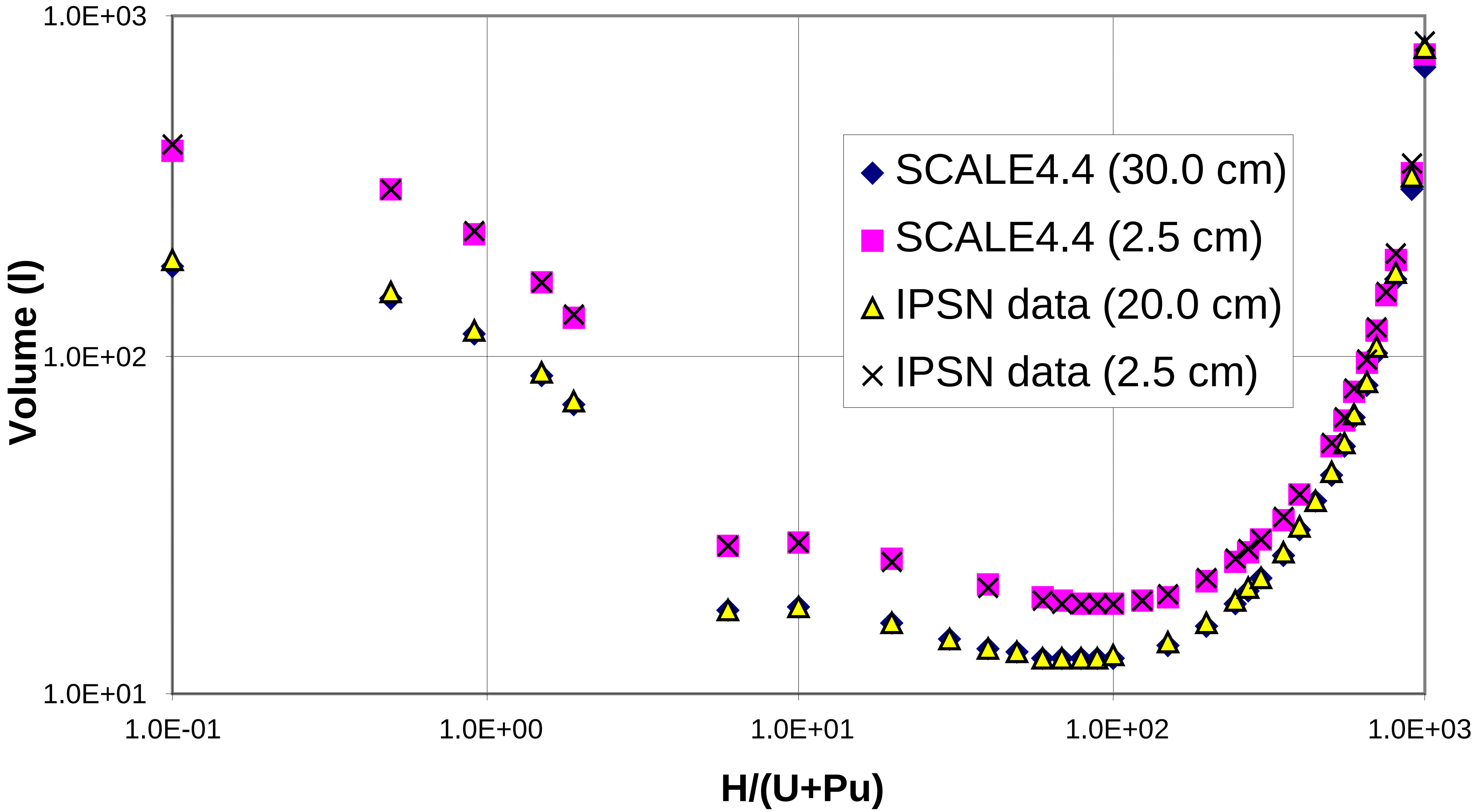

Fig. A.2.a.4. Sphere volume [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

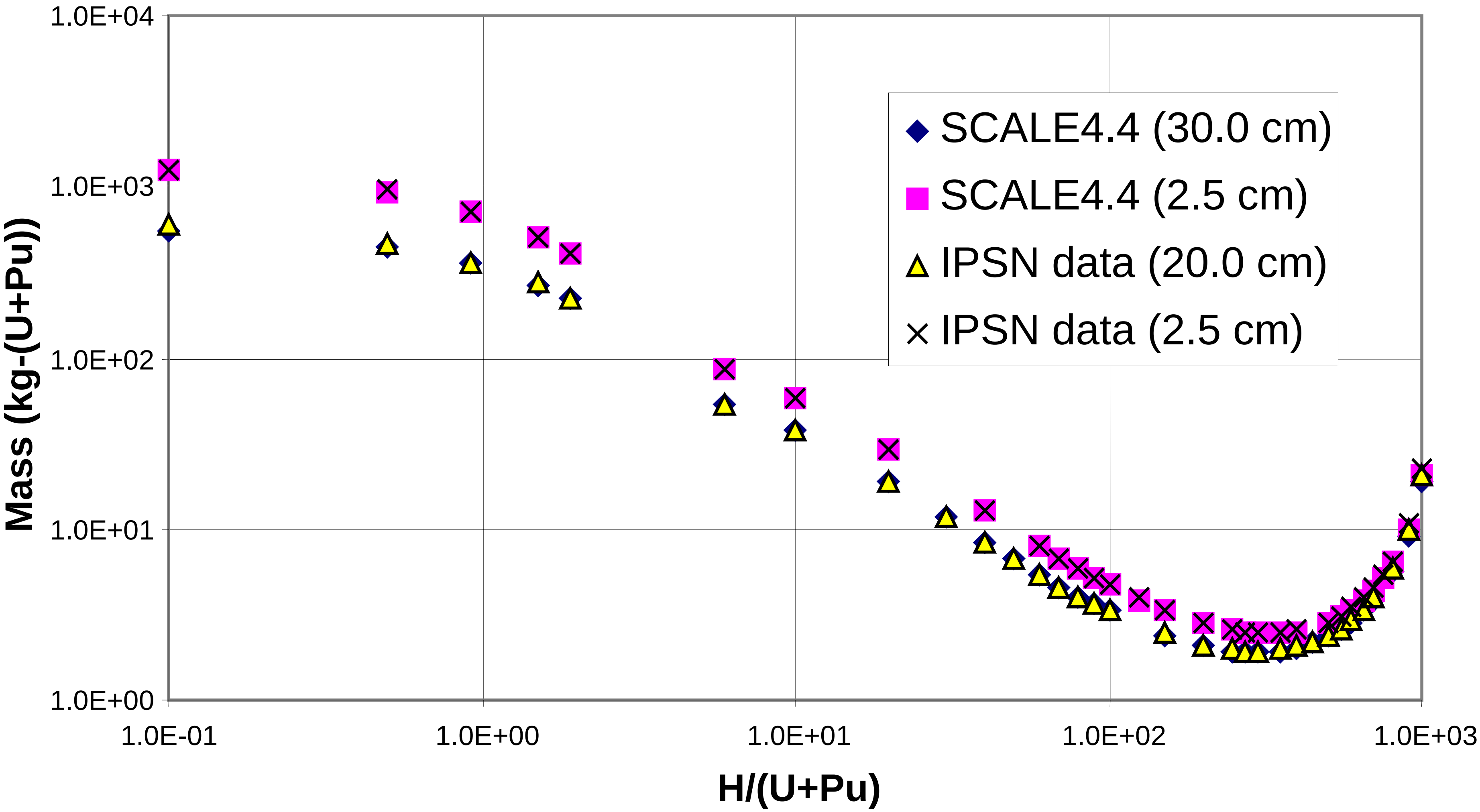

Fig. A.2.a.5. U + Pu mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

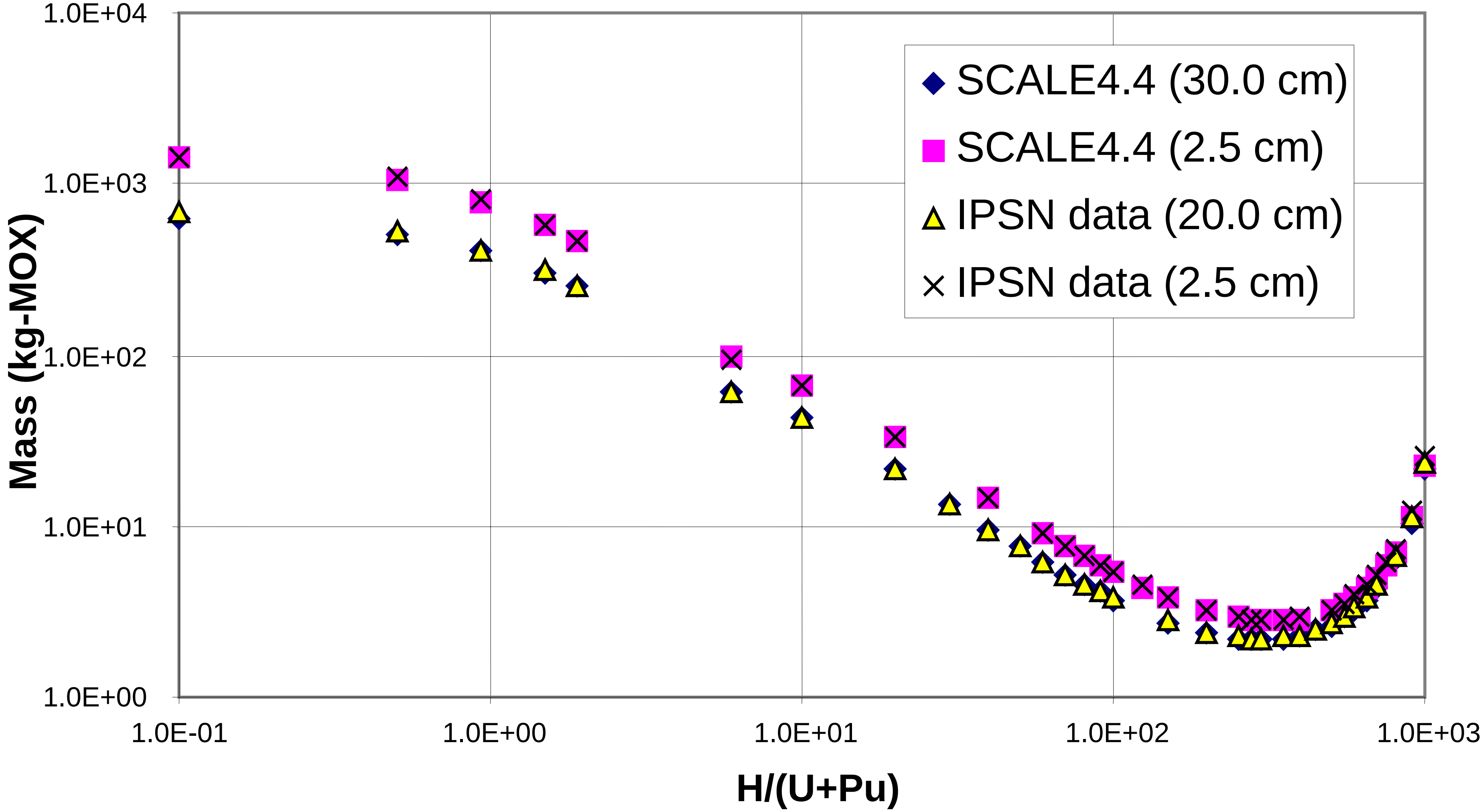

Fig. A.2.a.6. MOX mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

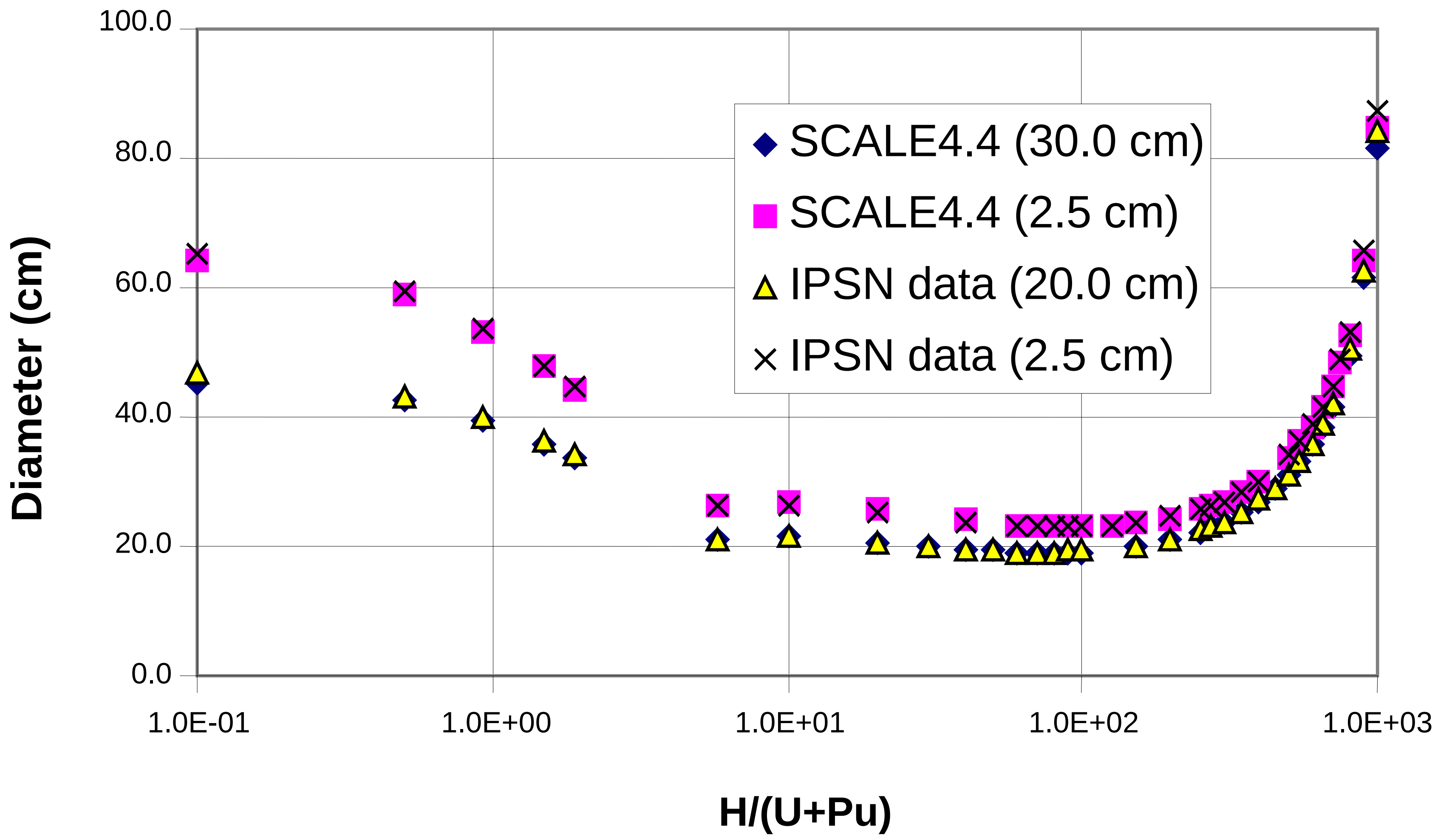

Fig. A.2.a.7-1. Cylinder diameter [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

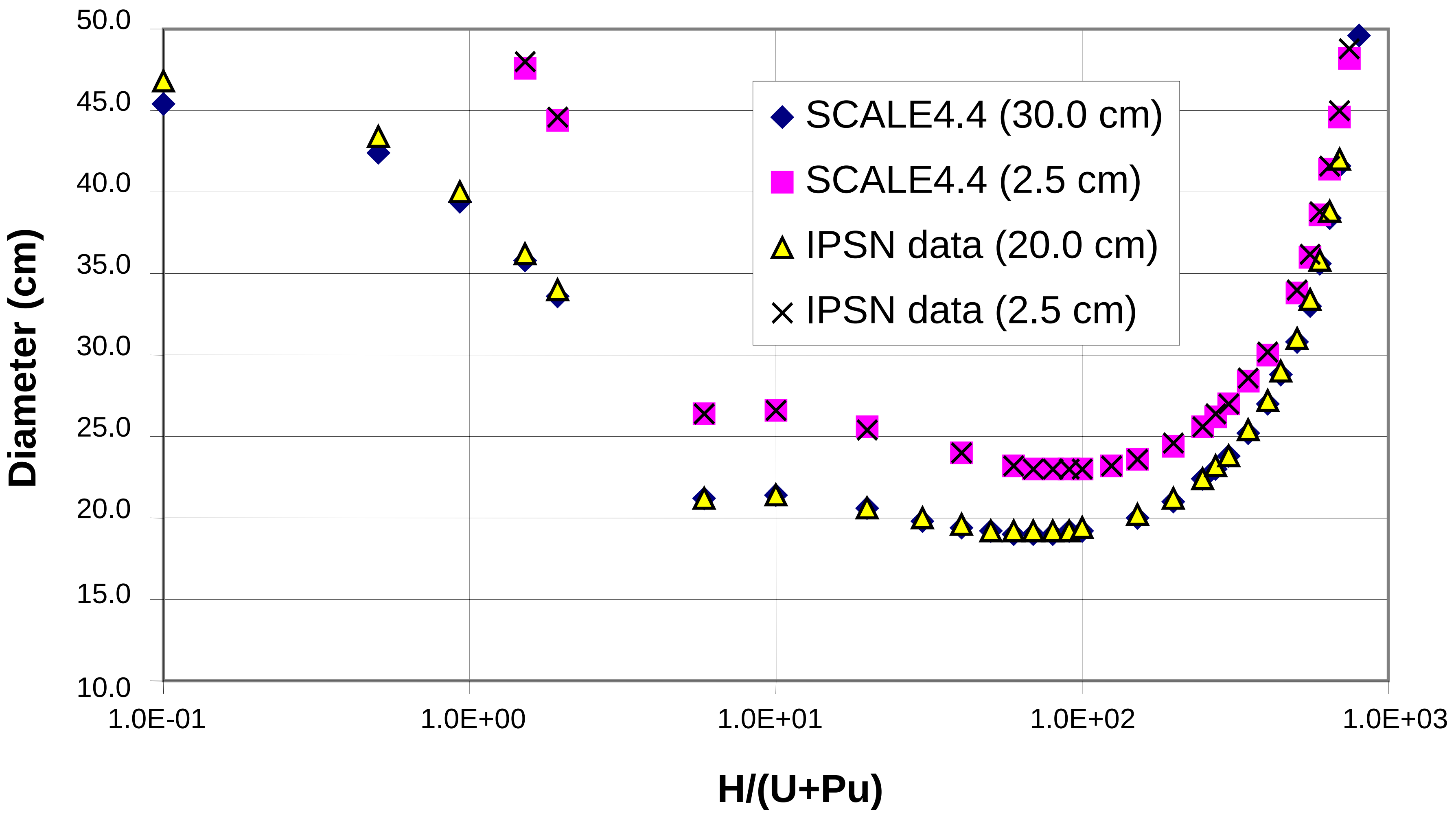

Fig. A.2.a.7-2. Cylinder diameter infinity [^{235}U/U = 0.3 %, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

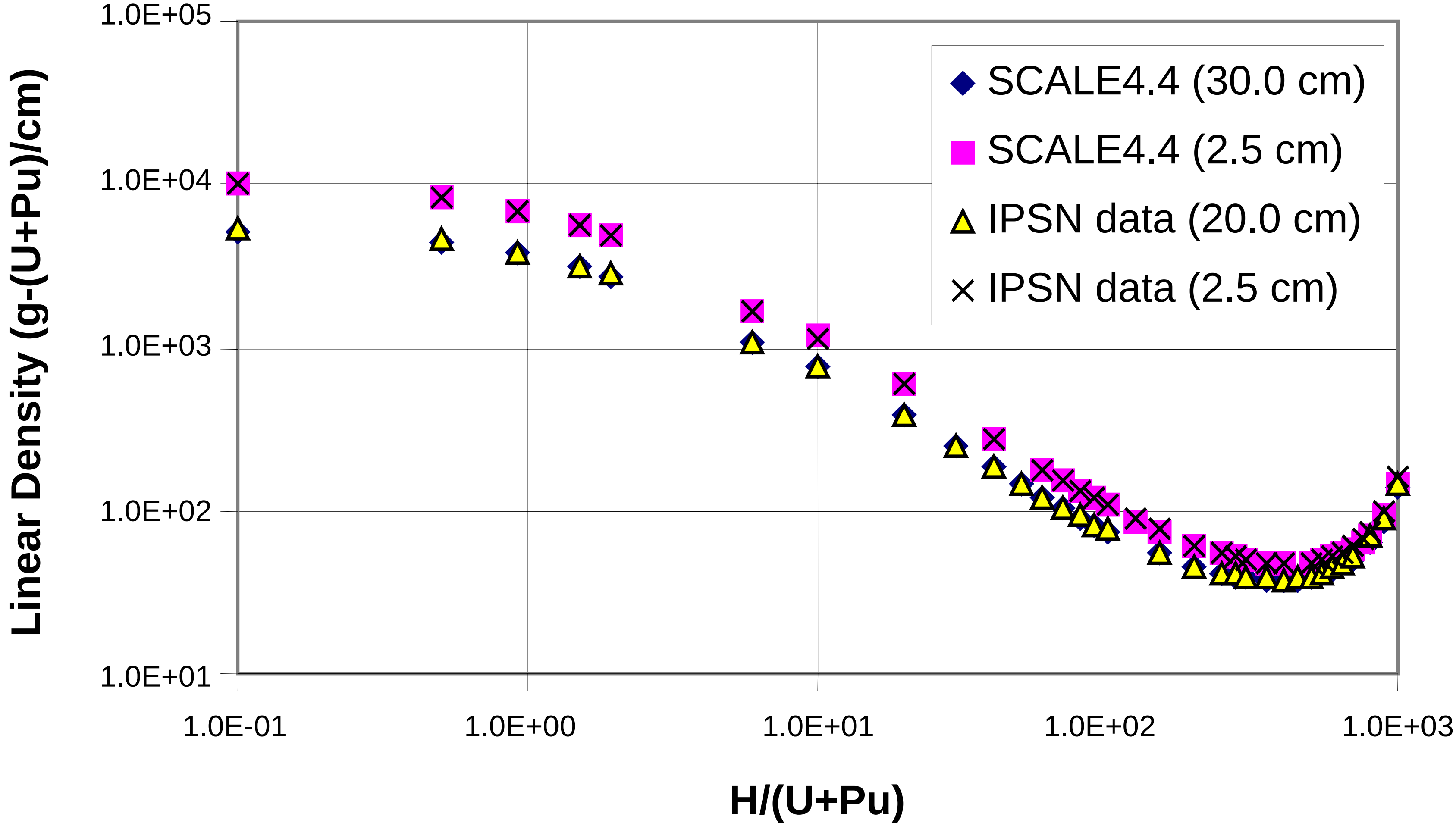

Fig. A.2.a.8. Linear density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

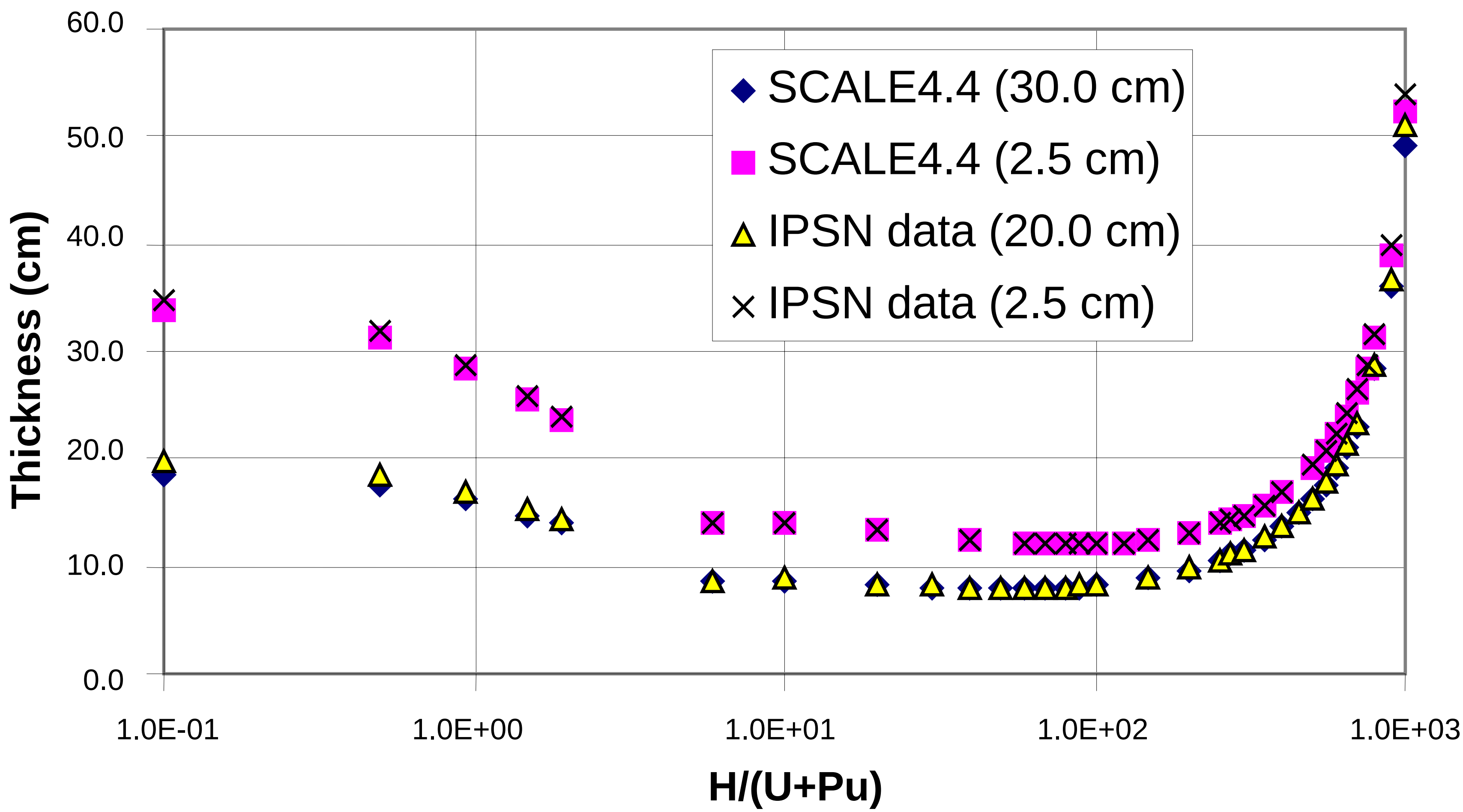

Fig. A.2.a.9-1. Slab thickness [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

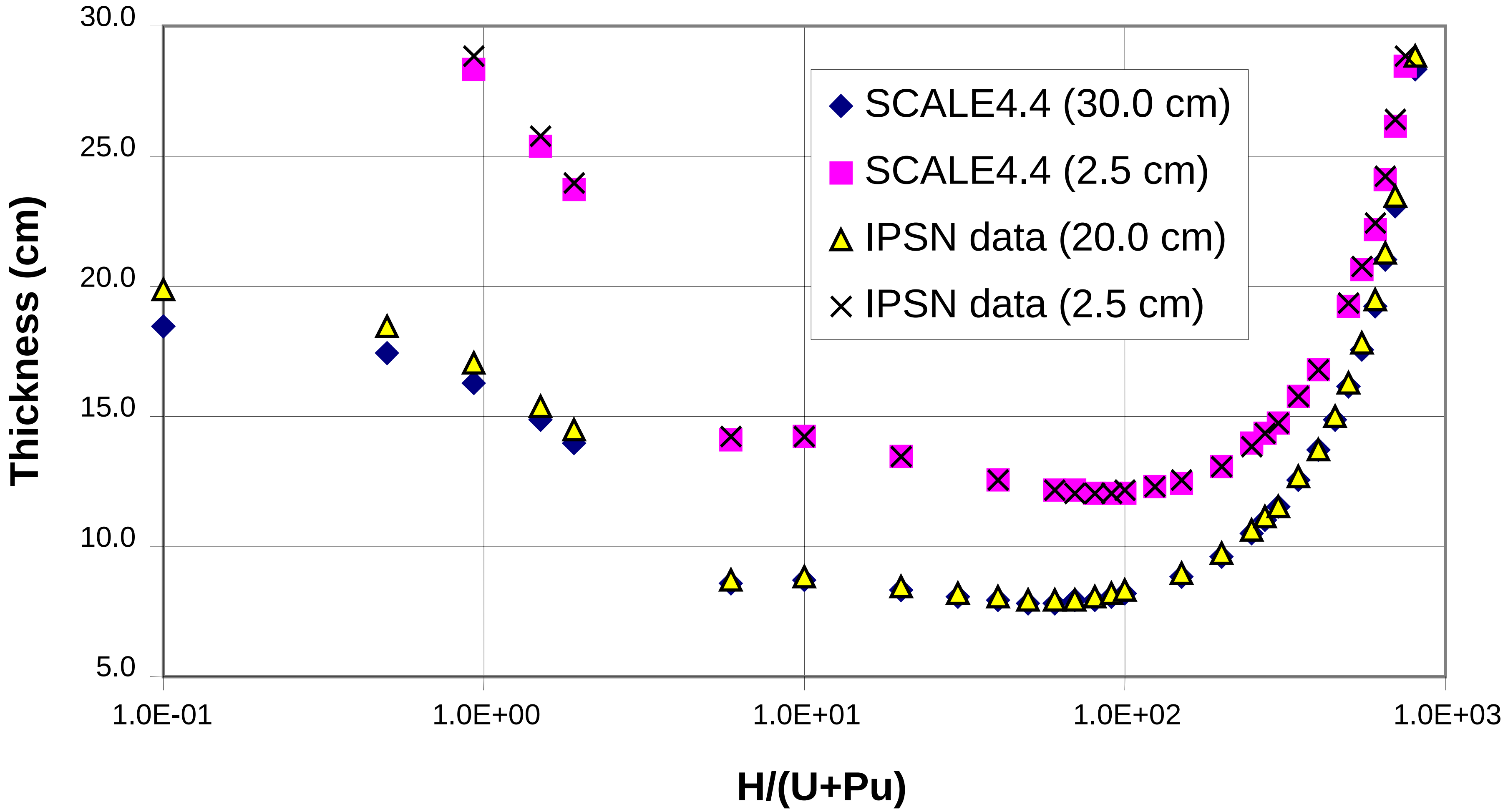

Fig. A.2.a.9-2. Slab thickness [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

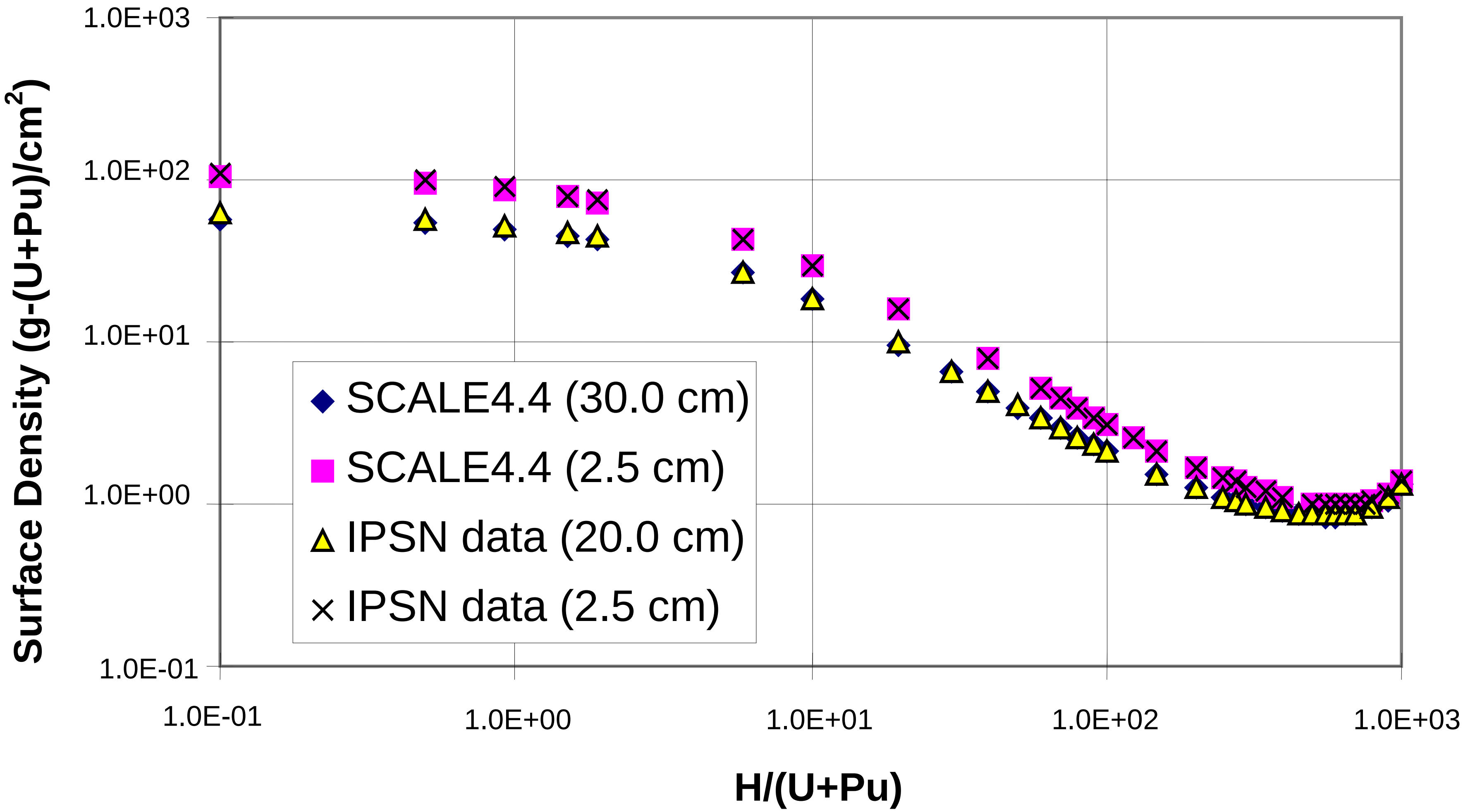

Fig. A.2.a.10. Surface density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

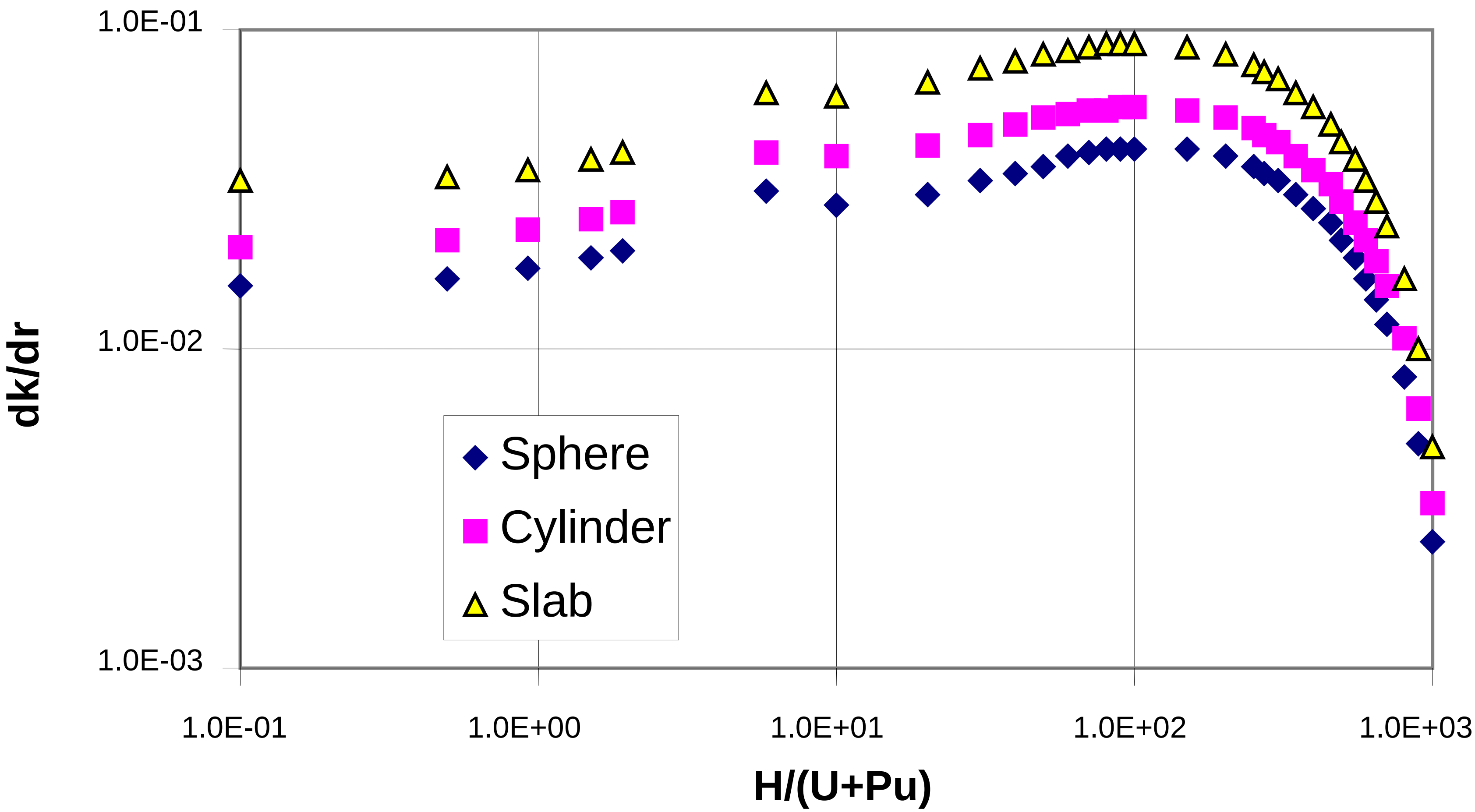

Fig. A.2.a.11. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 30.0 cm].

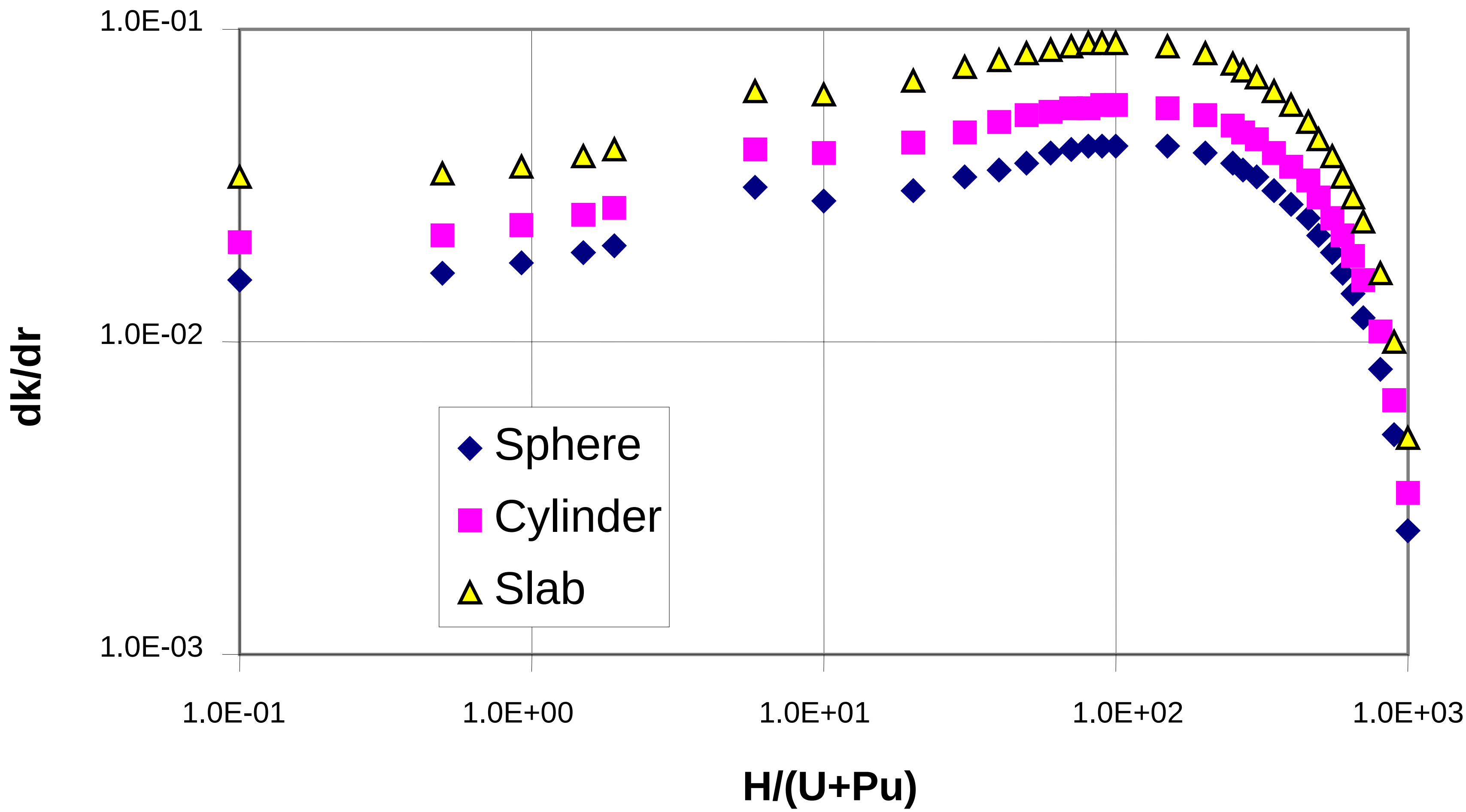

Fig. A.2.a.12. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 2.5 cm].

Table A.2.b.1. MOX data [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**95.000**	**5.000**	**0.000**	**0.000**

Fissile material oxide density
void-free

Water reflector
30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2
0.1	0.33	9.37840	10.63839	1.41070	7.408E-03
0.5	1.64	8.21316	9.31660	1.35284	8.069E-03
0.928	3.00	7.24940	8.22335	1.32293	8.399E-03
1.5	4.76	6.26664	7.10856	1.30667	8.769E-03
1.916	6.00	5.70424	6.47060	1.30386	9.072E-03
5	14.29	3.42532	3.88551	1.34358	1.160E-02
10	25.00	2.07883	2.35812	1.41745	1.473E-02
20	40.01	1.16383	1.32019	1.50236	1.799E-02
30	50.01	0.80813	0.91670	1.54093	1.934E-02
40	57.15	0.61896	0.70212	1.55637	1.979E-02
50	62.50	0.50155	0.56893	1.55875	1.976E-02
60	66.67	0.42158	0.47822	1.55320	1.945E-02
70	70.00	0.36361	0.41246	1.54255	1.898E-02
80	72.73	0.31965	0.36259	1.52862	1.840E-02
90	75.00	0.28518	0.32349	1.51249	1.776E-02
100	76.93	0.25741	0.29199	1.49492	1.708E-02
125	80.65	0.20703	0.23484	1.44770	1.531E-02
150	83.34	0.17314	0.19640	1.39906	1.355E-02
175	85.37	0.14878	0.16877	1.35107	1.184E-02
200	86.96	0.13043	0.14795	1.30472	1.022E-02
225	88.24	0.11611	0.13171	1.26047	8.694E-03
250	89.29	0.10463	0.11869	1.21842	7.258E-03
275	90.17	0.09521	0.10800	1.17861	5.911E-03
300	90.91	0.08735	0.09909	1.14098	4.647E-03
350	92.11	0.07496	0.08503	1.07180	2.348E-03
400	93.025	0.06566	0.07448	1.00998	3.238E-04
405	93.105	0.06474	0.07344	1.00416	
406	93.121	0.06458	0.07326	1.00301	
407	93.136	0.06442	0.07307	1.00185	
408	93.152	0.06427	0.07290	1.00070	
409	**93.168**	**0.06411**	**0.07272**	**0.99957**	
410	93.183	0.06396	0.07255	0.99842	
415	93.260	0.06319	0.07168	0.99272	
450	93.751	0.05831	0.06614	0.95457	

H/(U + Pu)	Sphere					Cylinder			Slab		
	Radius (cm)	dk/dr	Volume (l)	Mass U + Pu (kg)	Mass MOX (kg)	Diameter (cm)	dk/dr	Linear den. Pu + U (g/cm)	Thickness (cm)	dk/dr	Surface den. Pu + U (g/cm^2)
0.1	27.230	1.570E-02	84.575	793.177	899.740	37.137	2.014E-02	10158.782	17.247	2.937E-02	161.750
0.5	26.391	1.523E-02	76.996	632.377	717.337	36.144	1.965E-02	8426.899	17.078	2.886E-02	140.264
0.928	25.872	1.476E-02	72.539	525.867	596.517	35.439	1.913E-02	7150.723	16.777	2.839E-02	121.627
1.5	25.234	1.465E-02	67.305	421.776	478.441	34.521	1.905E-02	5865.247	16.286	2.852E-02	102.061
1.916	24.722	1.486E-02	63.291	361.029	409.534	33.771	1.936E-02	5109.587	15.861	2.912E-02	90.474
5	21.291	1.748E-02	40.425	138.467	157.070	28.748	2.470E-02	2223.311	12.986	3.784E-02	44.480
10	18.480	2.318E-02	26.435	54.954	62.337	24.705	3.282E-02	996.471	10.793	5.097E-02	22.437
20	16.553	3.180E-02	18.997	22.109	25.079	22.031	4.212E-02	443.674	9.529	6.598E-02	11.090
30	16.017	3.487E-02	17.210	13.908	15.777	21.359	4.624E-02	289.556	**9.333**	7.279E-02	7.542
40	**15.944**	3.604E-02	**16.976**	10.508	11.919	**21.341**	4.781E-02	221.411	9.476	7.533E-02	5.865
50	16.088	3.616E-02	17.442	8.748	9.923	21.628	4.795E-02	184.256	9.770	7.557E-02	4.900
60	16.356	3.565E-02	18.330	7.727	8.766	22.086	4.726E-02	161.518	10.149	7.444E-02	4.279
70	16.706	3.472E-02	19.531	7.102	8.056	22.658	4.602E-02	146.614	10.584	7.239E-02	3.849
80	17.115	3.355E-02	21.000	6.713	7.614	23.312	4.443E-02	136.439	11.060	6.980E-02	3.535
90	17.571	3.221E-02	22.724	6.480	7.351	24.033	4.264E-02	129.365	11.570	6.686E-02	3.300
100	18.069	3.077E-02	24.709	**6.360**	**7.215**	24.812	4.071E-02	124.467	12.112	6.375E-02	3.118
125	19.471	2.700E-02	30.922	6.402	7.262	26.990	3.566E-02	118.450	13.596	5.560E-02	2.815
150	21.101	2.322E-02	39.355	6.814	7.729	29.502	3.062E-02	**118.359**	15.234	4.774E-02	2.638
175	22.987	1.960E-02	50.878	7.570	8.587	32.397	2.581E-02	122.645	17.121	4.016E-02	2.547
200	25.186	1.622E-02	66.922	8.729	9.901	35.765	2.132E-02	131.037	19.331	3.307E-02	**2.521**
225	27.791	1.312E-02	89.909	10.439	11.842	39.750	1.723E-02	144.091	21.903	2.668E-02	2.543
250	30.951	1.031E-02	124.193	12.994	14.740	44.580	1.353E-02	163.318	25.041	2.089E-02	2.620
275	34.911	7.800E-03	178.220	16.968	19.248	50.632	1.022E-02	191.702	28.967	1.576E-02	2.758
300	40.098	5.594E-03	270.060	23.590	26.759	58.561	7.317E-03	235.275	34.119	1.126E-02	2.980
350	58.763	2.113E-03	849.964	63.713	72.273	87.101	2.761E-03	446.650	52.688	4.228E-03	3.950

Table A.2.b.2. MOX data [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	99.700	95.000	5.000	0.000	0.000

Fissile material oxide density void-free

Water reflector 2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	9.37840	10.63839	1.41070	7.408E-03	31.733	1.642E-02	133.856	1255.357	1424.014	46.274	2.136E-02	15771.943	26.796	3.231E-02	251.302
0.5	1.64	8.21316	9.31660	1.35284	8.069E-03	30.337	1.565E-02	116.946	960.495	1089.538	44.180	2.039E-02	12590.750	25.502	3.102E-02	209.455
0.928	3.00	7.24940	8.22335	1.32293	8.399E-03	29.628	1.501E-02	108.946	789.797	895.906	43.094	1.959E-02	10573.763	24.794	2.988E-02	179.745
1.5	4.76	6.26664	7.10856	1.30667	8.769E-03	28.855	1.478E-02	100.633	630.628	715.352	41.904	1.931E-02	8642.507	24.005	2.954E-02	150.429
1.916	6.00	5.70424	6.47060	1.30386	9.072E-03	28.267	1.494E-02	94.612	539.690	612.197	40.999	1.954E-02	7530.533	23.407	2.992E-02	133.518
5	14.29	3.42532	3.88551	1.34358	1.160E-02	24.408	1.721E-02	60.907	208.624	236.653	35.089	2.266E-02	3312.401	19.565	3.781E-02	67.015
10	25.00	2.07883	2.35812	1.41745	1.473E-02	21.179	2.269E-02	39.795	82.727	93.842	30.190	2.998E-02	1488.150	16.450	5.005E-02	34.197
20	40.01	1.16383	1.32019	1.50236	1.799E-02	18.841	2.904E-02	28.016	32.605	36.986	26.679	3.846E-02	650.607	14.299	6.422E-02	16.642
30	50.01	0.80813	0.91670	1.54093	1.934E-02	18.096	3.422E-02	24.823	20.060	22.755	25.583	4.519E-02	415.420	13.673	7.051E-02	11.050
40	57.15	0.61896	0.70212	1.55637	1.979E-02	**17.894**	3.539E-02	**24.000**	14.855	16.851	**25.303**	4.675E-02	311.236	**13.583**	7.272E-02	8.407
50	62.50	0.50155	0.56893	1.55875	1.976E-02	17.949	3.554E-02	24.222	12.149	13.781	25.407	4.696E-02	254.287	13.685	7.308E-02	6.864
60	66.67	0.42158	0.47822	1.55320	1.945E-02	18.152	3.508E-02	25.052	10.562	11.980	25.732	4.634E-02	219.242	13.923	7.210E-02	5.870
70	70.00	0.36361	0.41246	1.54255	1.898E-02	18.451	3.421E-02	26.312	9.567	10.853	26.201	4.519E-02	196.042	14.250	7.028E-02	5.181
80	72.73	0.31965	0.36259	1.52862	1.840E-02	18.820	3.308E-02	27.921	8.925	10.124	26.772	4.368E-02	179.945	14.640	6.790E-02	4.680
90	75.00	0.28518	0.32349	1.51249	1.776E-02	19.243	3.180E-02	29.847	8.512	9.655	27.426	4.198E-02	168.469	15.022	6.550E-02	4.284
100	76.93	0.25741	0.29199	1.49492	1.708E-02	19.714	3.041E-02	32.091	8.261	9.370	28.149	4.012E-02	160.197	15.503	6.255E-02	3.991
125	80.65	0.20703	0.23484	1.44770	1.531E-02	21.065	2.674E-02	39.156	**8.106**	**9.196**	30.221	3.525E-02	148.501	16.871	5.482E-02	3.493
150	83.34	0.17314	0.19640	1.39906	1.355E-02	22.660	2.303E-02	48.741	8.439	9.573	32.659	3.034E-02	**145.044**	18.434	4.716E-02	3.192
175	85.37	0.14878	0.16877	1.35107	1.184E-02	24.522	1.947E-02	61.763	9.189	10.424	35.501	2.562E-02	147.270	20.265	3.978E-02	3.015
200	86.96	0.13043	0.14795	1.30472	1.022E-02	26.703	1.614E-02	79.754	10.402	11.800	38.830	2.121E-02	154.455	22.414	3.287E-02	2.923
225	88.24	0.11611	0.13171	1.26047	8.694E-03	29.295	1.306E-02	105.306	12.227	13.870	42.785	1.716E-02	166.935	24.971	2.655E-02	**2.899**
250	89.29	0.10463	0.11869	1.21842	7.258E-03	32.444	1.028E-02	143.047	14.967	16.978	47.593	1.349E-02	186.137	28.085	2.083E-02	2.938
275	90.17	0.09521	0.10800	1.17861	5.911E-03	36.397	7.792E-03	201.966	19.229	21.813	53.628	1.021E-02	215.061	31.991	1.572E-02	3.046
300	90.91	0.08735	0.09909	1.14098	4.647E-03	41.580	5.582E-03	301.122	26.303	29.837	61.546	7.317E-03	259.864	37.128	1.125E-02	3.243
350	92.11	0.07496	0.08503	1.07180	2.348E-03	60.242	2.113E-03	915.766	68.646	77.868	90.074	2.764E-03	477.655	55.679	4.233E-03	4.174
400	93.025	0.06566	0.07448	1.00998	3.238E-04											
405	93.105	0.06474	0.07344	1.00416												
406	93.121	0.06458	0.07326	1.00301												
407	93.136	0.06442	0.07307	1.00185												
408	93.152	0.06427	0.07290	1.00070												
409	**93.168**	**0.06411**	**0.07272**	**0.99957**												
410	93.183	0.06396	0.07255	0.99842												
415	93.260	0.06319	0.07168	0.99272												
450	93.751	0.05831	0.06614	0.95457												

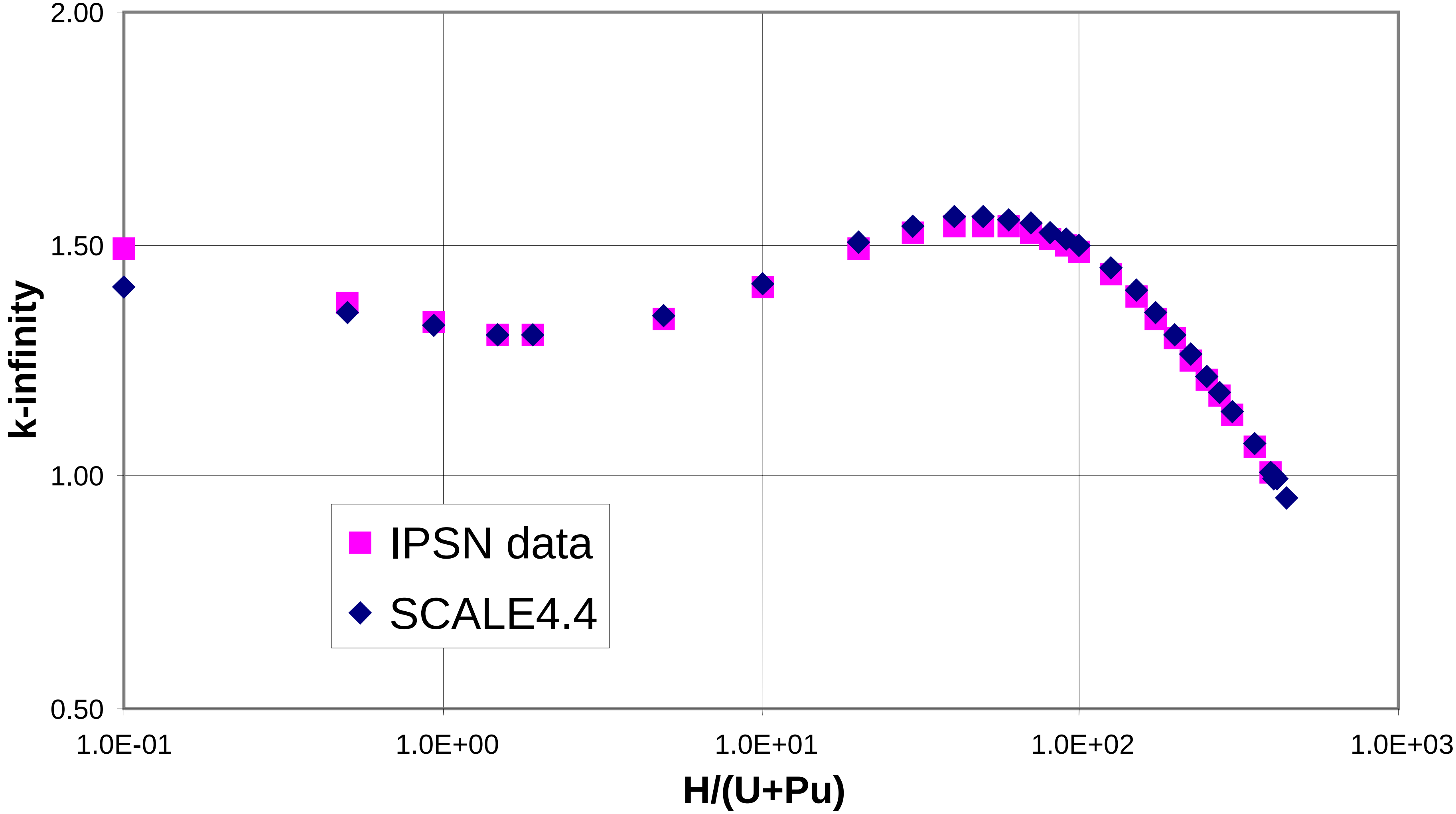

Fig. A.2.b.1. *k*-infinity [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

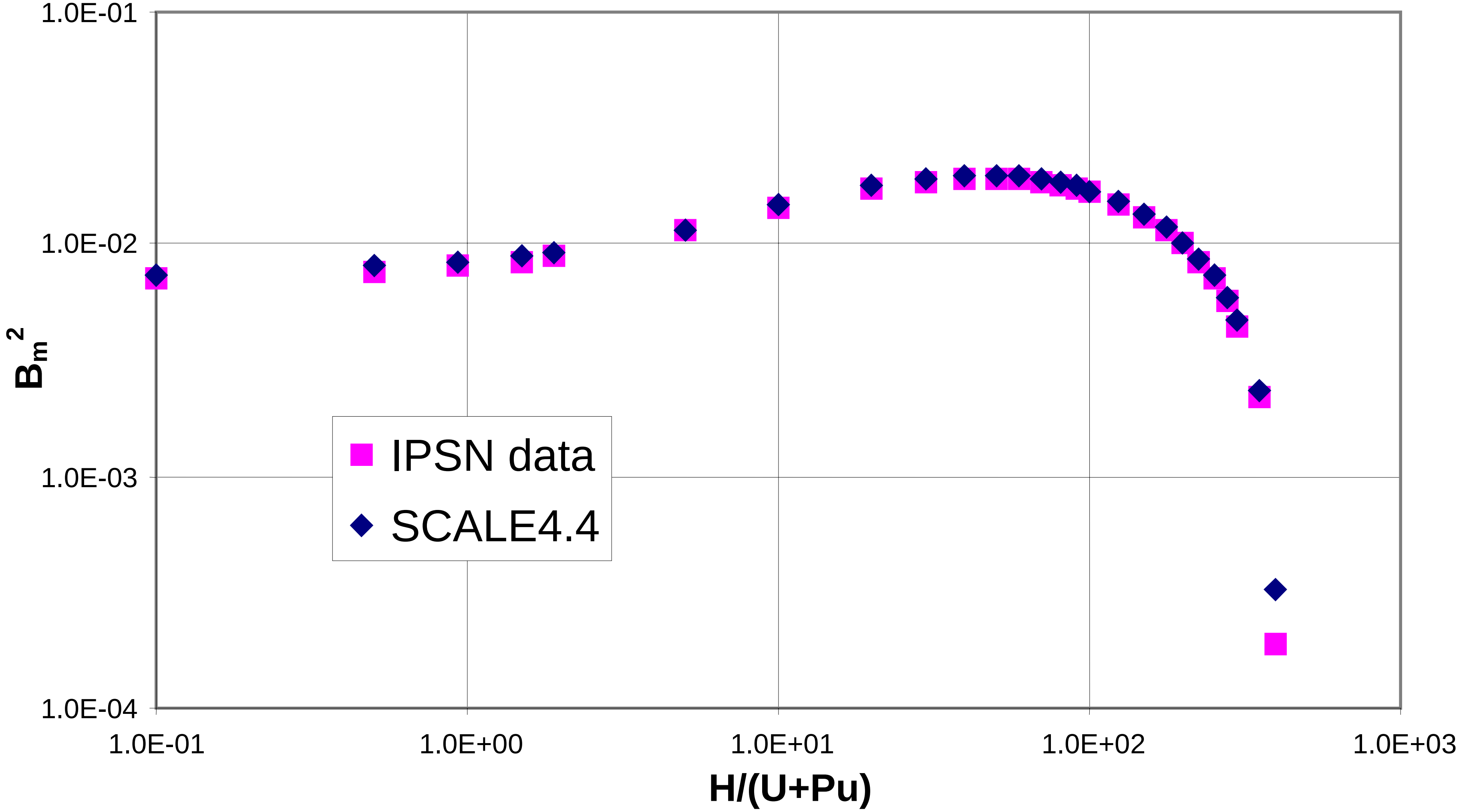

Fig. A.2.b.2. B_m^2 [^{235}U/U = 0.3%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

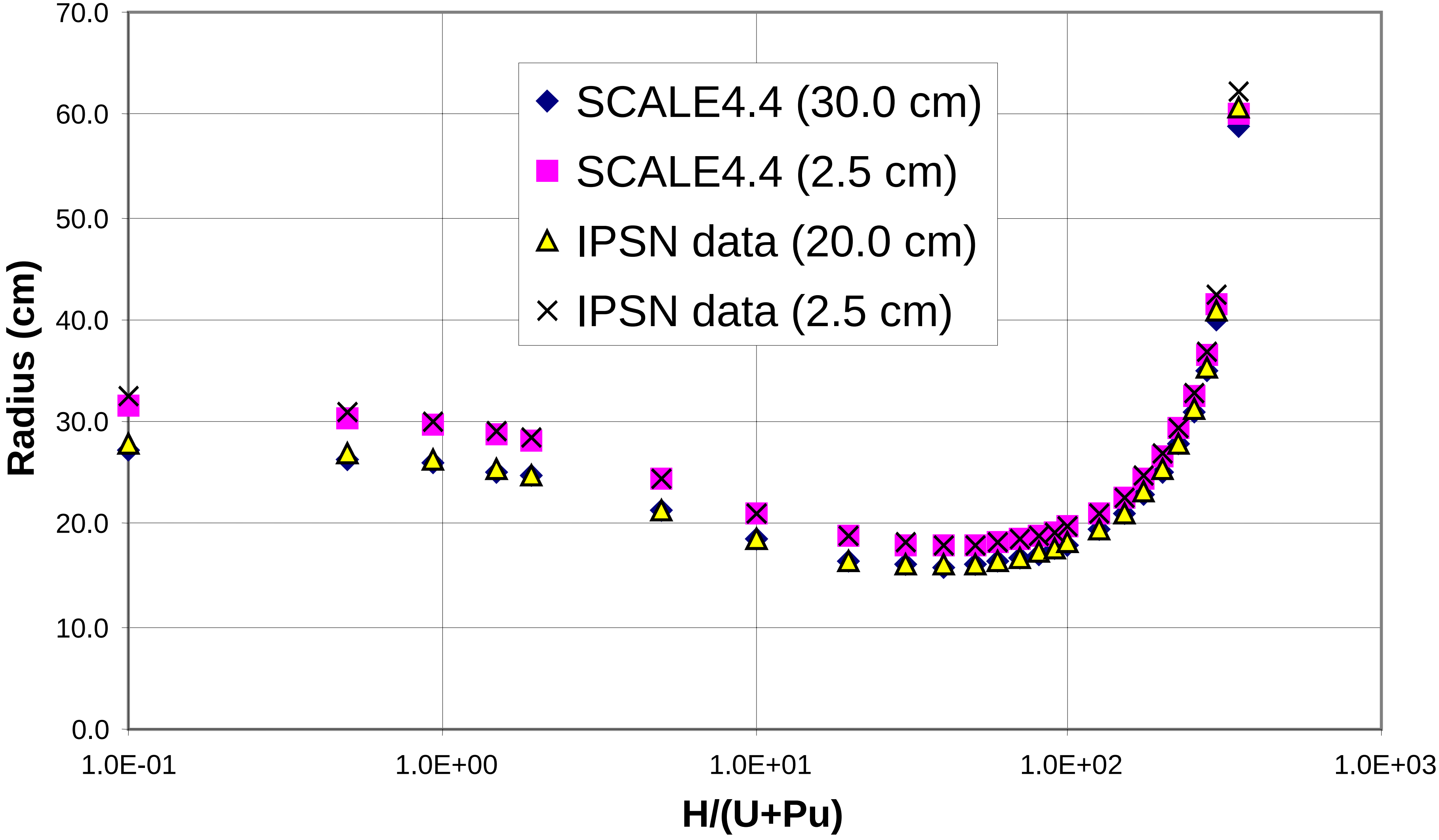

Fig. A.2.b.3-1. Sphere radius [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

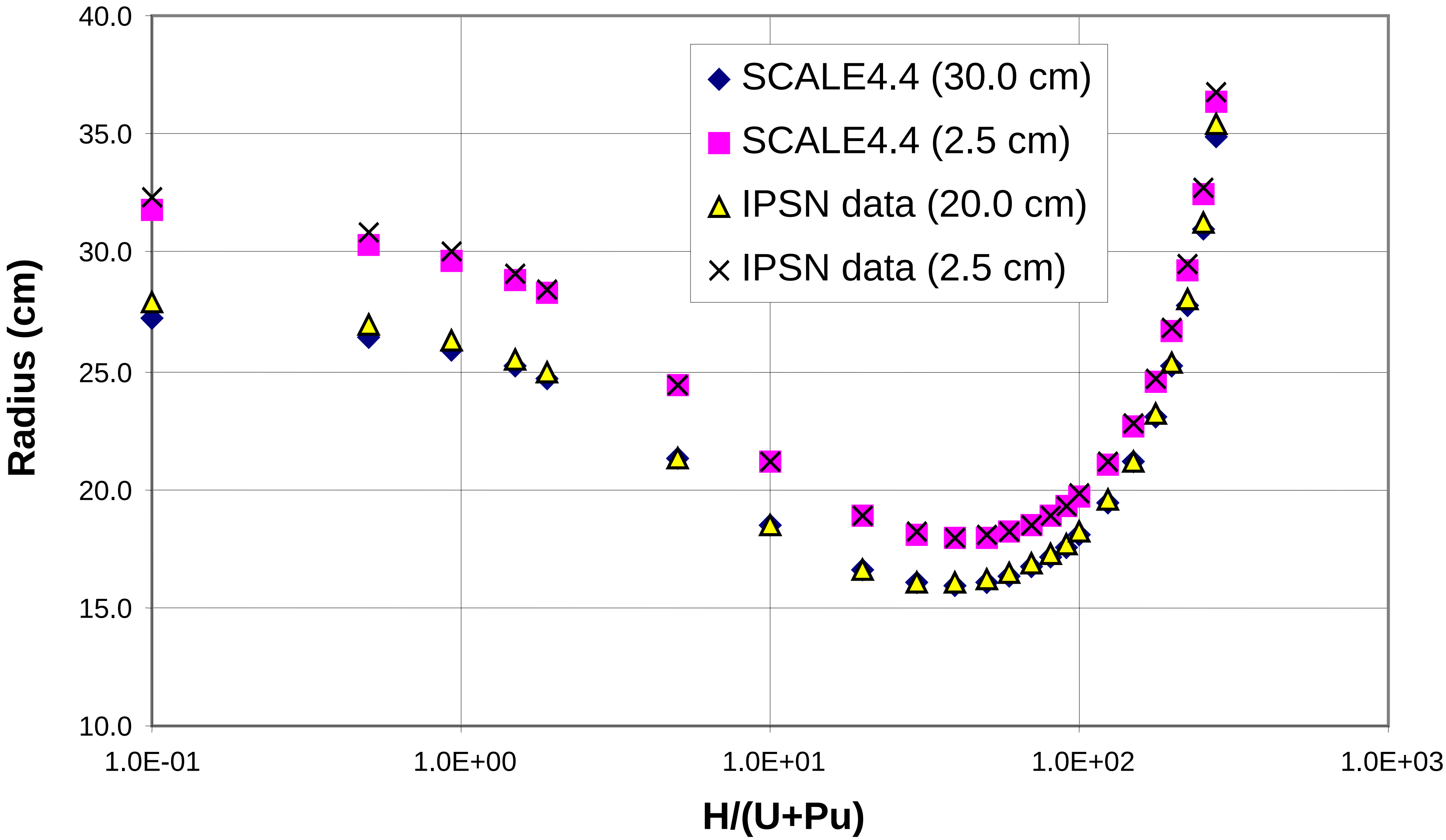

Fig. A.2.b.3-2. Sphere radius [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

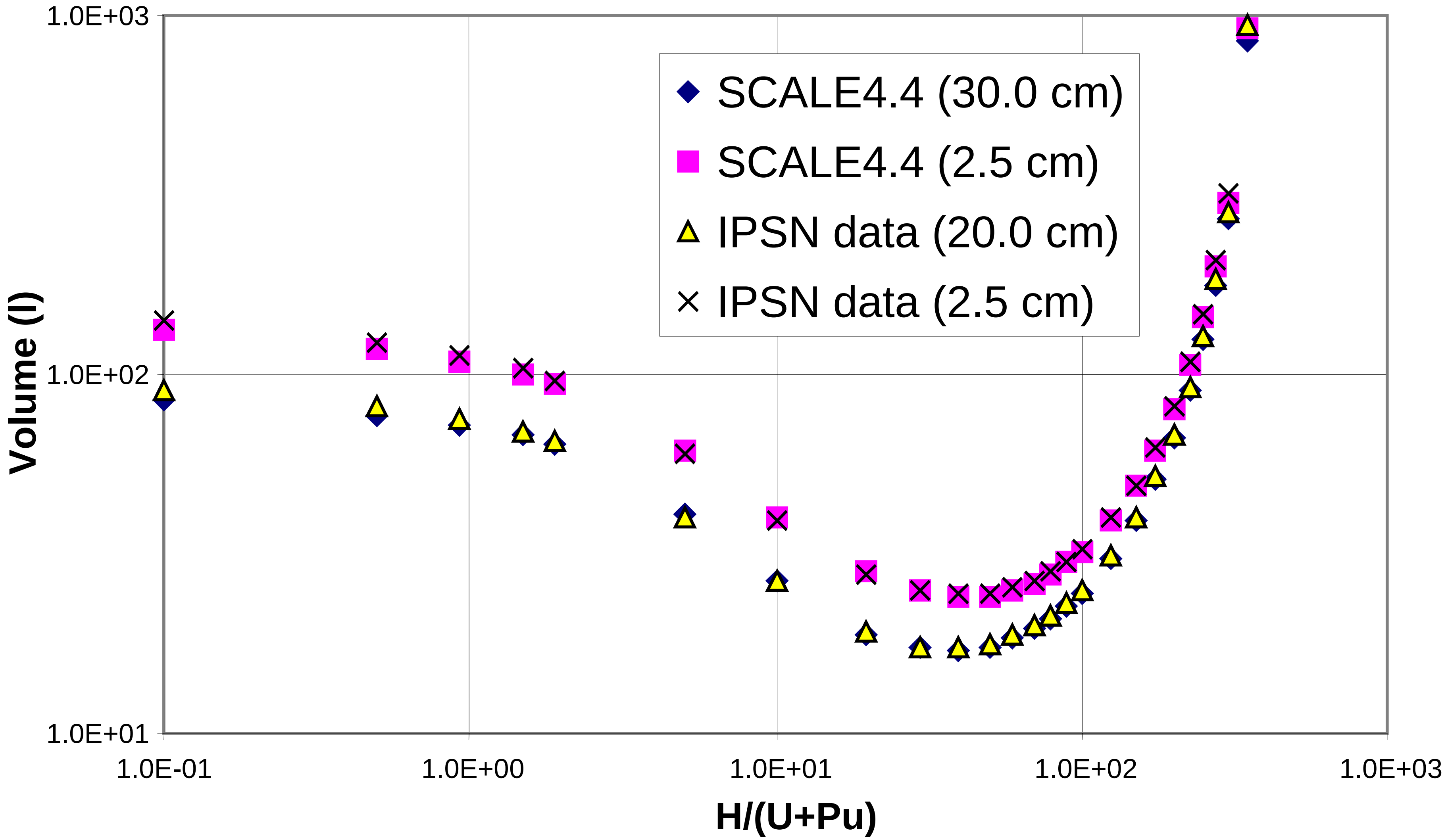

Fig. A.2.b.4. Sphere volume (^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

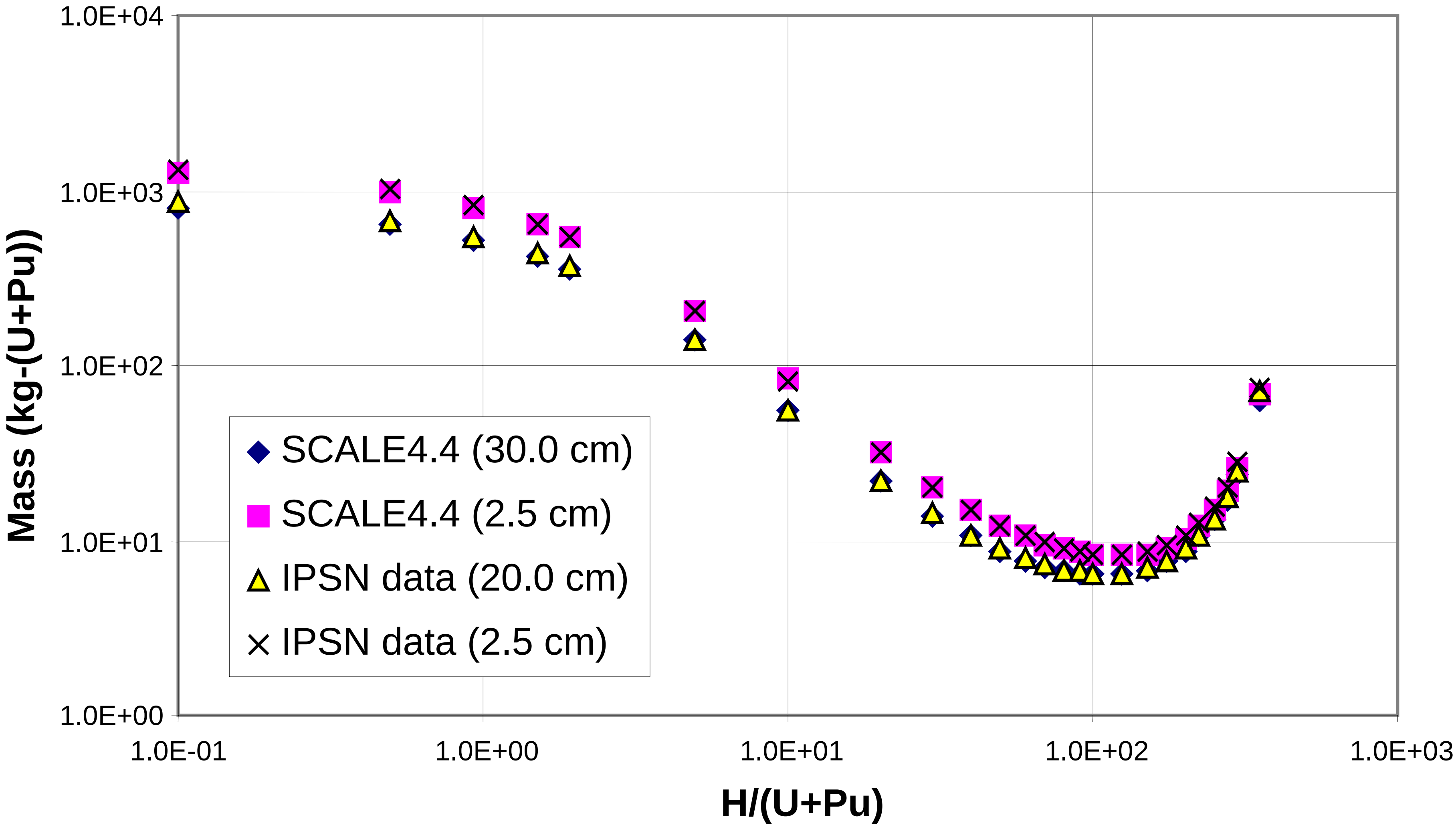

Fig. A.2.b.5. U + Pu mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

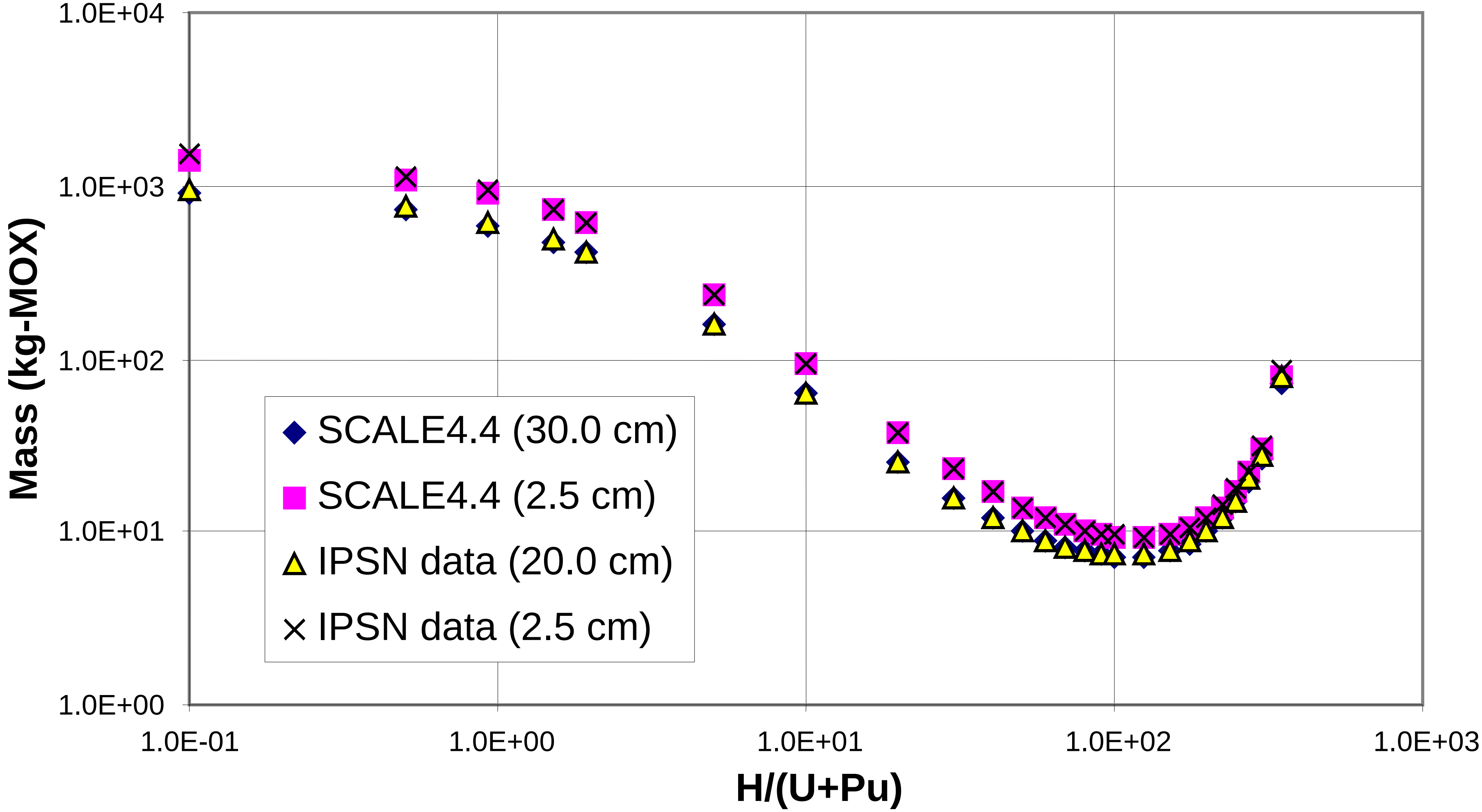

Fig. A.2.b.6. MOX mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

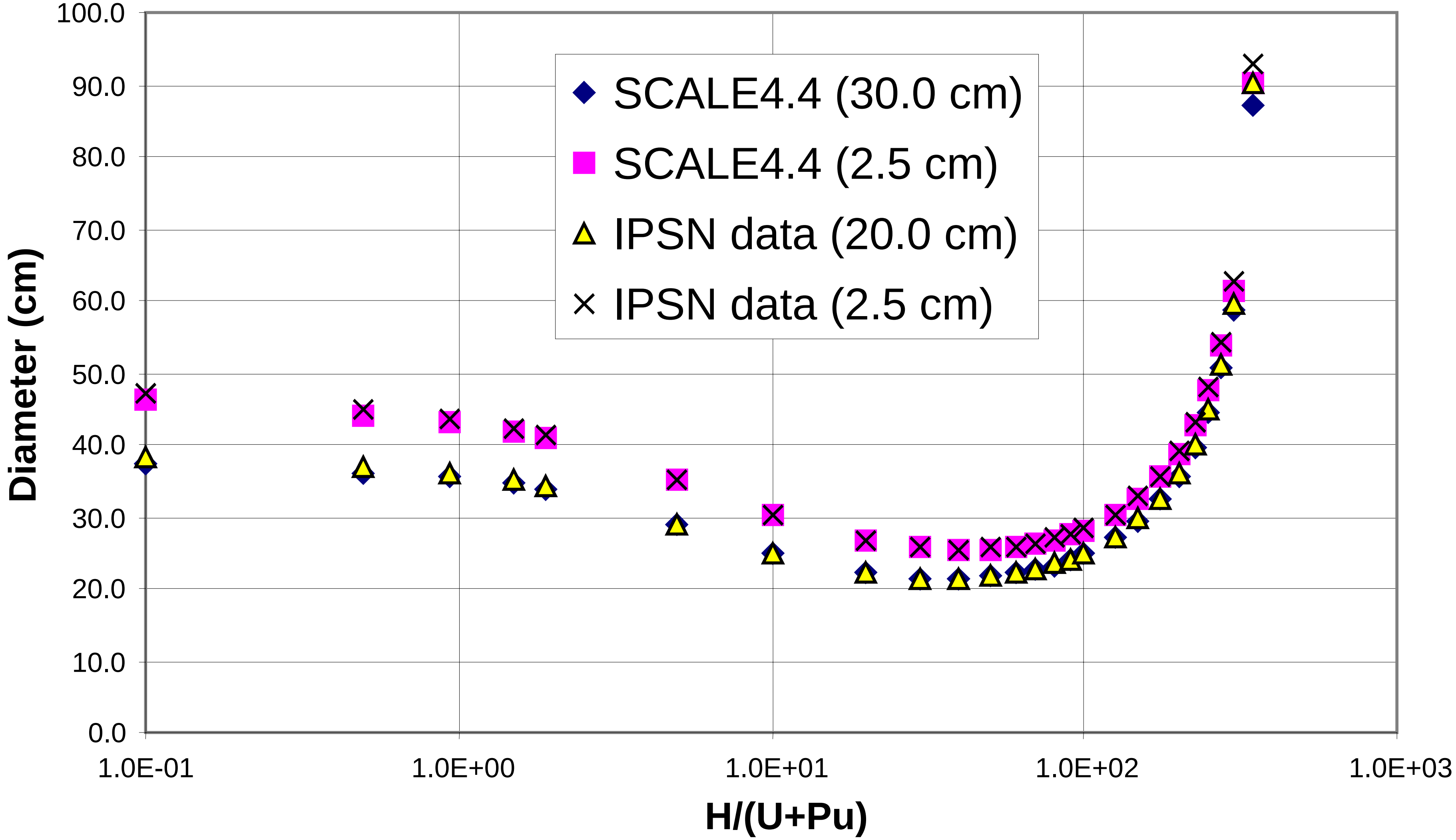

Fig. A.2.b.7-1. Cylinder diameter [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

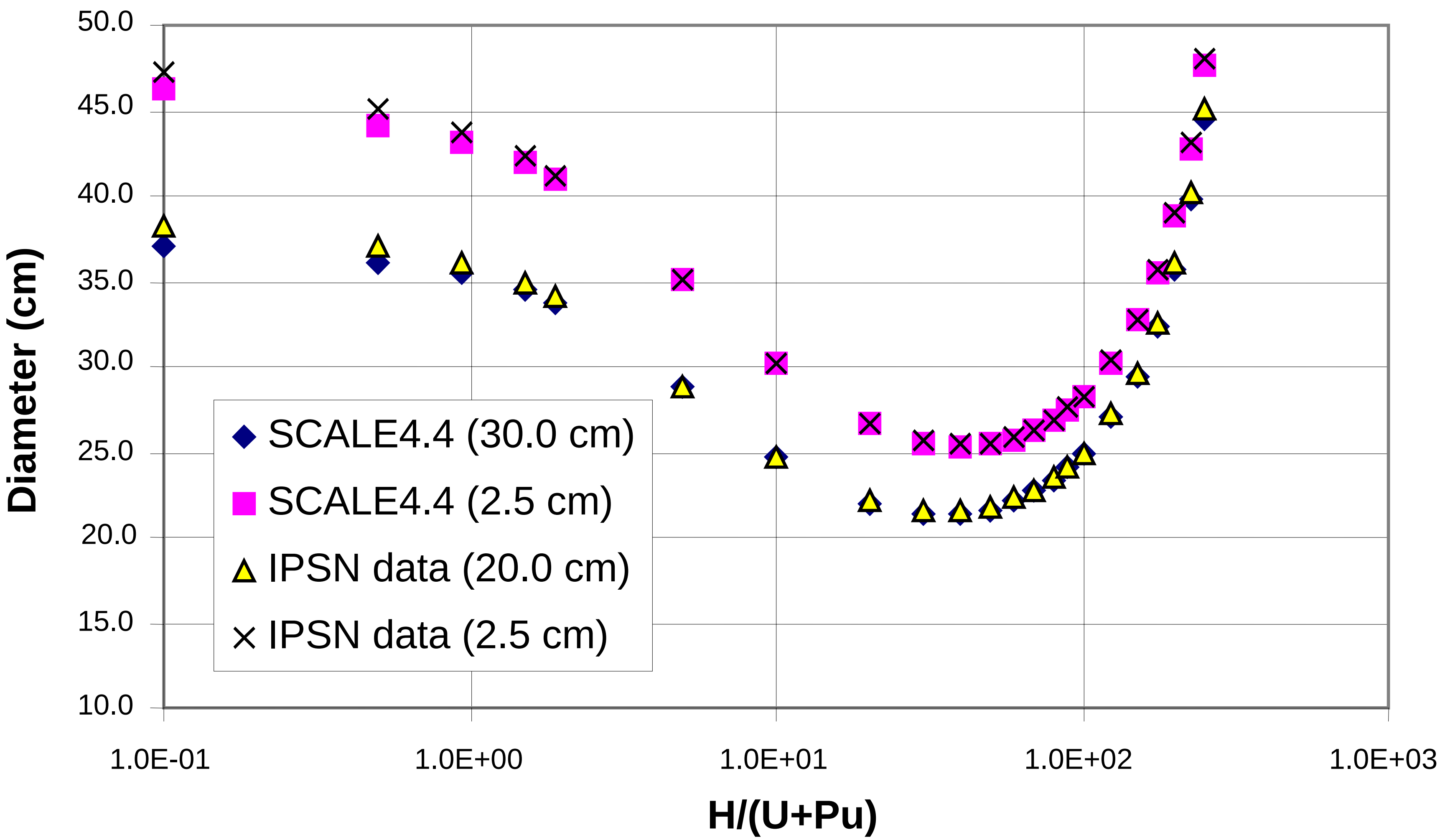

Fig. A.2.b.7-2. Cylinder diameter infinity [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

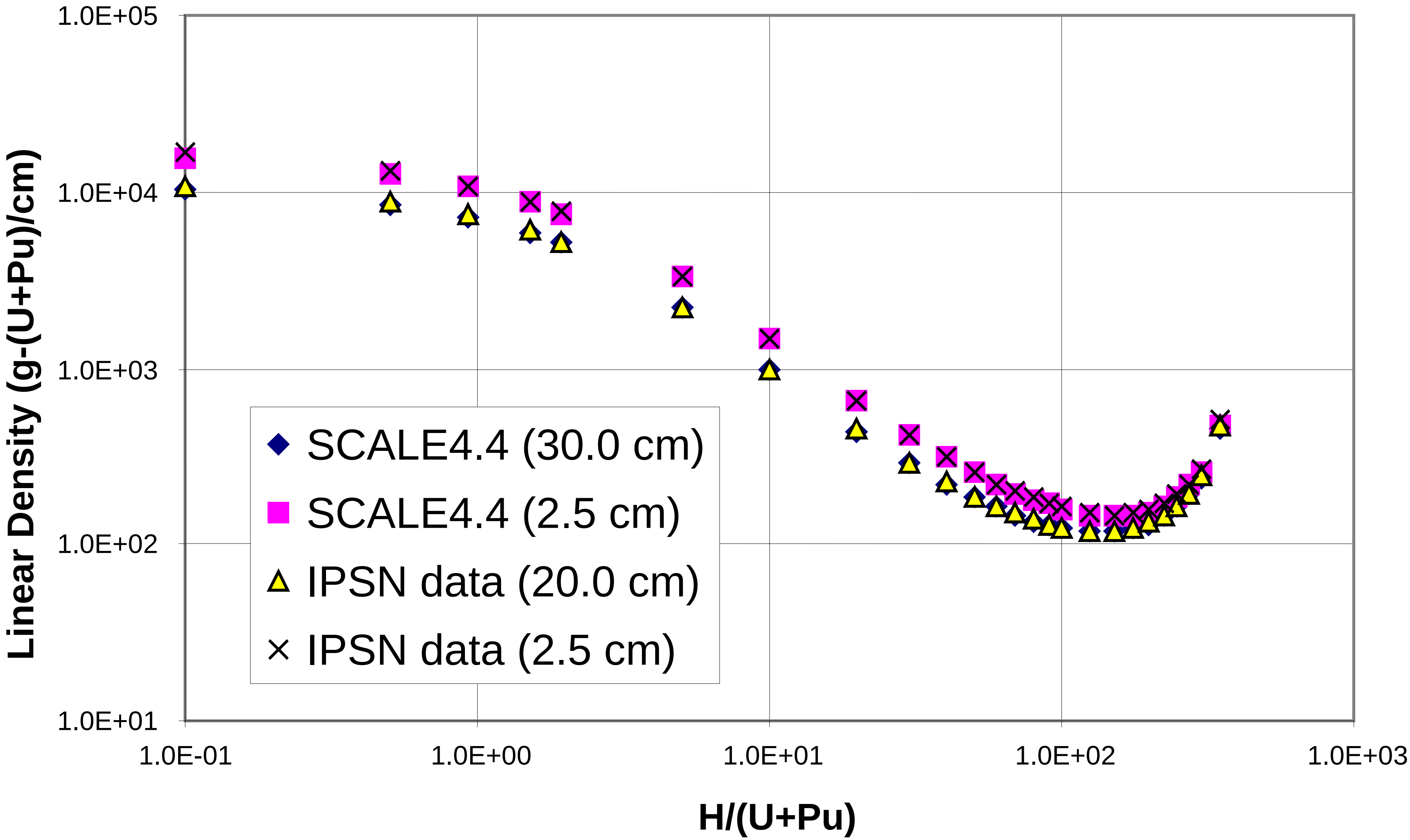

Fig. A.2.b.8. Linear density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

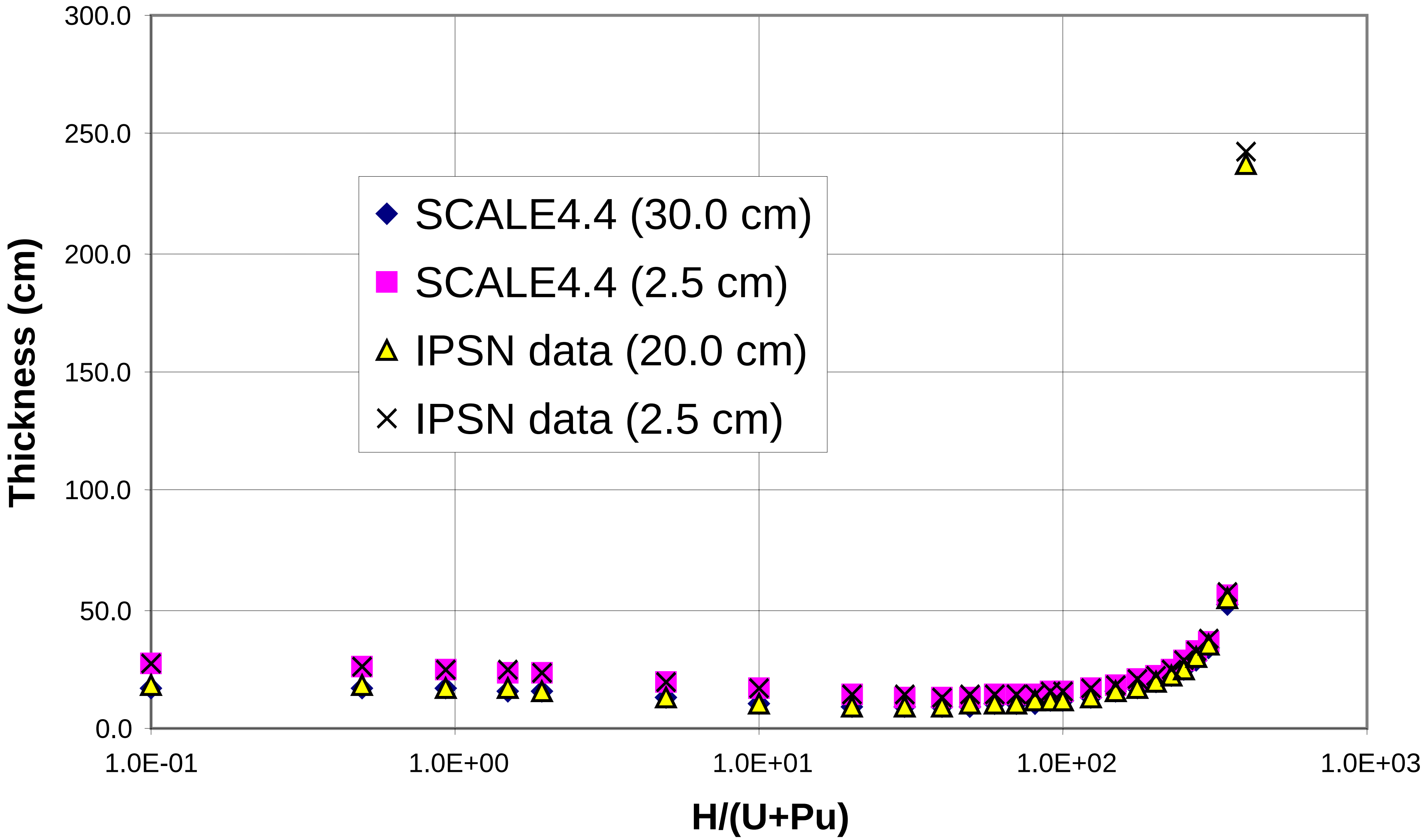

Fig. A.2.b.9-1. Slab thickness [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

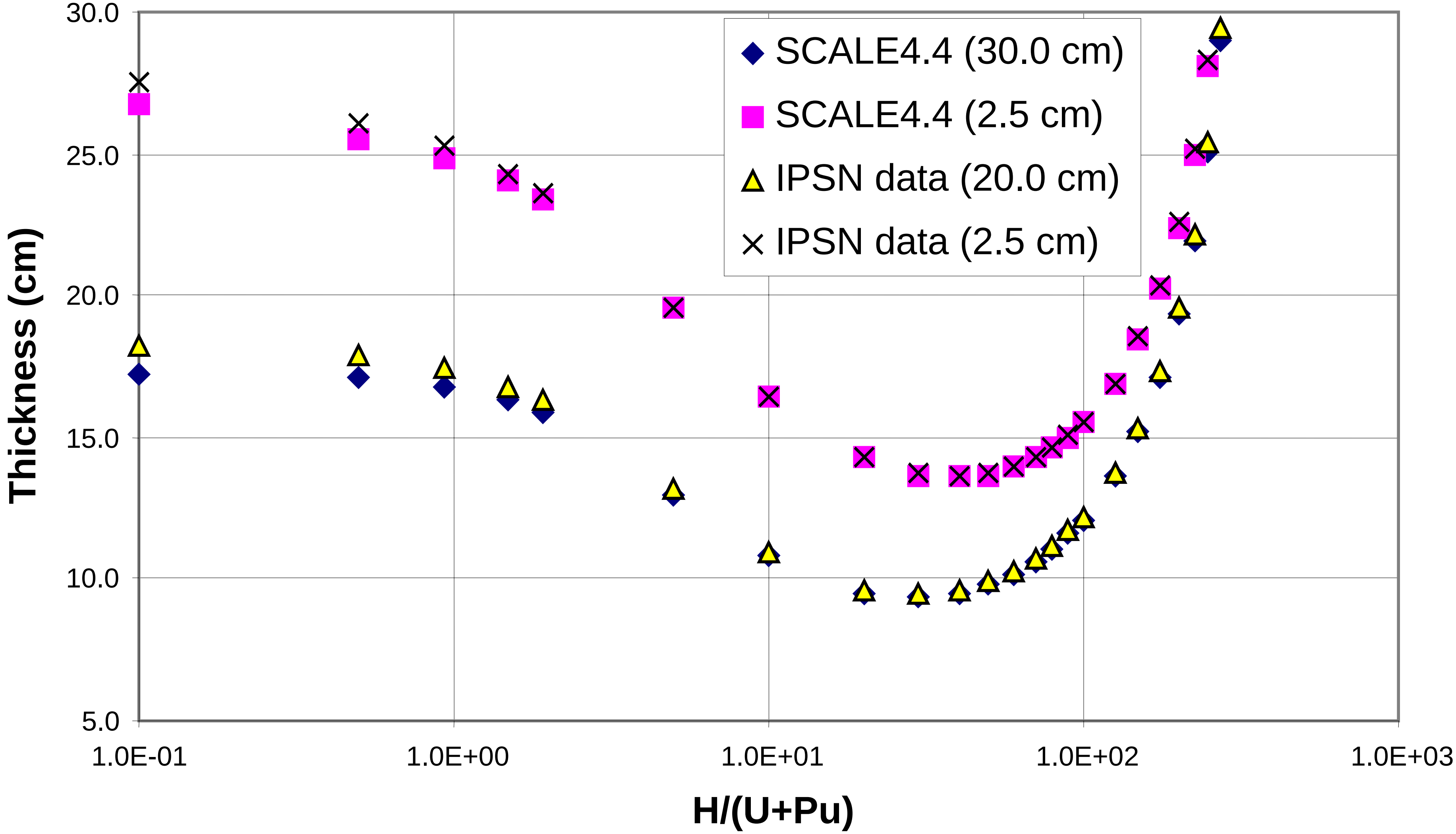

Fig. A.2.b.9-2. Slab thickness [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

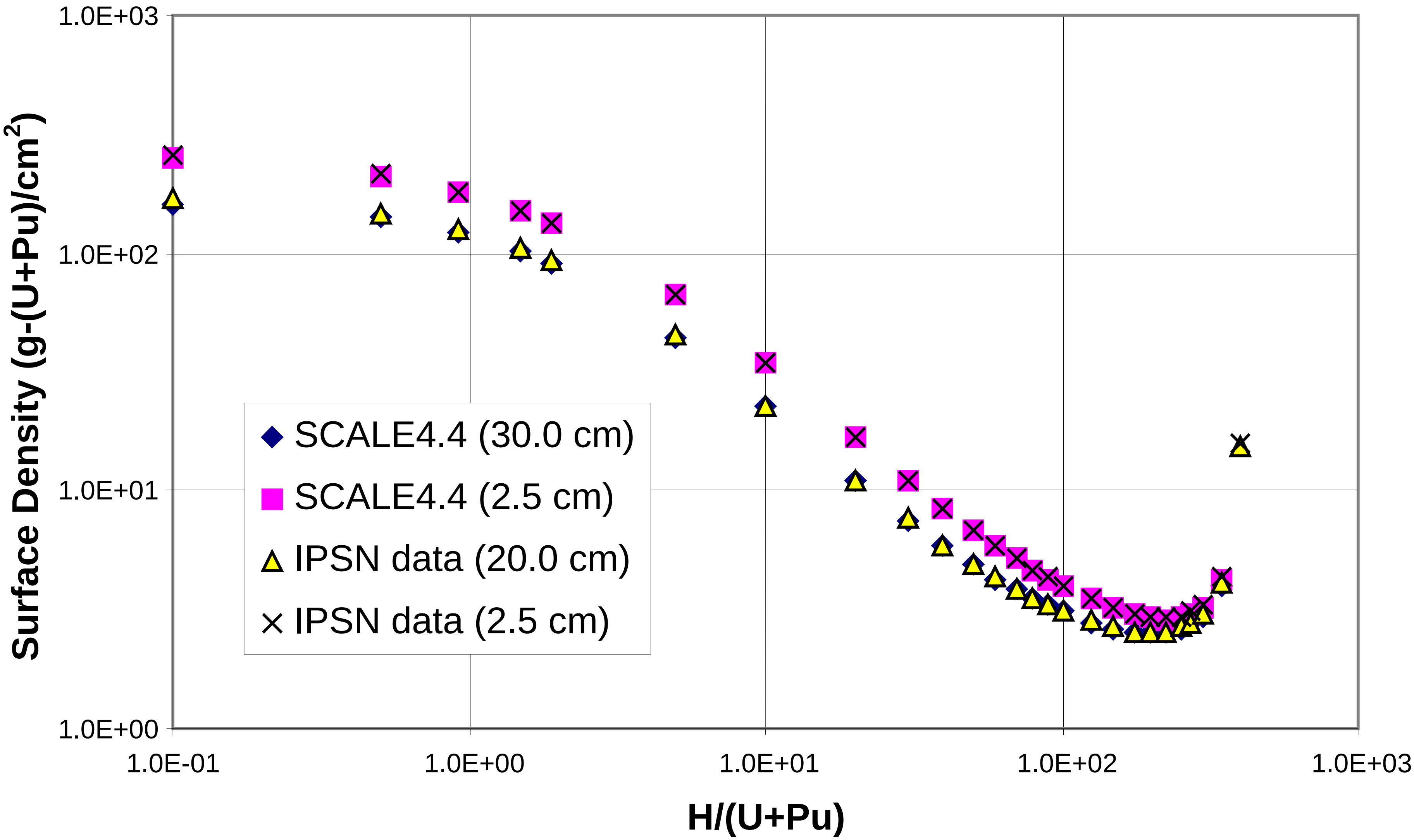

Fig. A.2.b.10. Surface density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

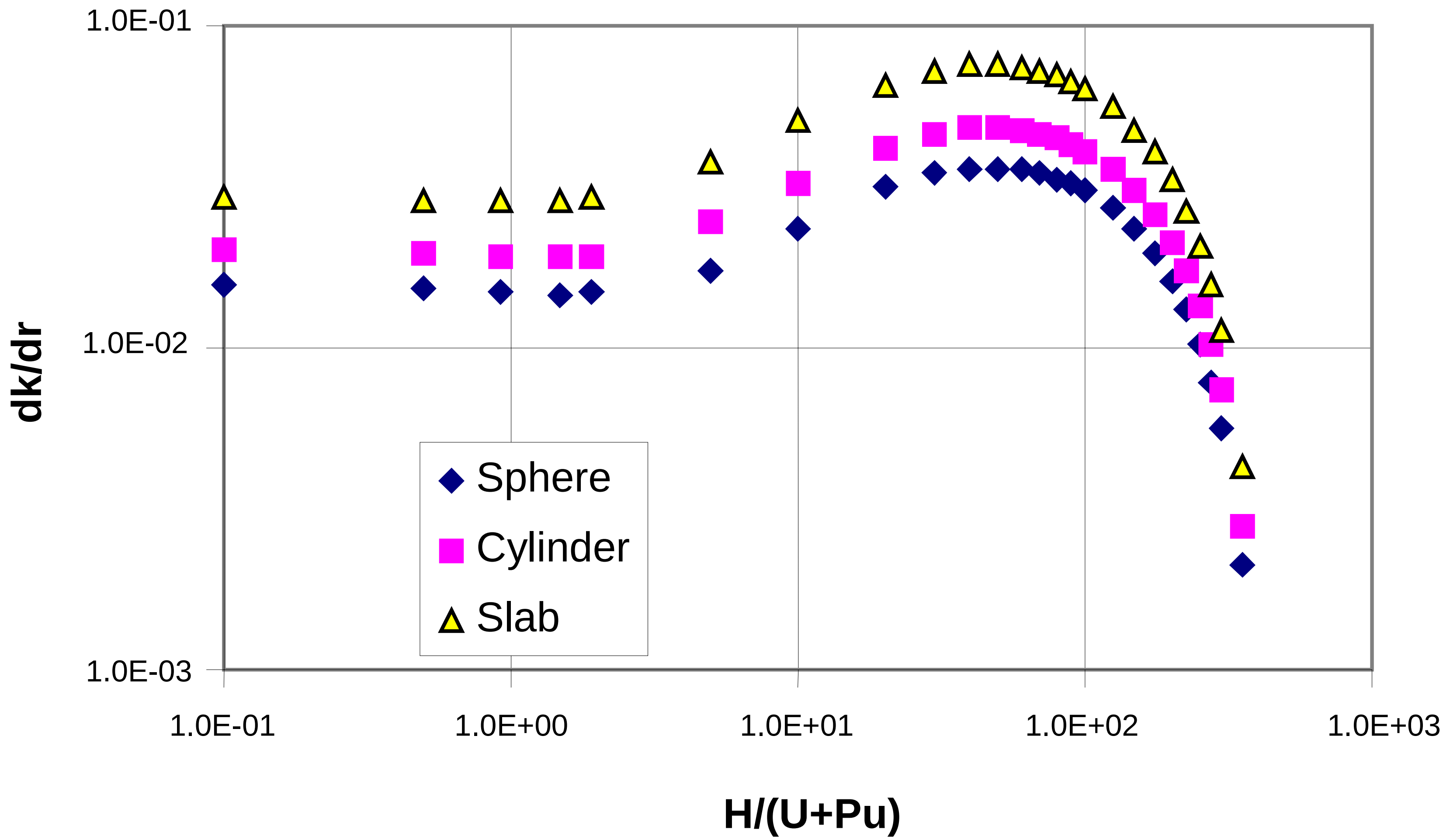

Fig. A.2.b.11. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 30.0 cm].

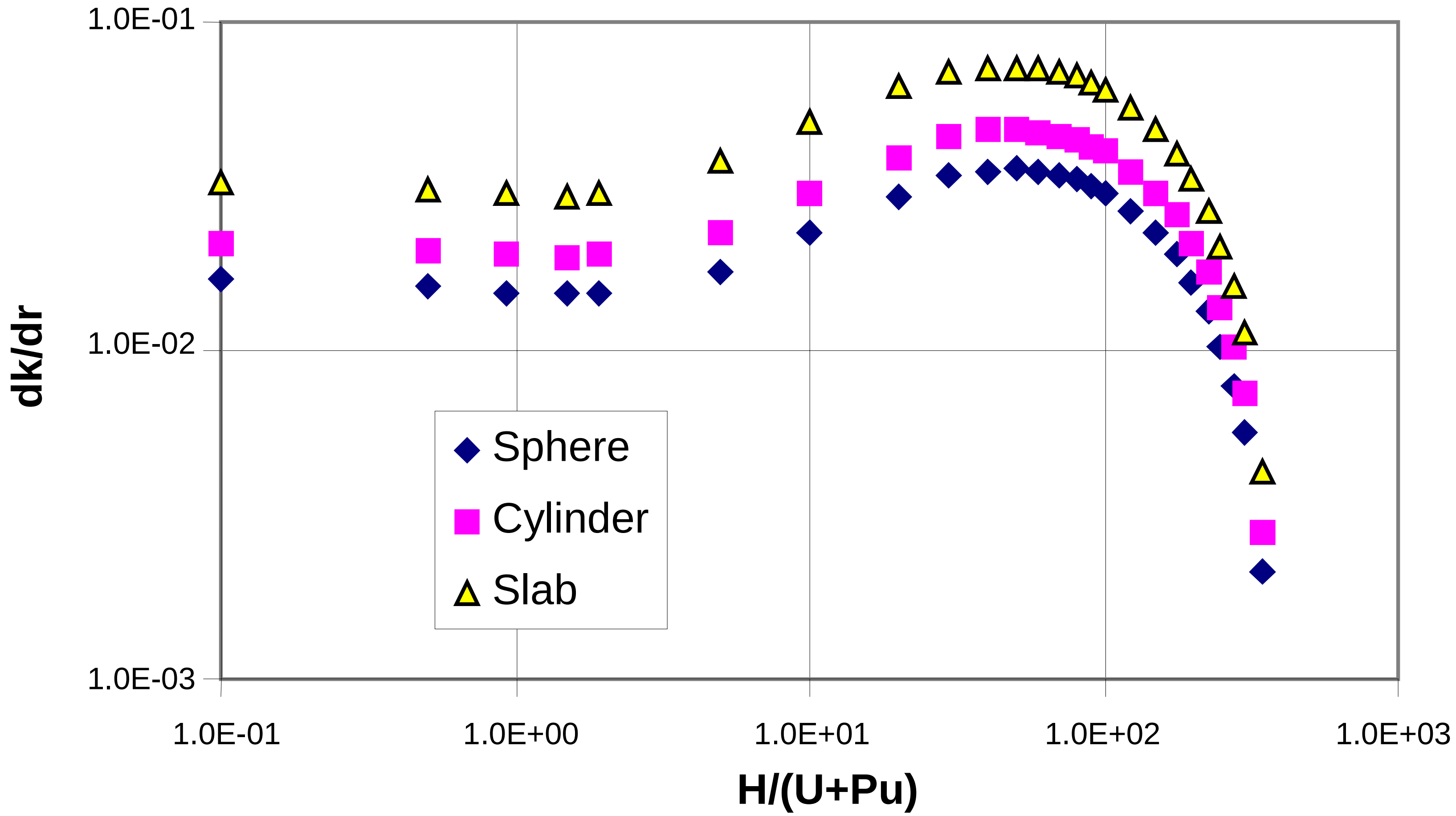

Fig. A.2.b.12. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3%, ^{39}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 2.5 cm].

Table A.2.c.1. MOX data [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**95.000**	**5.000**	**0.000**	**0.000**

Fissile material oxide density
3.5 g (UO_2 + PuO_2)/cm^3

Water reflector
30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08547	3.50000	1.41068	8.018E-04	77.191	4.746E-03	1926.572	5944.377	6743.002	105.956	6.193E-03	27206.041	52.498	9.838E-03	161.980
0.5	1.64	3.08547	3.50000	1.35285	1.139E-03	66.226	5.320E-03	1216.668	3753.992	4258.339	91.199	6.957E-03	20155.563	45.500	1.086E-02	140.389
0.928	3.00	3.08547	3.50000	1.32292	1.521E-03	57.655	5.934E-03	802.790	2476.982	2809.764	79.378	7.734E-03	15269.024	39.451	1.206E-02	121.724
1.5	4.76	3.08547	3.50000	1.30667	2.126E-03	48.952	6.761E-03	491.360	1516.076	1719.761	67.244	9.137E-03	10957.796	33.075	1.395E-02	102.051
1.916	6.00	3.08547	3.50000	1.30387	2.654E-03	43.844	7.704E-03	353.046	1089.311	1235.660	60.104	9.990E-03	8754.342	29.303	1.545E-02	90.415
5.84	16.30	3.08547	3.50000	1.35757	1.220E-02	20.630	1.955E-02	36.777	113.474	128.719	27.794	2.574E-02	1872.031	12.436	4.001E-02	38.372
10	25.00	2.07883	2.35812	1.41745	1.473E-02	18.480	2.318E-02	26.435	54.954	62.337	24.705	3.282E-02	996.471	10.793	5.097E-02	22.437
20	40.01	1.16383	1.32019	1.50236	1.799E-02	16.553	3.180E-02	18.997	22.109	25.079	22.031	4.212E-02	443.674	9.529	6.598E-02	11.090
30	50.01	0.80813	0.91670	1.54093	1.934E-02	16.017	3.487E-02	17.210	13.908	15.777	21.359	4.624E-02	289.556	9.333	7.279E-02	7.542
40	57.15	0.61896	0.70212	1.55637	1.979E-02	**15.944**	3.604E-02	**16.976**	10.508	11.919	**21.341**	4.781E-02	221.411	9.476	7.533E-02	5.865
50	62.50	0.50155	0.56893	1.55875	1.976E-02	16.088	3.616E-02	17.442	8.748	9.923	21.628	4.795E-02	184.256	9.770	7.557E-02	4.900
60	66.67	0.42158	0.47822	1.55320	1.945E-02	16.356	3.565E-02	18.330	7.727	8.766	22.086	4.726E-02	161.518	10.149	7.444E-02	4.279
70	70.00	0.36361	0.41246	1.54255	1.898E-02	16.706	3.472E-02	19.531	7.102	8.056	22.658	4.602E-02	146.614	10.584	7.239E-02	3.849
80	72.73	0.31965	0.36259	1.52862	1.840E-02	17.115	3.355E-02	21.000	6.713	7.614	23.312	4.443E-02	136.439	11.060	6.980E-02	3.535
90	75.00	0.28518	0.32349	1.51249	1.776E-02	17.571	3.221E-02	22.724	6.480	7.351	24.033	4.264E-02	129.365	11.570	6.686E-02	3.300
100	76.93	0.25741	0.29199	1.49492	1.708E-02	18.069	3.077E-02	24.709	**6.360**	**7.215**	24.812	4.071E-02	124.467	12.112	6.375E-02	3.118
125	80.65	0.20703	0.23484	1.44770	1.531E-02	19.471	2.700E-02	30.922	6.402	7.262	26.990	3.566E-02	118.450	13.596	5.560E-02	2.815
150	83.34	0.17314	0.19640	1.39906	1.355E-02	21.101	2.322E-02	39.355	6.814	7.729	29.502	3.062E-02	**118.359**	15.234	4.774E-02	2.638
175	85.37	0.14878	0.16877	1.35107	1.184E-02	22.987	1.960E-02	50.878	7.570	8.587	32.397	2.581E-02	122.645	17.121	4.016E-02	2.547
200	86.96	0.13043	0.14795	1.30472	1.022E-02	25.186	1.622E-02	66.922	8.729	9.901	35.765	2.132E-02	131.037	19.331	3.307E-02	**2.521**
225	88.24	0.11611	0.13171	1.26047	8.694E-03	27.791	1.312E-02	89.909	10.439	11.842	39.750	1.723E-02	144.091	21.903	2.668E-02	2.543
250	89.29	0.10463	0.11869	1.21842	7.258E-03	30.951	1.031E-02	124.193	12.994	14.740	44.580	1.353E-02	163.318	25.041	2.089E-02	2.620
275	90.17	0.09521	0.10800	1.17861	5.911E-03	34.911	7.800E-03	178.220	16.968	19.248	50.632	1.022E-02	191.702	28.967	1.576E-02	2.758
300	90.91	0.08735	0.09909	1.14098	4.647E-03	40.098	5.594E-03	270.060	23.590	26.759	58.561	7.317E-03	235.275	34.119	1.126E-02	2.980
350	92.11	0.07496	0.08503	1.07180	2.348E-03	58.763	2.113E-03	849.964	63.713	72.273	87.101	2.761E-03	446.650	52.688	4.228E-03	3.950
400	93.025	0.06566	0.07448	1.00998	3.238E-04											
405	93.105	0.06474	0.07344	1.00416												
406	93.121	0.06458	0.07326	1.00301												
407	93.136	0.06442	0.07307	1.00185												
408	93.152	0.06427	0.07290	1.00070												
409	**93.168**	**0.06411**	**0.07272**	**0.99957**												
410	93.183	0.06396	0.07255	0.99842												
415	93.260	0.06319	0.07168	0.99272												
450	93.751	0.05831	0.06614	0.95457												

* [grey shading] means the data are the same as the data of Table A.2.b.1.

Table A.2.c.2. MOX data [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 95%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**95.000**	**5.000**	**0.000**	**0.000**

Fissile material oxide density
5.5 g ($UO_2 + PuO_2$)/cm^3

Water reflector
30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	4.84859	5.50000	1.41071	1.980E-03	50.307	7.679E-03	533.303	2585.768	2933.165	68.896	9.975E-03	18075.428	33.381	1.519E-02	161.851
0.5	1.64	4.84859	5.50000	1.35287	2.812E-03	43.160	8.498E-03	336.779	1632.904	1852.284	59.286	1.132E-02	13384.558	28.929	1.708E-02	140.265
0.928	3.00	4.84859	5.50000	1.32294	3.757E-03	37.631	9.478E-03	223.220	1082.302	1227.709	51.681	1.248E-02	10171.088	25.069	1.871E-02	121.550
1.5	4.76	4.84859	5.50000	1.30669	5.250E-03	32.023	1.090E-02	137.551	666.927	756.528	43.866	1.449E-02	7327.465	21.037	2.168E-02	101.999
1.916	6.00	4.84859	5.50000	1.30388	6.555E-03	28.729	1.210E-02	99.325	481.587	546.288	39.291	1.629E-02	5878.782	18.640	2.455E-02	90.377
2.73	8.34	4.84859	5.50000	1.30871	9.715E-03	23.692	1.527E-02	55.704	270.087	306.373	32.259	1.980E-02	3962.848	14.973	3.097E-02	72.598
5	14.29	3.42532	3.88551	1.34358	1.160E-02	21.291	1.748E-02	40.425	138.467	157.070	28.748	2.470E-02	2223.311	12.986	3.784E-02	44.480
10	25.00	2.07883	2.35812	1.41745	1.473E-02	18.480	2.318E-02	26.435	54.954	62.337	24.705	3.282E-02	996.471	10.793	5.097E-02	22.437
20	40.01	1.16383	1.32019	1.50236	1.799E-02	16.553	3.180E-02	18.997	22.109	25.079	22.031	4.212E-02	443.674	9.529	6.598E-02	11.090
30	50.01	0.80813	0.91670	1.54093	1.934E-02	16.017	3.487E-02	17.210	13.908	15.777	21.359	4.624E-02	289.556	**9.333**	7.279E-02	7.542
40	57.15	0.61896	0.70212	1.55637	1.979E-02	**15.944**	3.604E-02	**16.976**	10.508	11.919	**21.341**	4.781E-02	221.411	9.476	7.533E-02	5.865
50	62.50	0.50155	0.56893	1.55875	1.976E-02	16.088	3.616E-02	17.442	8.748	9.923	21.628	4.795E-02	184.256	9.770	7.557E-02	4.900
60	66.67	0.42158	0.47822	1.55320	1.945E-02	16.356	3.565E-02	18.330	7.727	8.766	22.086	4.726E-02	161.518	10.149	7.444E-02	4.279
70	70.00	0.36361	0.41246	1.54255	1.898E-02	16.706	3.472E-02	19.531	7.102	8.056	22.658	4.602E-02	146.614	10.584	7.239E-02	3.849
80	72.73	0.31965	0.36259	1.52862	1.840E-02	17.115	3.355E-02	21.000	6.713	7.614	23.312	4.443E-02	136.439	11.060	6.980E-02	3.535
90	75.00	0.28518	0.32349	1.51249	1.776E-02	17.571	3.221E-02	22.724	6.480	7.351	24.033	4.264E-02	129.365	11.570	6.686E-02	3.300
100	76.93	0.25741	0.29199	1.49492	1.708E-02	18.069	3.077E-02	24.709	**6.360**	**7.215**	24.812	4.071E-02	124.467	12.112	6.375E-02	3.118
125	80.65	0.20703	0.23484	1.44770	1.531E-02	19.471	2.700E-02	30.922	6.402	7.262	26.990	3.566E-02	118.450	13.596	5.560E-02	2.815
150	83.34	0.17314	0.19640	1.39906	1.355E-02	21.101	2.322E-02	39.355	6.814	7.729	29.502	3.062E-02	**118.359**	15.234	4.774E-02	2.638
175	85.37	0.14878	0.16877	1.35107	1.184E-02	22.987	1.960E-02	50.878	7.570	8.587	32.397	2.581E-02	122.645	17.121	4.016E-02	2.547
200	86.96	0.13043	0.14795	1.30472	1.022E-02	25.186	1.622E-02	66.922	8.729	9.901	35.765	2.132E-02	131.037	19.331	3.307E-02	**2.521**
225	88.24	0.11611	0.13171	1.26047	8.694E-03	27.791	1.312E-02	89.909	10.439	11.842	39.750	1.723E-02	144.091	21.903	2.668E-02	2.543
250	89.29	0.10463	0.11869	1.21842	7.258E-03	30.951	1.031E-02	124.193	12.994	14.740	44.580	1.353E-02	163.318	25.041	2.089E-02	2.620
275	90.17	0.09521	0.10800	1.17861	5.911E-03	34.911	7.800E-03	178.220	16.968	19.248	50.632	1.022E-02	191.702	28.967	1.576E-02	2.758
300	90.91	0.08735	0.09909	1.14098	4.647E-03	40.098	5.594E-03	270.060	23.590	26.759	58.561	7.317E-03	235.275	34.119	1.126E-02	2.980
350	92.11	0.07496	0.08503	1.07180	2.348E-03	58.763	2.113E-03	849.964	63.713	72.273	87.101	2.761E-03	446.650	52.688	4.228E-03	3.950
400	93.025	0.06566	0.07448	1.00998	3.238E-04											
405	93.105	0.06474	0.07344	1.00416												
406	93.121	0.06458	0.07326	1.00301												
407	93.136	0.06442	0.07307	1.00185												
408	93.152	0.06427	0.07290	1.00070												
409	**93.168**	**0.06411**	**0.07272**	**0.99957**												
410	93.183	0.06396	0.07255	0.99842												
415	93.260	0.06319	0.07168	0.99272												
450	93.751	0.05831	0.06614	0.95457												

* means the data are the same as the data of Table A.2.b.1.

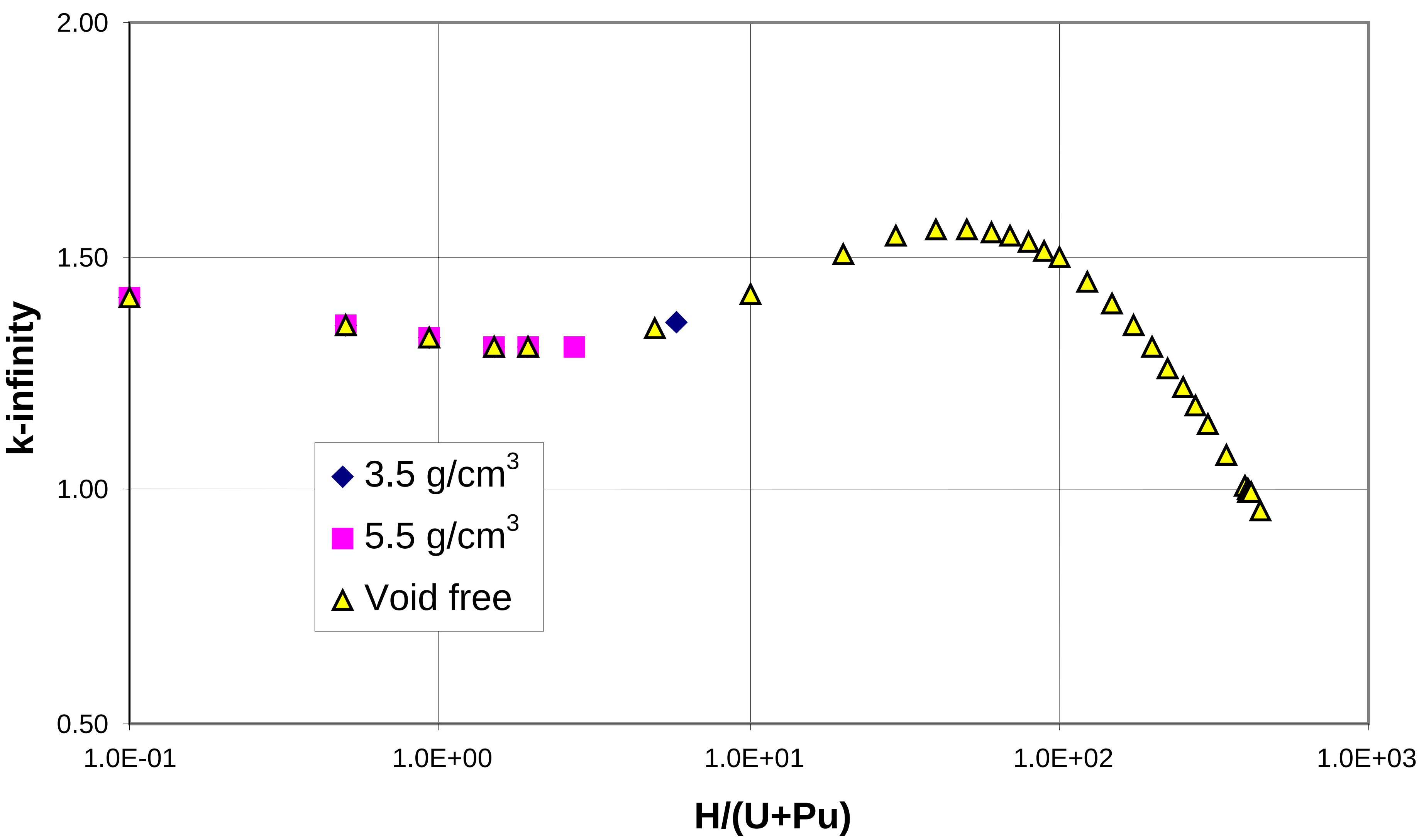

Fig. A.2.c.1. *k*-infinity [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%].

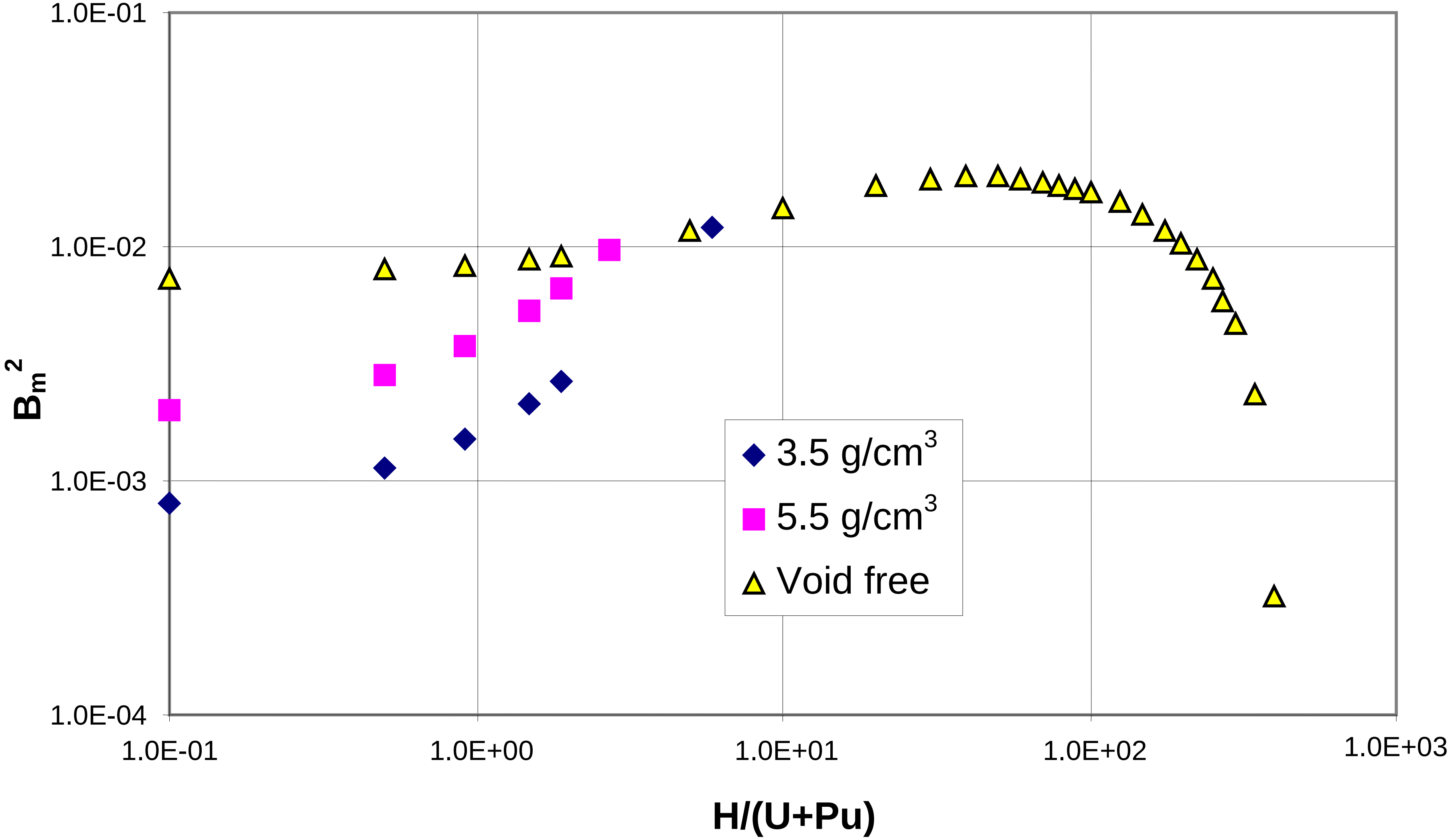

Fig. A.2.c.2. B_m^2 [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%].

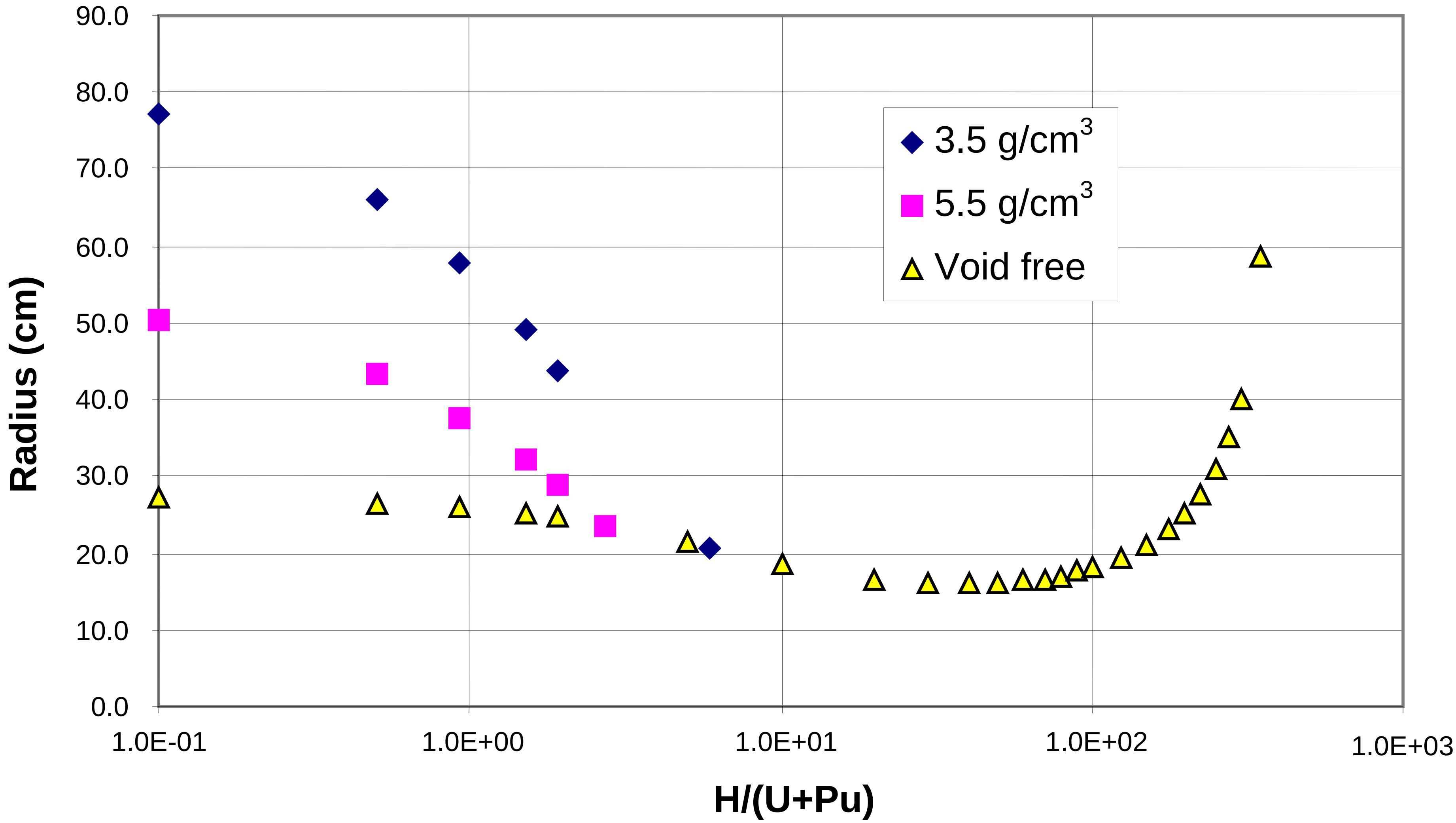

Fig. A.2.c.3. Sphere radius [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

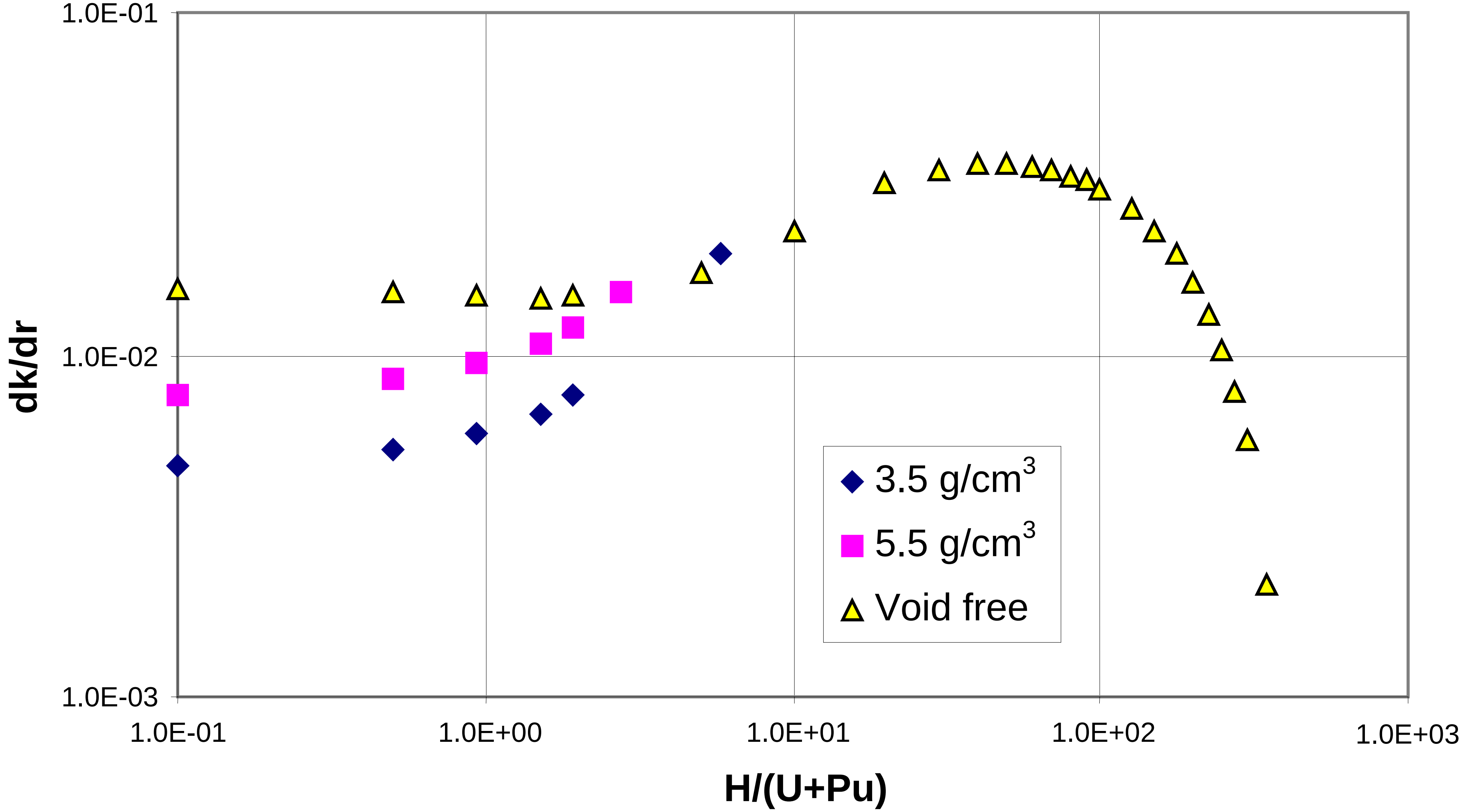

Fig. A.2.c.4. Delta lambda divided by delta dimension [sphere, $^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

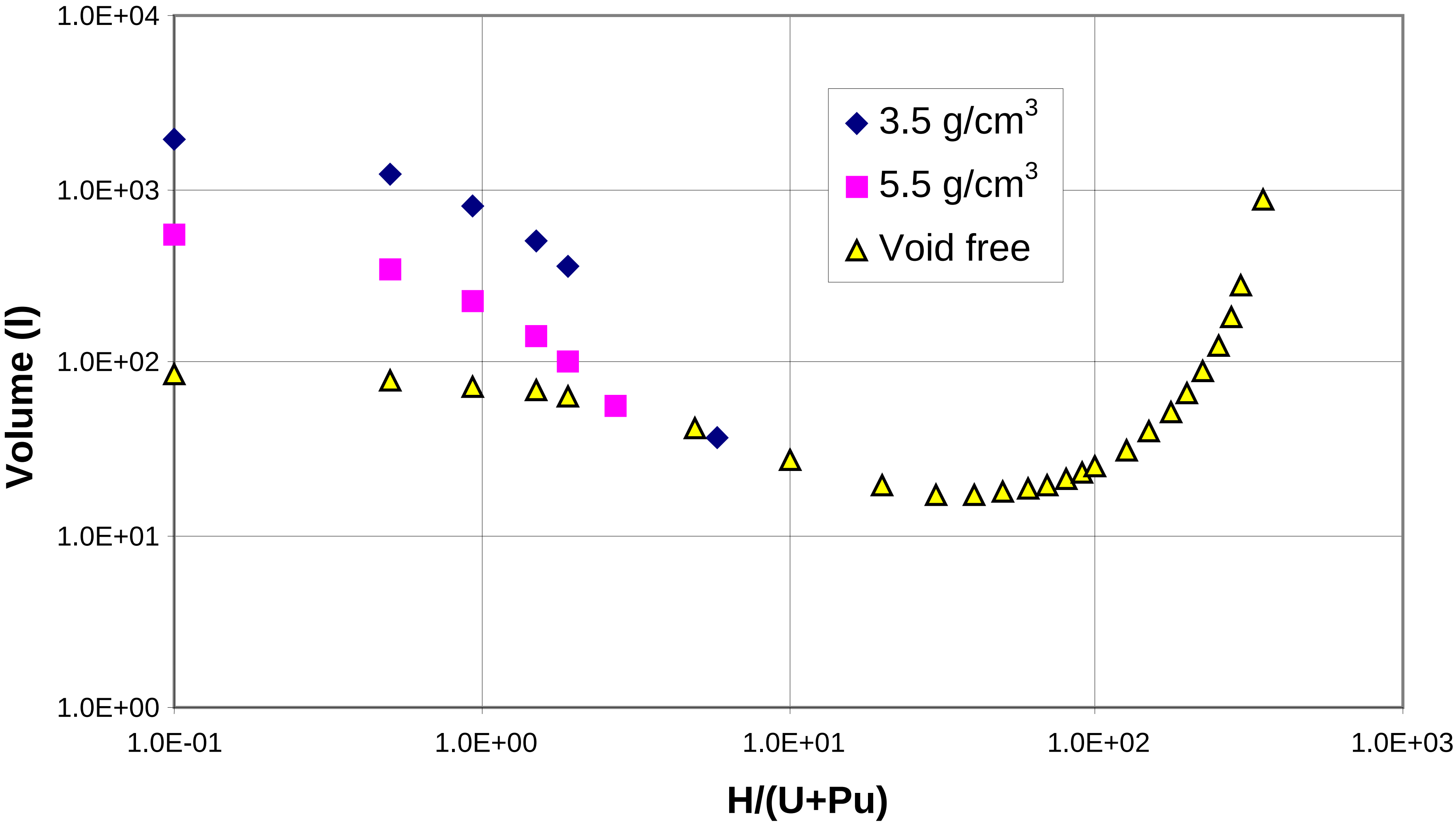

Fig. A.2.c.5. Sphere volume [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

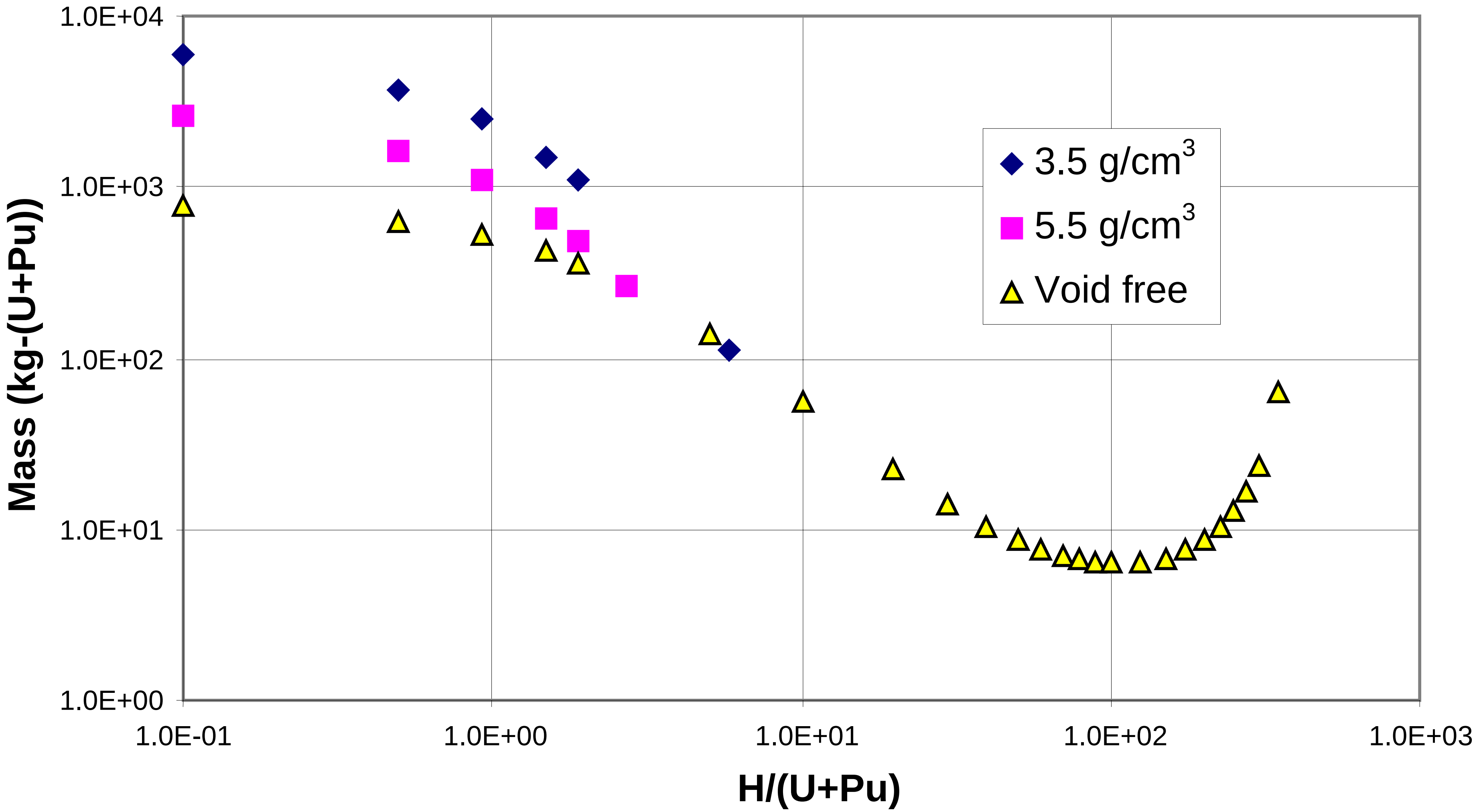

Fig. A.2.c.6. U + Pu mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

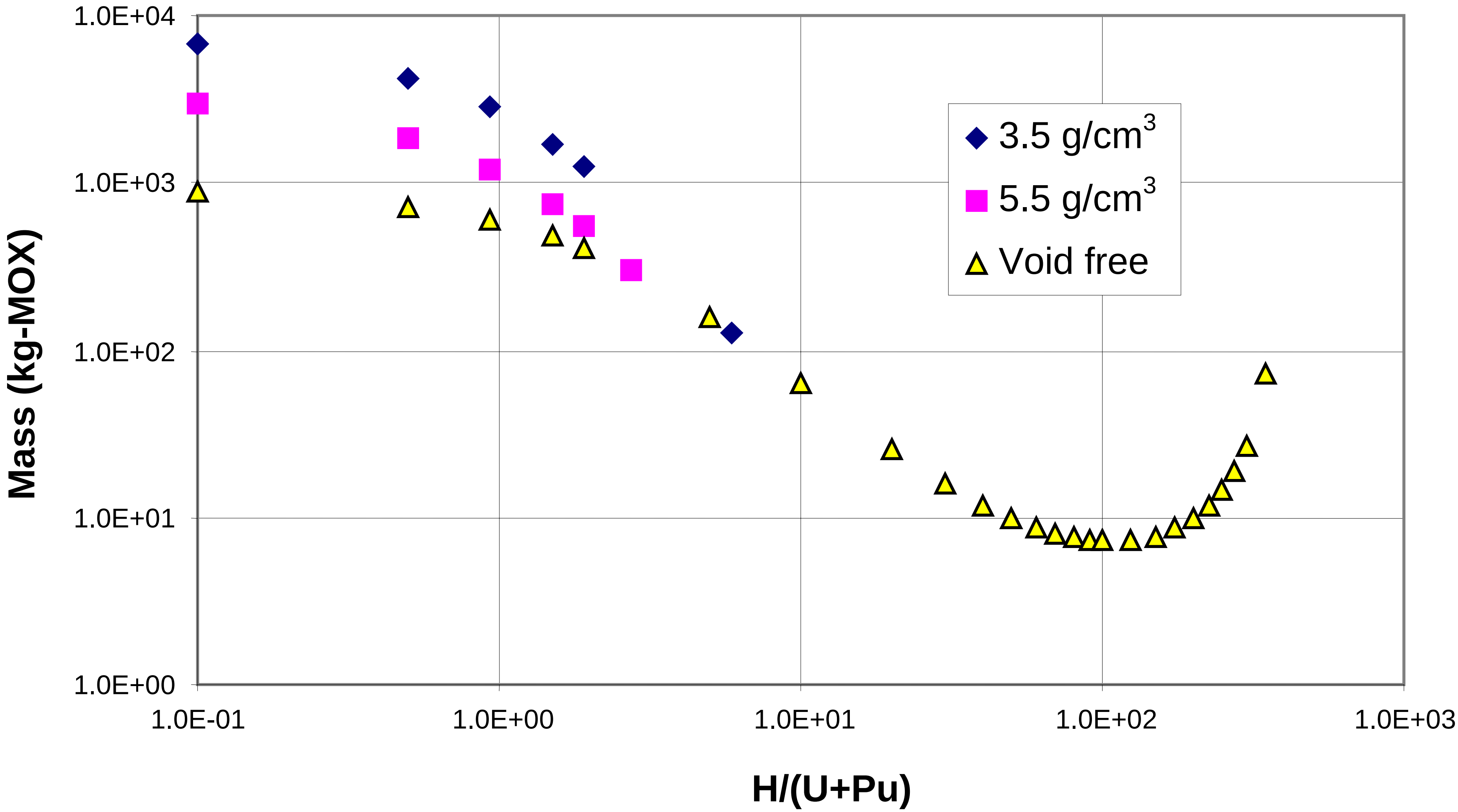

Fig. A.2.c.7. MOX mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) =12.5%, water reflector: 30.0 cm].

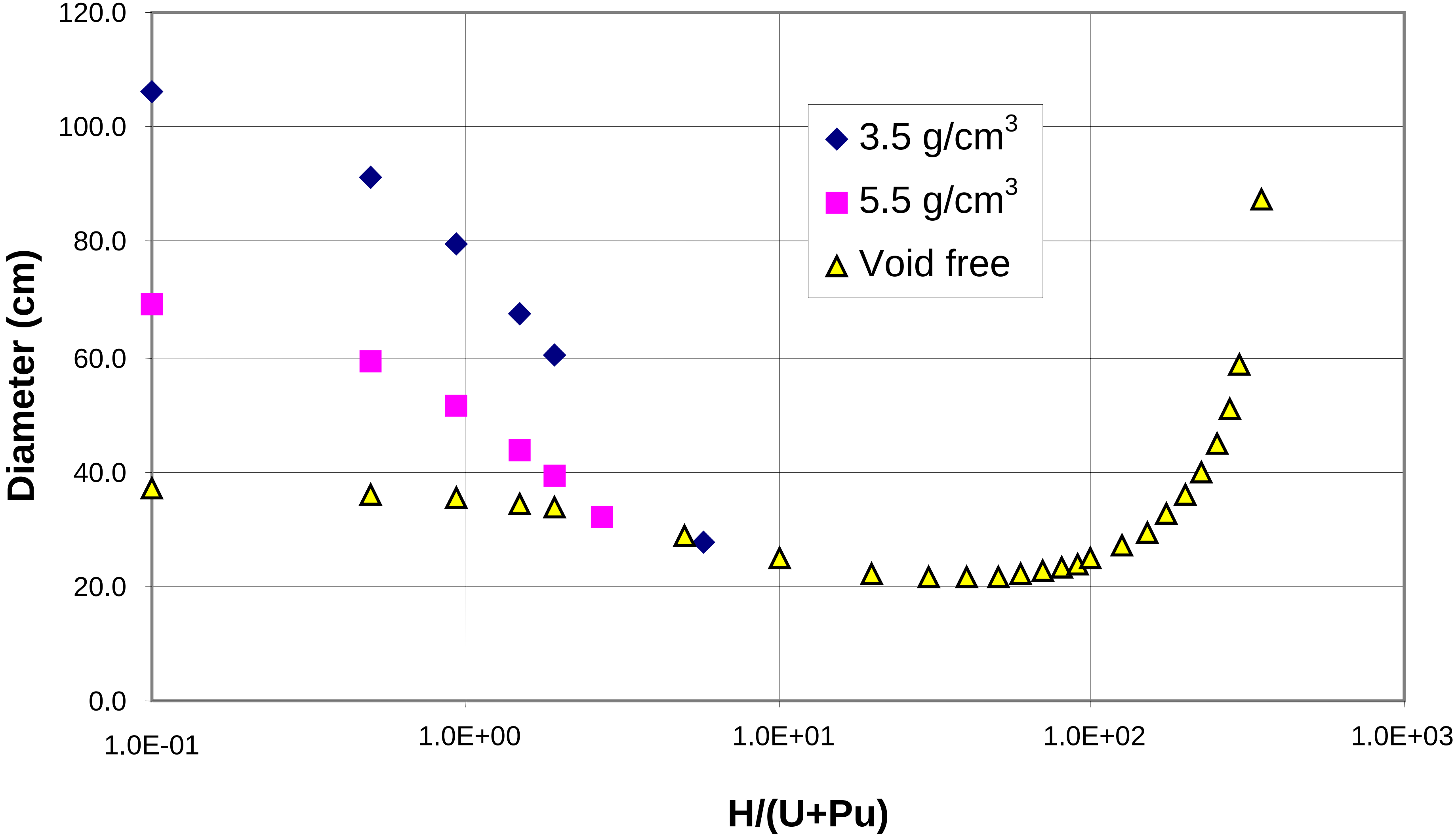

Fig. A.2.c.8. Cylinder diameter [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

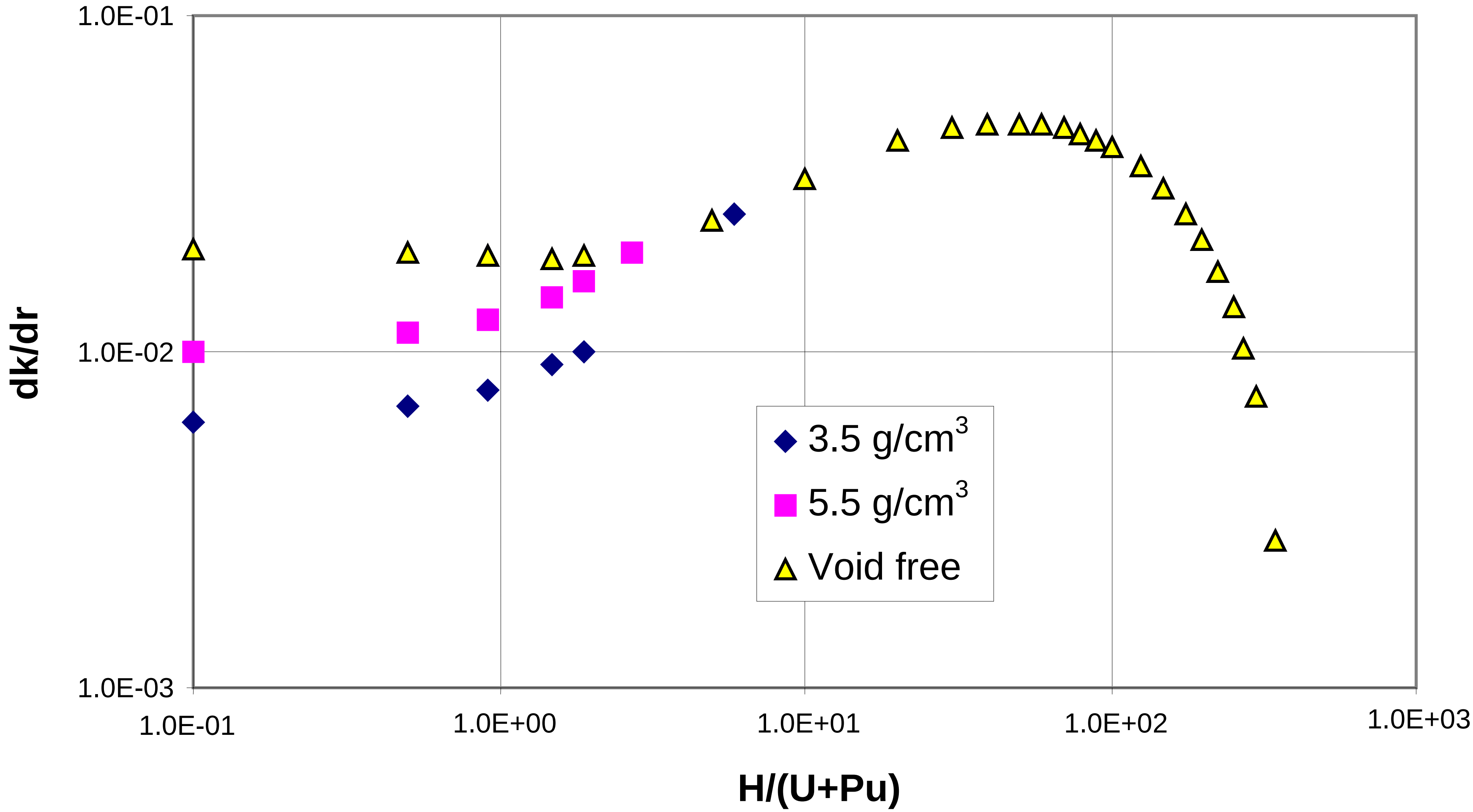

Fig. A.2.c.9. Delta lambda divided by delta dimension [cylinder, ^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

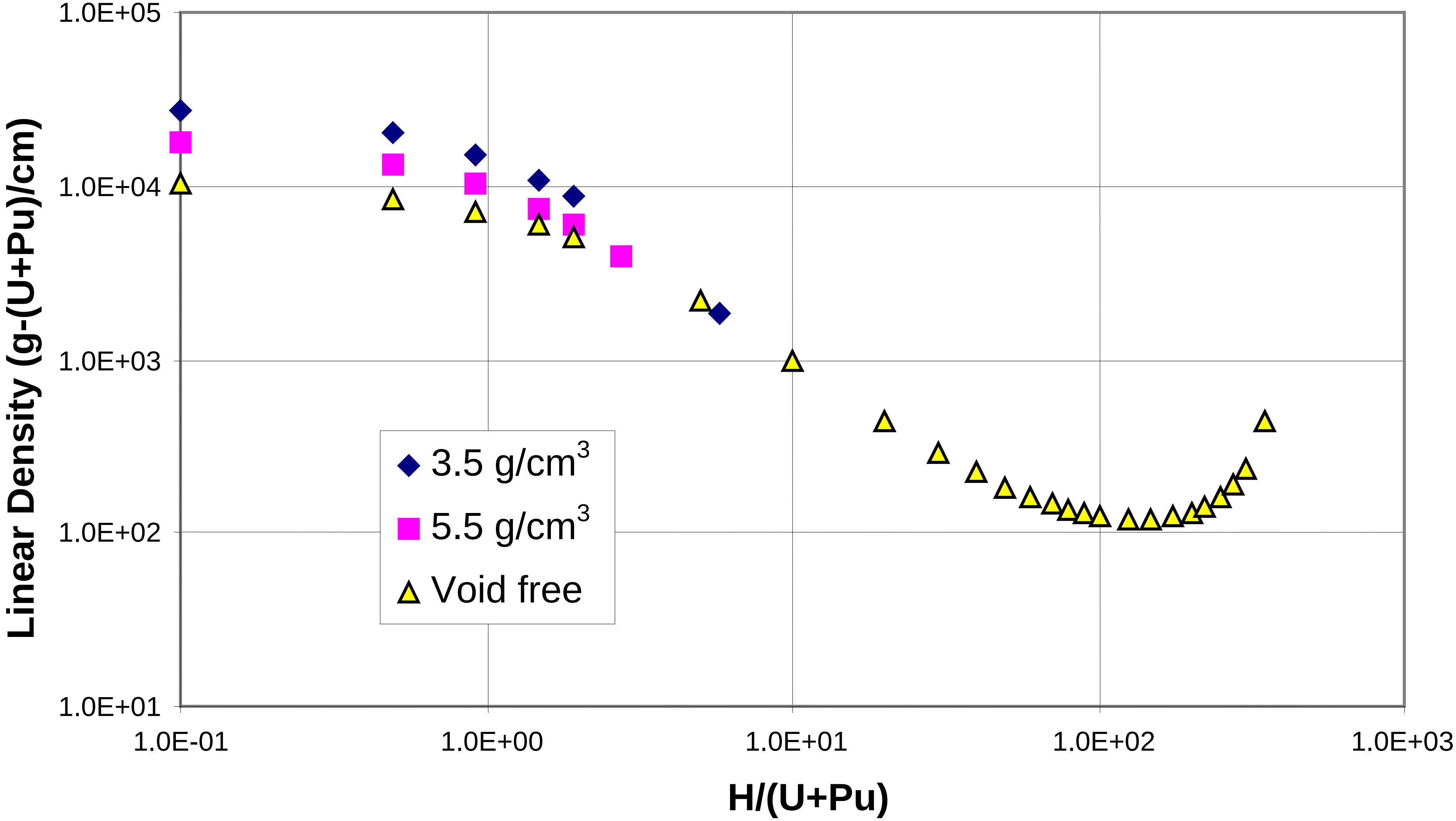

Fig. A.2.c.10. Linear density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

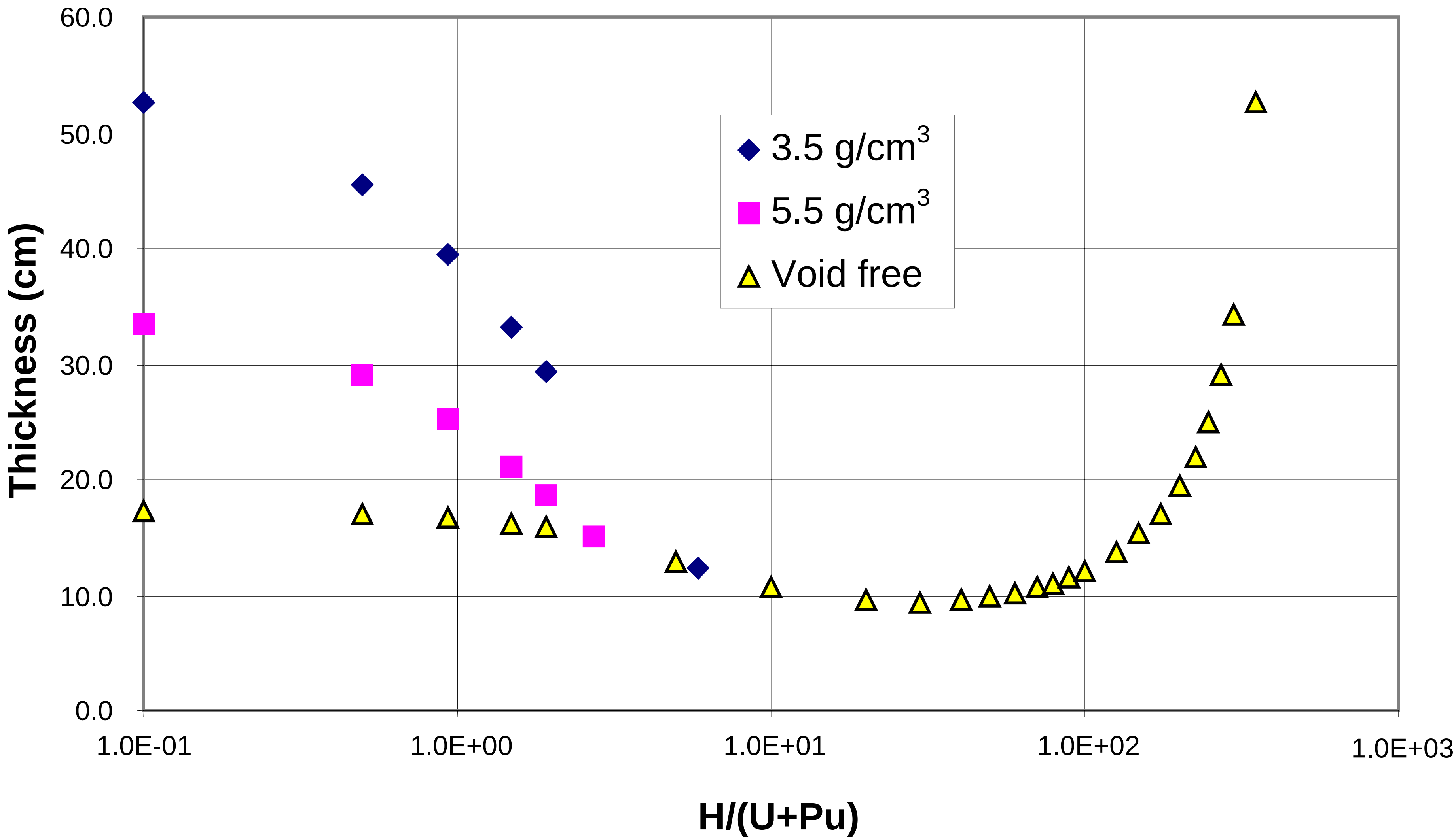

Fig. A.2.c.11. Slab thickness [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

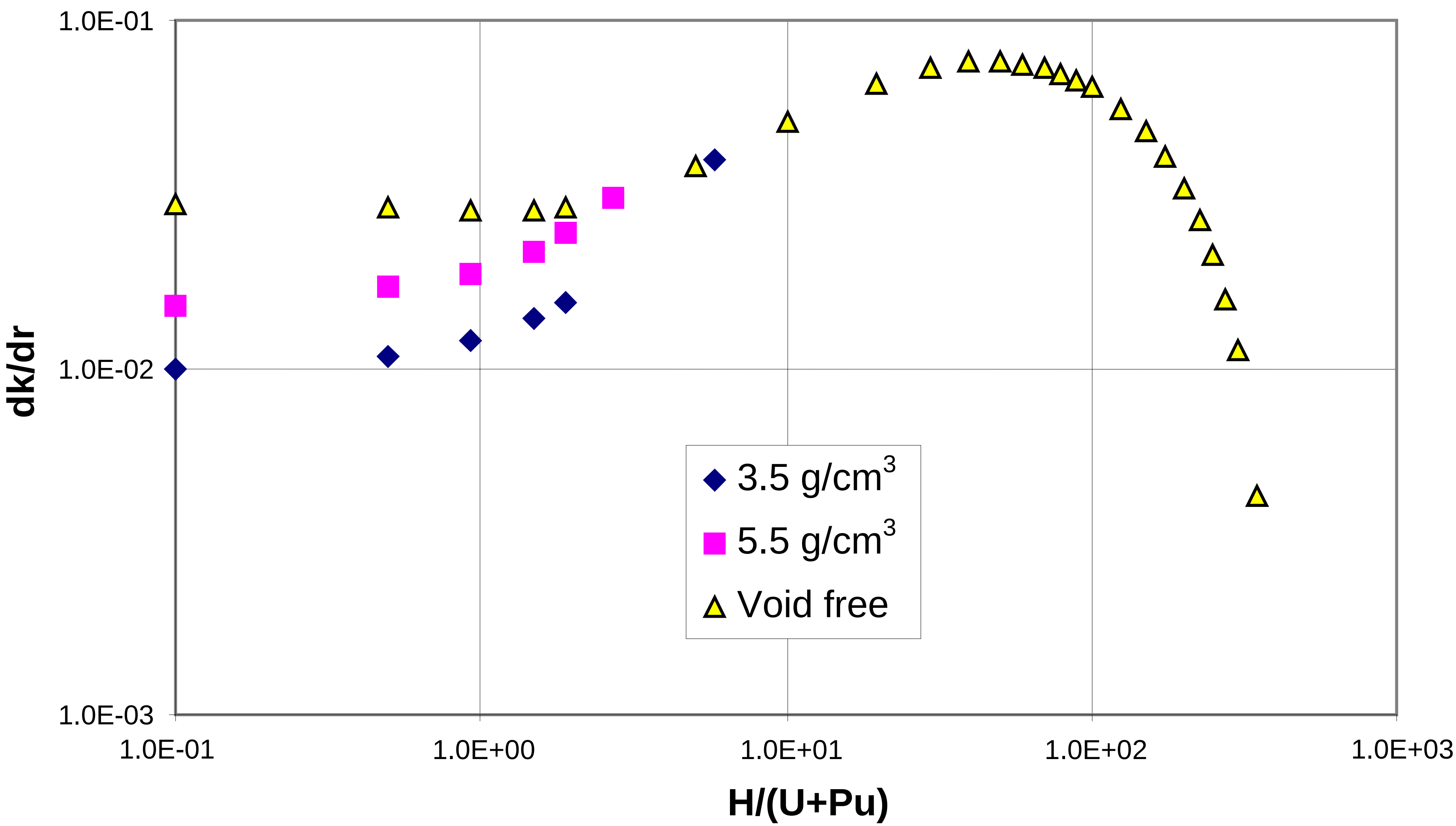

Fig. A.2.c.12. Delta lambda divided by delta dimension [slab, ^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

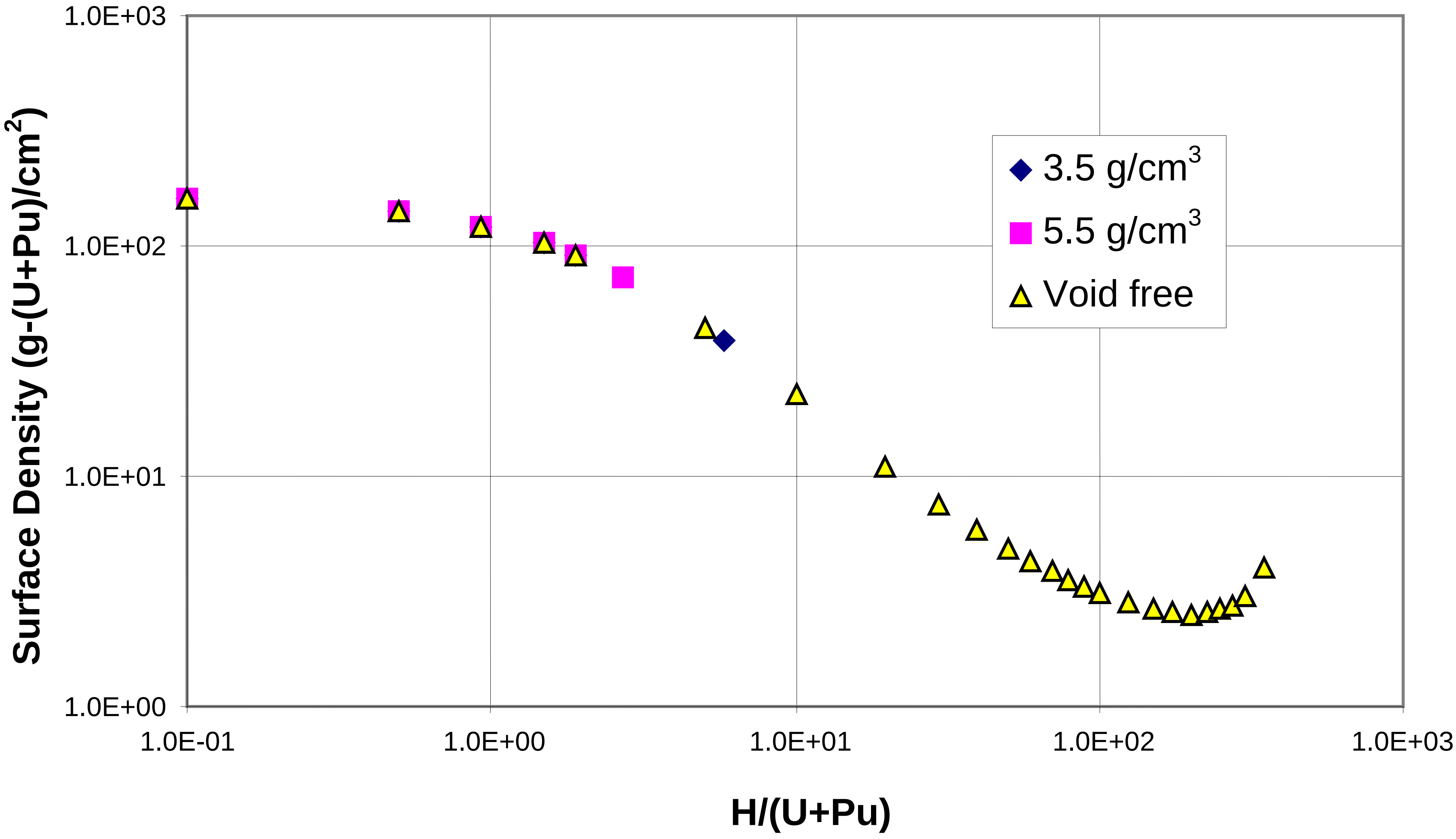

Fig. A.2.c.13. Surface density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

Table A.2.d.1. MOX data [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**95.000**	**5.000**	**0.000**	**0.000**

Fissile material oxide density
3.5 g (UO_2 + PuO_2)/cm^3

Water reflector
2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08547	3.50000	1.41068	8.018E-04	95.649	5.247E-03	3665.518	11309.839	12829.313	139.672	6.836E-03	47274.661	81.537	1.050E-02	251.580
0.5	1.64	3.08547	3.50000	1.35285	1.139E-03	80.125	5.699E-03	2154.697	6648.250	7541.440	116.842	7.438E-03	33083.308	67.961	1.149E-02	209.692
0.928	3.00	3.08547	3.50000	1.32292	1.521E-03	69.072	6.272E-03	1380.355	4259.043	4831.244	100.606	8.094E-03	24527.905	58.286	1.270E-02	179.841
1.5	4.76	3.08547	3.50000	1.30667	2.126E-03	58.182	6.879E-03	825.018	2545.567	2887.564	84.585	9.176E-03	17338.029	48.768	1.416E-02	150.471
1.916	6.00	3.08547	3.50000	1.30387	2.654E-03	51.906	7.551E-03	585.772	1807.381	2050.203	75.351	1.040E-02	13759.214	43.268	1.597E-02	133.503
5.84	16.30	3.08547	3.50000	1.35757	1.220E-02	23.667	1.933E-02	55.525	171.321	194.338	33.961	2.563E-02	2794.969	18.828	3.946E-02	58.093
10	25.00	2.07883	2.35812	1.41745	1.473E-02	21.179	2.269E-02	39.795	82.727	93.842	30.190	2.998E-02	1488.150	16.450	5.005E-02	34.197
20	40.01	1.16383	1.32019	1.50236	1.799E-02	18.841	2.904E-02	28.016	32.605	36.986	26.679	3.846E-02	650.607	14.299	6.422E-02	16.642
30	50.01	0.80813	0.91670	1.54093	1.934E-02	18.096	3.422E-02	24.823	20.060	22.755	25.583	4.519E-02	415.420	13.673	7.051E-02	11.050
40	57.15	0.61896	0.70212	1.55637	1.979E-02	**17.894**	3.539E-02	**24.000**	14.855	16.851	**25.303**	4.675E-02	311.236	**13.583**	7.272E-02	8.407
50	62.50	0.50155	0.56893	1.55875	1.976E-02	17.949	3.554E-02	24.222	12.149	13.781	25.407	4.696E-02	254.287	13.685	7.308E-02	6.864
60	66.67	0.42158	0.47822	1.55320	1.945E-02	18.152	3.508E-02	25.052	10.562	11.980	25.732	4.634E-02	219.242	13.923	7.210E-02	5.870
70	70.00	0.36361	0.41246	1.54255	1.898E-02	18.451	3.421E-02	26.312	9.567	10.853	26.201	4.519E-02	196.042	14.250	7.028E-02	5.181
80	72.73	0.31965	0.36259	1.52862	1.840E-02	18.820	3.308E-02	27.921	8.925	10.124	26.772	4.368E-02	179.945	14.640	6.790E-02	4.680
90	75.00	0.28518	0.32349	1.51249	1.776E-02	19.243	3.180E-02	29.847	8.512	9.655	27.426	4.198E-02	168.469	15.022	6.550E-02	4.284
100	76.93	0.25741	0.29199	1.49492	1.708E-02	19.714	3.041E-02	32.091	8.261	9.370	28.149	4.012E-02	160.197	15.503	6.255E-02	3.991
125	80.65	0.20703	0.23484	1.44770	1.531E-02	21.065	2.674E-02	39.156	**8.106**	**9.196**	30.221	3.525E-02	148.501	16.871	5.482E-02	3.493
150	83.34	0.17314	0.19640	1.39906	1.355E-02	22.660	2.303E-02	48.741	8.439	9.573	32.659	3.034E-02	**145.044**	18.434	4.716E-02	3.192
175	85.37	0.14878	0.16877	1.35107	1.184E-02	24.522	1.947E-02	61.763	9.189	10.424	35.501	2.562E-02	147.270	20.265	3.978E-02	3.015
200	86.96	0.13043	0.14795	1.30472	1.022E-02	26.703	1.614E-02	79.754	10.402	11.800	38.830	2.121E-02	154.455	22.414	3.287E-02	2.923
225	88.24	0.11611	0.13171	1.26047	8.694E-03	29.295	1.306E-02	105.306	12.227	13.870	42.785	1.716E-02	166.935	24.971	2.655E-02	2.899
250	89.29	0.10463	0.11869	1.21842	7.258E-03	32.444	1.028E-02	143.047	14.967	16.978	47.593	1.349E-02	186.137	28.085	2.083E-02	2.938
275	90.17	0.09521	0.10800	1.17861	5.911E-03	36.397	7.792E-03	201.966	19.229	21.813	53.628	1.021E-02	215.061	31.991	1.572E-02	3.046
300	90.91	0.08735	0.09909	1.14098	4.647E-03	41.580	5.582E-03	301.122	26.303	29.837	61.546	7.317E-03	259.864	37.128	1.125E-02	3.243
350	92.11	0.07496	0.08503	1.07180	2.348E-03	60.242	2.113E-03	915.766	68.646	77.868	90.074	2.764E-03	477.655	55.679	4.233E-03	4.174
400	93.025	0.06566	0.07448	1.00998	3.238E-04											
405	93.105	0.06474	0.07344	1.00416												
406	93.121	0.06458	0.07326	1.00301												
407	93.136	0.06442	0.07307	1.00185												
408	93.152	0.06427	0.07290	1.00070												
409	**93.168**	**0.06411**	**0.07272**	**0.99957**												
410	93.183	0.06396	0.07255	0.99842												
415	93.260	0.06319	0.07168	0.99272												
450	93.751	0.05831	0.06614	0.95457												

* [grey box] means the data are the same as the data of Table A.2.b.2.

Table A.2.d.2. MOX data [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**95.000**	**5.000**	**0.000**	**0.000**

Fissile material oxide density
5.5 g (UO_2 + PuO_2)/cm^3

Water reflector
2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	4.84859	5.50000	1.41071	1.980E-03	61.012	8.215E-03	951.323	4612.578	5232.276	89.076	1.079E-02	30215.443	51.849	1.669E-02	251.394
0.5	1.64	4.84859	5.50000	1.35287	2.812E-03	51.126	9.086E-03	559.779	2714.141	3078.785	74.522	1.181E-02	21148.145	43.211	1.793E-02	209.512
0.928	3.00	4.84859	5.50000	1.32294	3.757E-03	44.098	9.947E-03	359.203	1741.627	1975.614	64.202	1.300E-02	15696.594	37.065	1.962E-02	179.714
1.5	4.76	4.84859	5.50000	1.30669	5.250E-03	37.174	1.108E-02	215.182	1043.331	1183.503	54.017	1.441E-02	11111.425	31.017	2.224E-02	150.387
1.916	6.00	4.84859	5.50000	1.30388	6.555E-03	33.174	1.220E-02	152.930	741.497	841.117	48.136	1.630E-02	8823.596	27.522	2.490E-02	133.442
2.73	8.34	4.84859	5.50000	1.30871	9.715E-03	27.113	1.519E-02	83.487	404.792	459.176	39.228	1.978E-02	5859.945	22.231	3.094E-02	107.787
5	14.29	3.42532	3.88551	1.34358	1.160E-02	24.408	1.721E-02	60.907	208.624	236.653	35.089	2.266E-02	3312.401	19.565	3.781E-02	67.015
10	25.00	2.07883	2.35812	1.41745	1.473E-02	21.179	2.269E-02	39.795	82.727	93.842	30.190	2.998E-02	1488.150	16.450	5.005E-02	34.197
20	40.01	1.16383	1.32019	1.50236	1.799E-02	18.841	2.904E-02	28.016	32.605	36.986	26.679	3.846E-02	650.607	14.299	6.422E-02	16.642
30	50.01	0.80813	0.91670	1.54093	1.934E-02	18.096	3.422E-02	24.823	20.060	22.755	25.583	4.519E-02	415.420	13.673	7.051E-02	11.050
40	57.15	0.61896	0.70212	1.55637	1.979E-02	**17.894**	3.539E-02	**24.000**	14.855	16.851	**25.303**	4.675E-02	311.236	**13.583**	7.272E-02	8.407
50	62.50	0.50155	0.56893	1.55875	1.976E-02	17.949	3.554E-02	24.222	12.149	13.781	25.407	4.696E-02	254.287	13.685	7.308E-02	6.864
60	66.67	0.42158	0.47822	1.55320	1.945E-02	18.152	3.508E-02	25.052	10.562	11.980	25.732	4.634E-02	219.242	13.923	7.210E-02	5.870
70	70.00	0.36361	0.41246	1.54255	1.898E-02	18.451	3.421E-02	26.312	9.567	10.853	26.201	4.519E-02	196.042	14.250	7.028E-02	5.181
80	72.73	0.31965	0.36259	1.52862	1.840E-02	18.820	3.308E-02	27.921	8.925	10.124	26.772	4.368E-02	179.945	14.640	6.790E-02	4.680
90	75.00	0.28518	0.32349	1.51249	1.776E-02	19.243	3.180E-02	29.847	8.512	9.655	27.426	4.198E-02	168.469	15.022	6.550E-02	4.284
100	76.93	0.25741	0.29199	1.49492	1.708E-02	19.714	3.041E-02	32.091	8.261	9.370	28.149	4.012E-02	160.197	15.503	6.255E-02	3.991
125	80.65	0.20703	0.23484	1.44770	1.531E-02	21.065	2.674E-02	39.156	**8.106**	**9.196**	30.221	3.525E-02	148.501	16.871	5.482E-02	3.493
150	83.34	0.17314	0.19640	1.39906	1.355E-02	22.660	2.303E-02	48.741	8.439	9.573	32.659	3.034E-02	**145.044**	18.434	4.716E-02	3.192
175	85.37	0.14878	0.16877	1.35107	1.184E-02	24.522	1.947E-02	61.763	9.189	10.424	35.501	2.562E-02	147.270	20.265	3.978E-02	3.015
200	86.96	0.13043	0.14795	1.30472	1.022E-02	26.703	1.614E-02	79.754	10.402	11.800	38.830	2.121E-02	154.455	22.414	3.287E-02	2.923
225	88.24	0.11611	0.13171	1.26047	8.694E-03	29.295	1.306E-02	105.306	12.227	13.870	42.785	1.716E-02	166.935	24.971	2.655E-02	**2.899**
250	89.29	0.10463	0.11869	1.21842	7.258E-03	32.444	1.028E-02	143.047	14.967	16.978	47.593	1.349E-02	186.137	28.085	2.083E-02	2.938
275	90.17	0.09521	0.10800	1.17861	5.911E-03	36.397	7.792E-03	201.966	19.229	21.813	53.628	1.021E-02	215.061	31.991	1.572E-02	3.046
300	90.91	0.08735	0.09909	1.14098	4.647E-03	41.580	5.582E-03	301.122	26.303	29.837	61.546	7.317E-03	259.864	37.128	1.125E-02	3.243
350	92.11	0.07496	0.08503	1.07180	2.348E-03	60.242	2.113E-03	915.766	68.646	77.868	90.074	2.764E-03	477.655	55.679	4.233E-03	4.174
400	93.025	0.06566	0.07448	1.00998	3.238E-04											
405	93.105	0.06474	0.07344	1.00416												
406	93.121	0.06458	0.07326	1.00301												
407	93.136	0.06442	0.07307	1.00185												
408	93.152	0.06427	0.07290	1.00070												
409	**93.168**	**0.06411**	**0.07272**	**0.99957**												
410	93.183	0.06396	0.07255	0.99842												
415	93.260	0.06319	0.07168	0.99272												
450	93.751	0.05831	0.06614	0.95457												

* (grey shading) means the data are the same as the data of Table A.2.b.2.

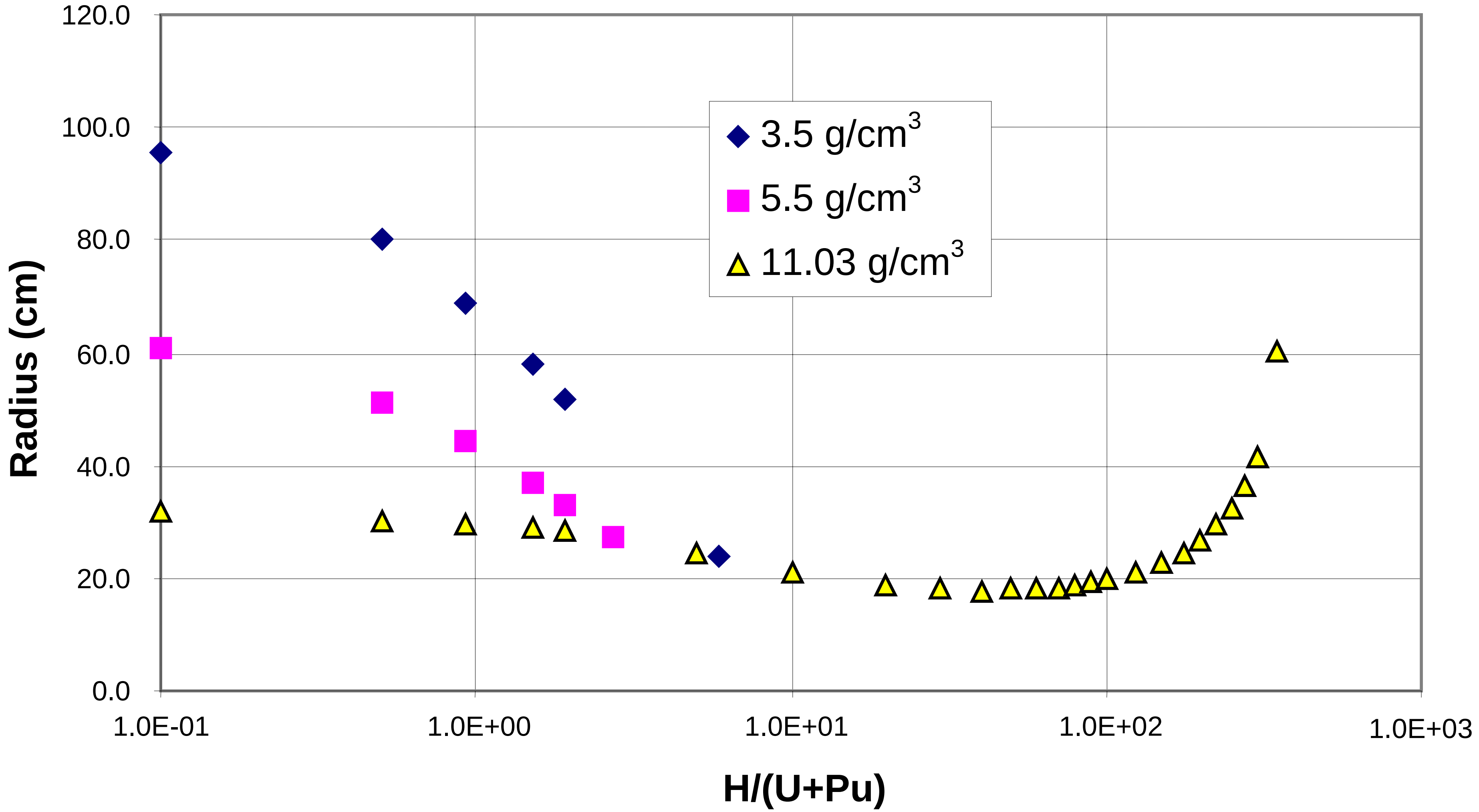

Fig. A.2.d.1. Sphere radius [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

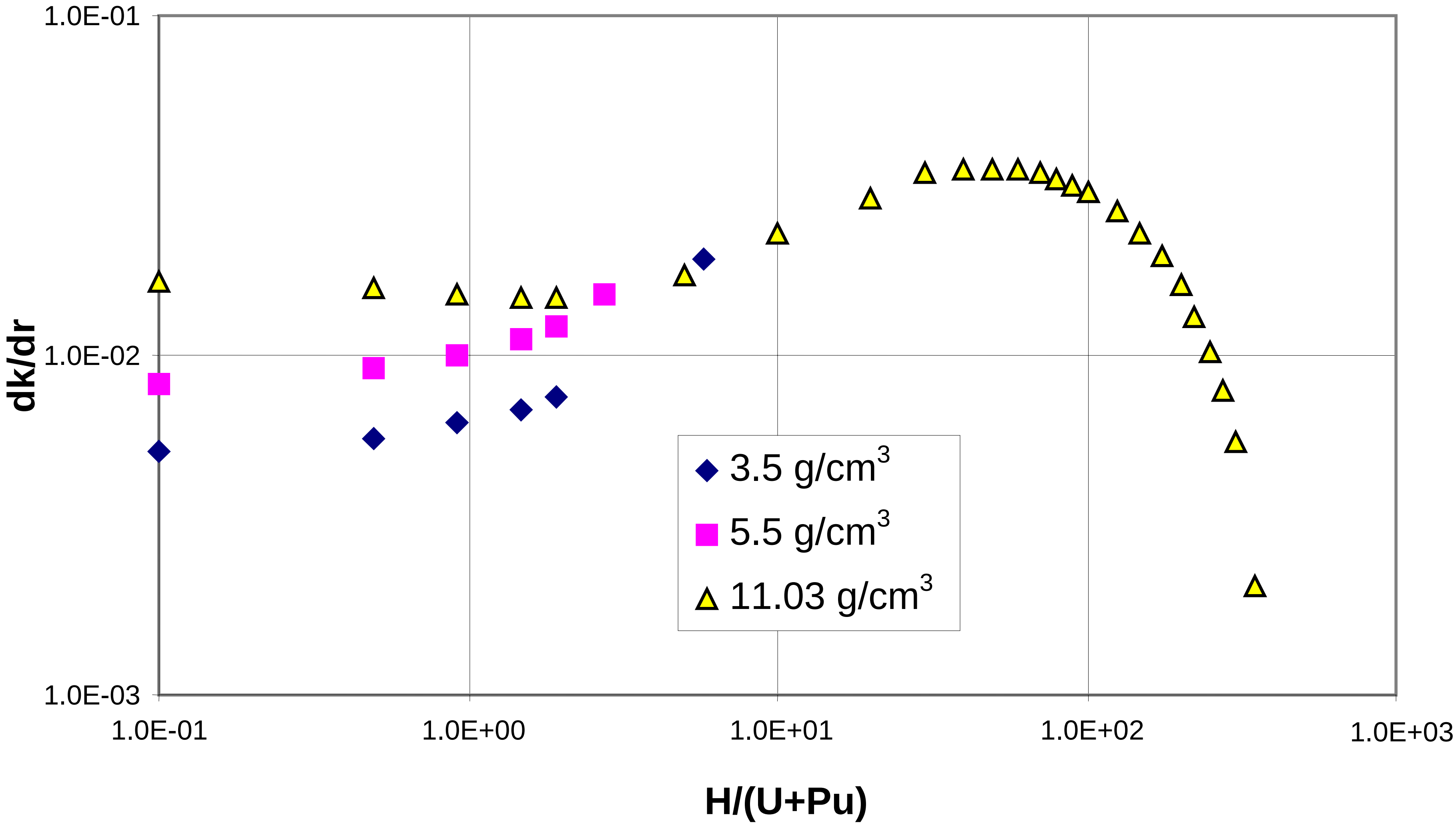

Fig. A.2.d.2. Delta lambda divided by delta dimension [sphere, $^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

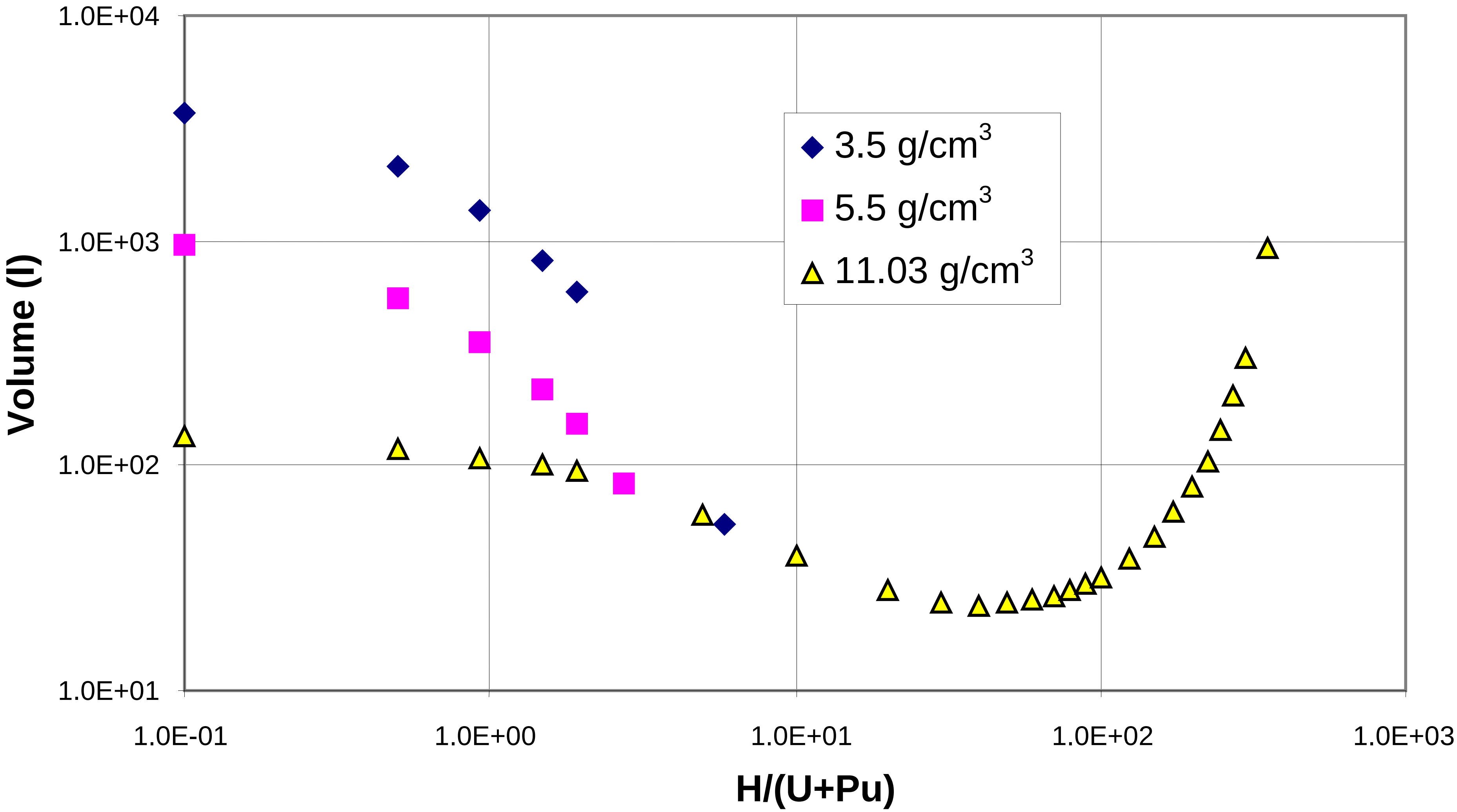

Fig. A.2.d.3. Sphere volume [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

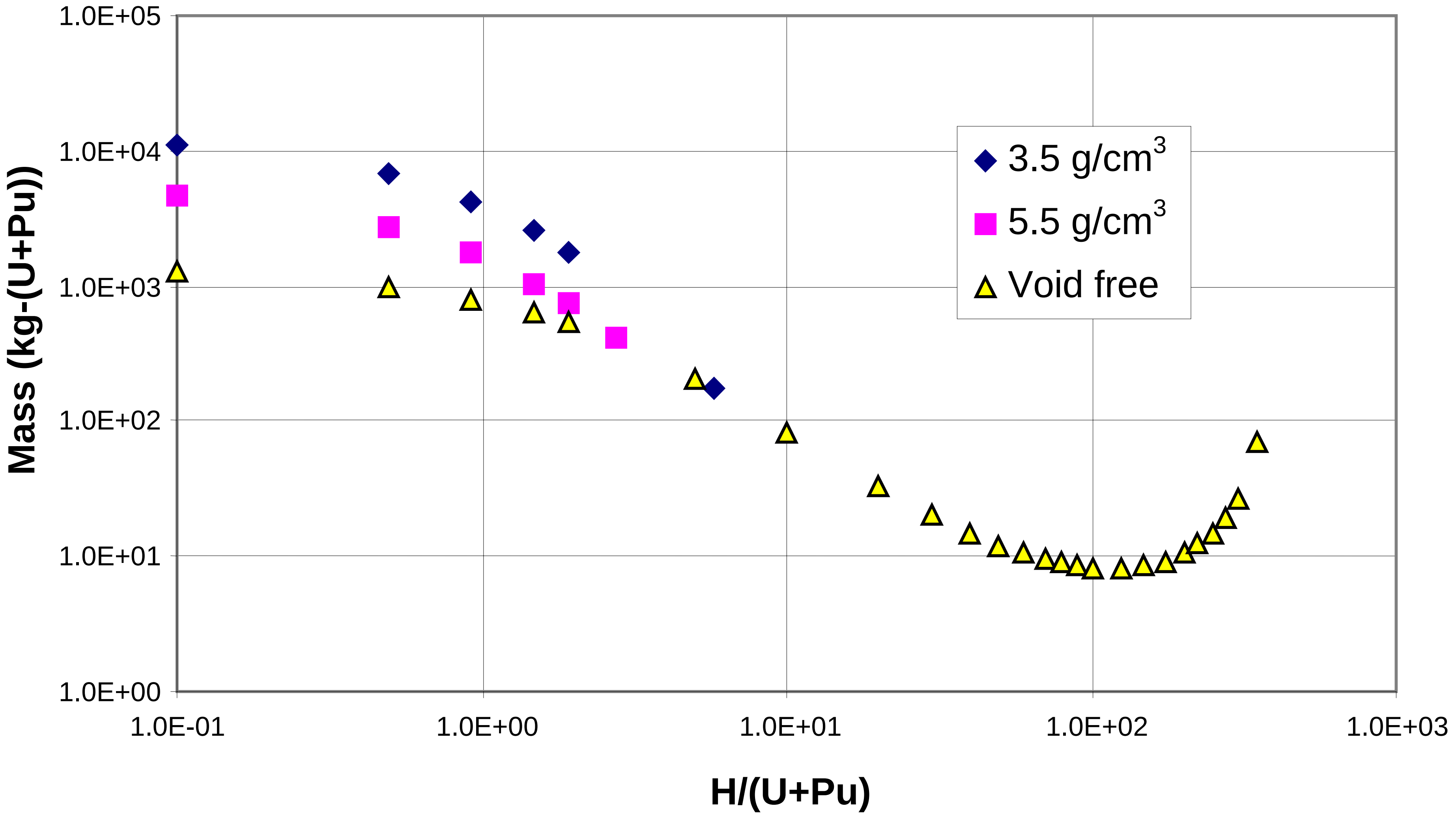

Fig. A.2.d.4. U + Pu mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

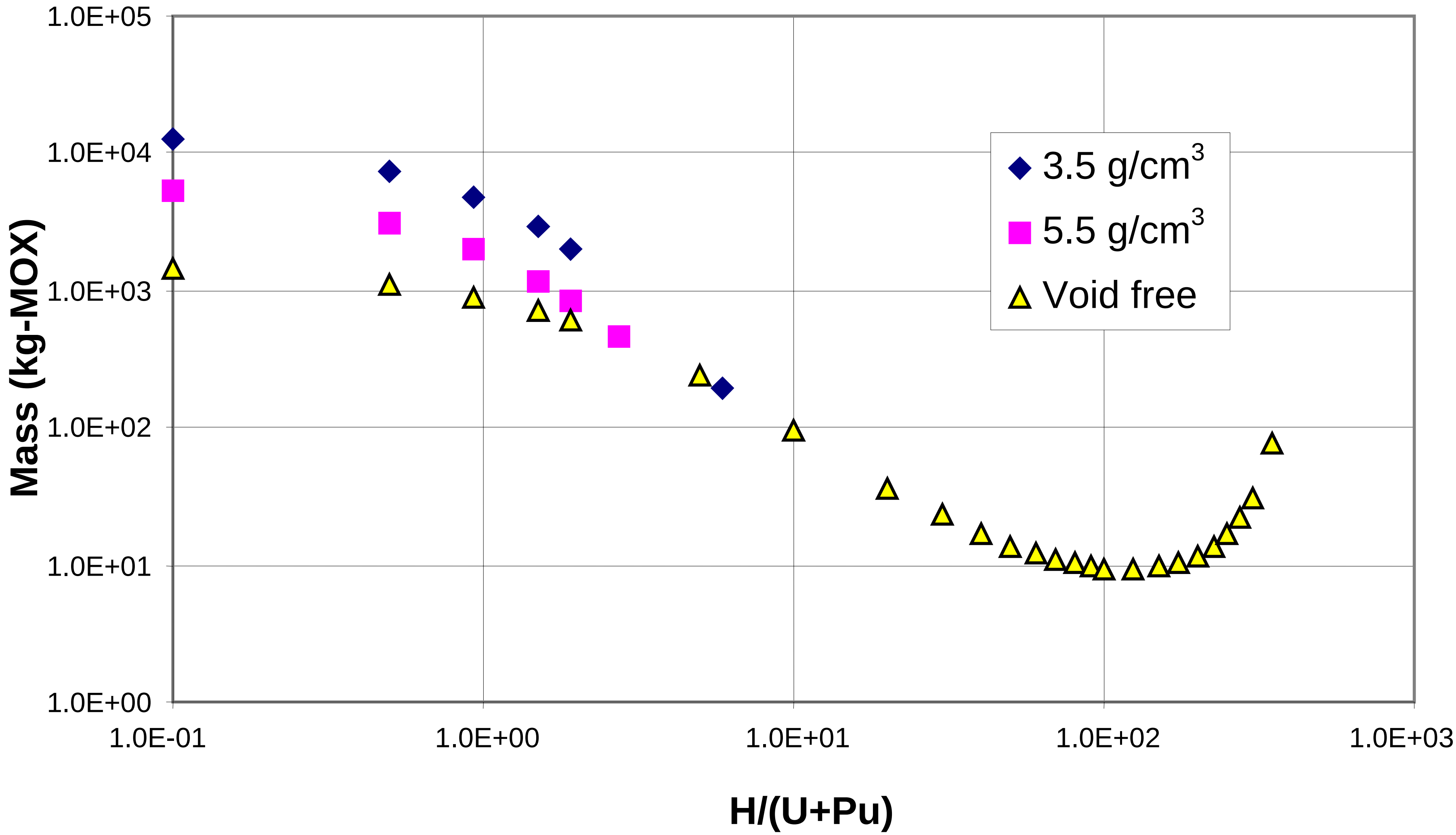

Fig. A.2.d.5. MOX mass [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

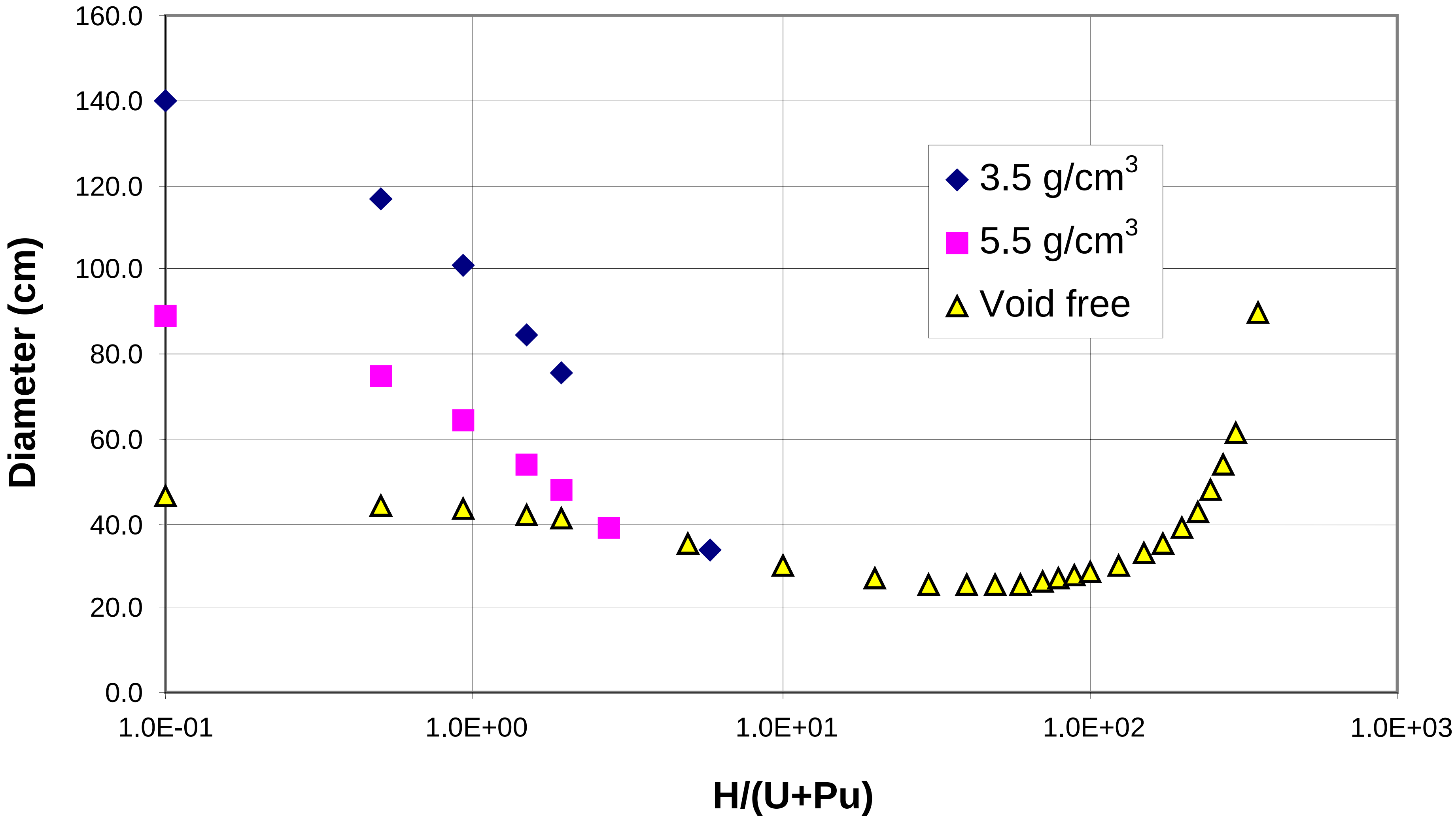

Fig. A.2.d.6. Cylinder diameter [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

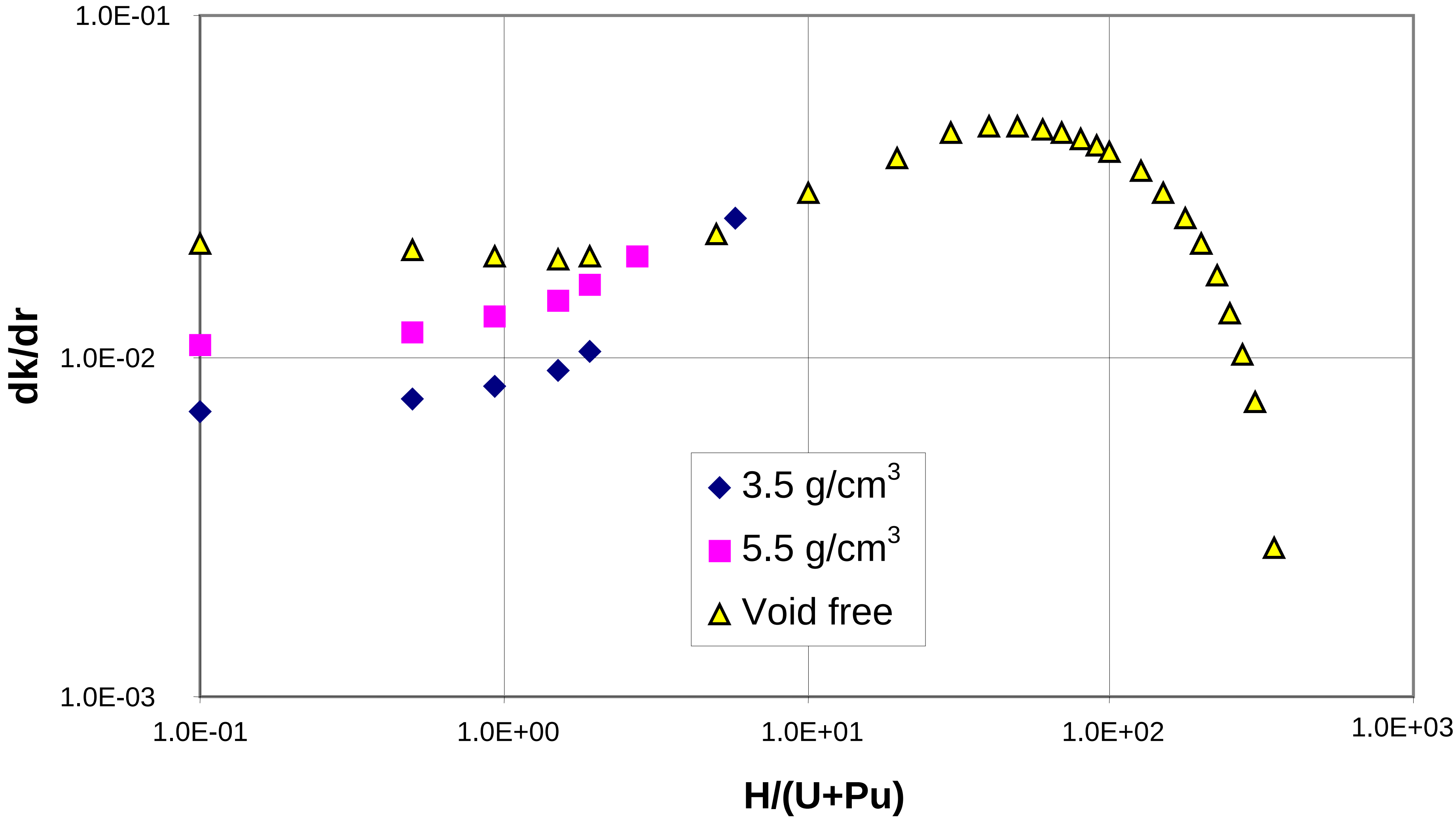

Fig. A.2.d.7. Delta lambda divided by delta dimension [cylinder, ^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

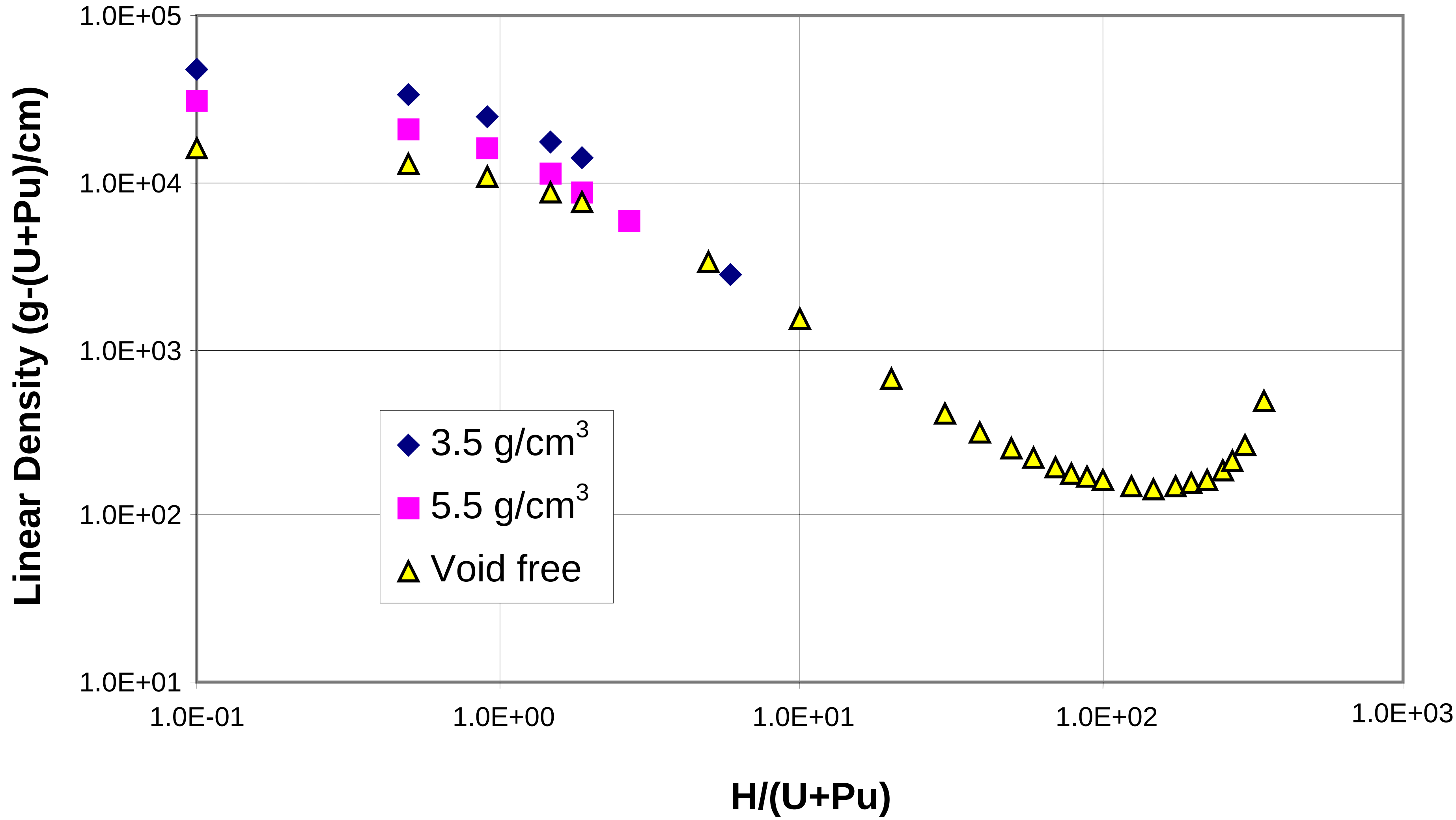

Fig. A.2.d.8. Linear density [$^{235}U/U$ = 0.3%, $^{239}Pu/Pu$ = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

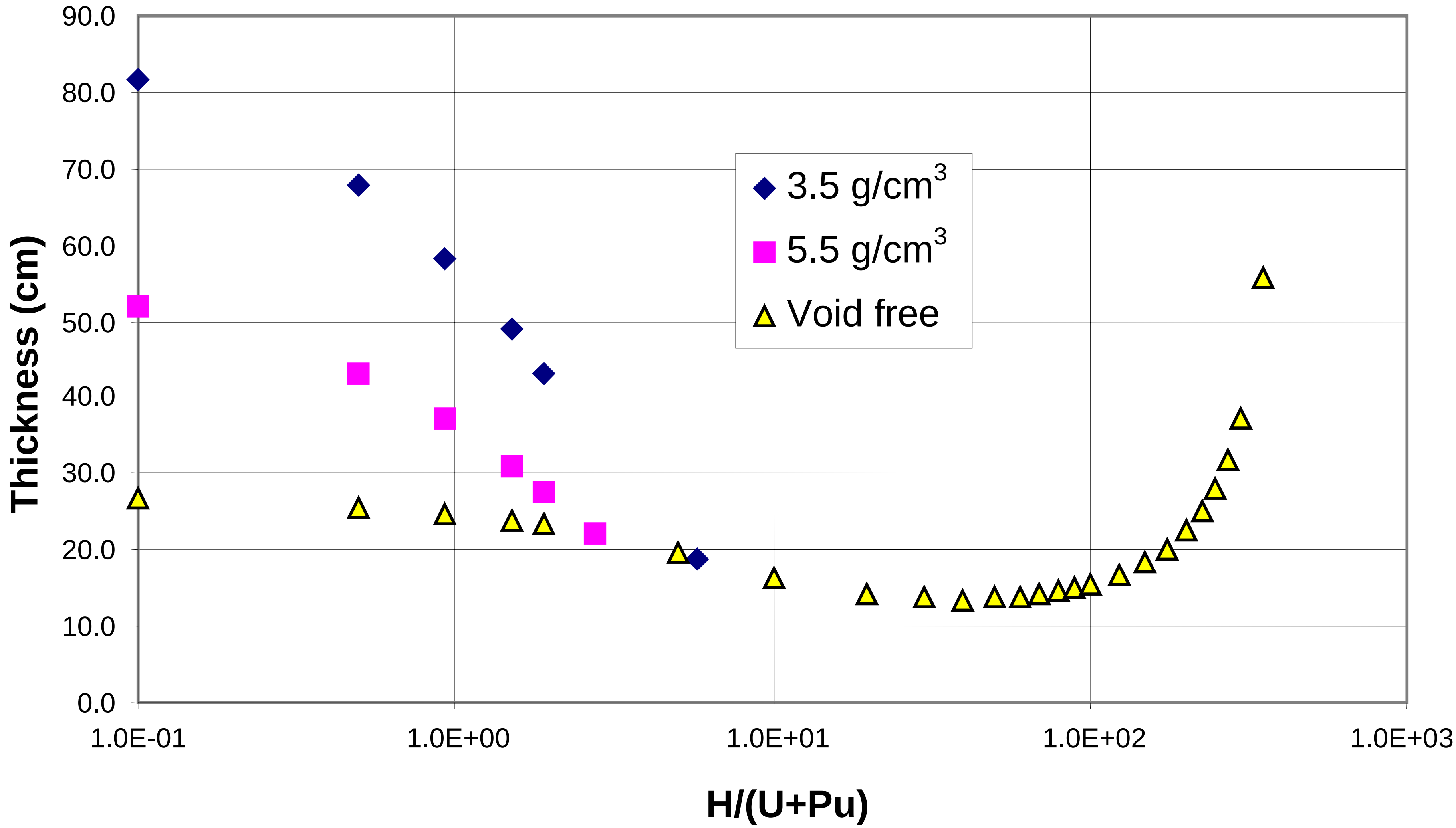

Fig. A.2.d.9. Slab thickness [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

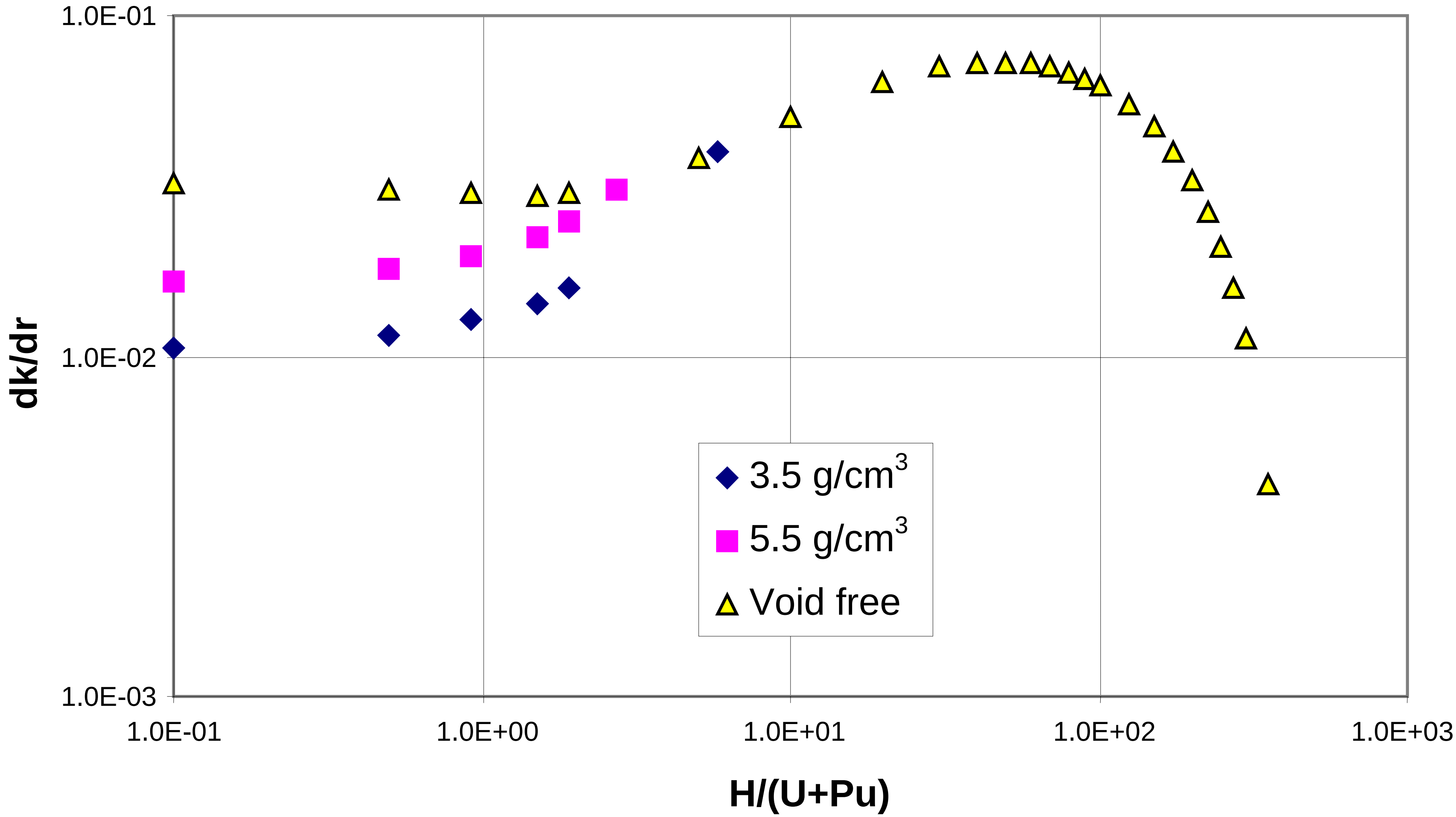

Fig. A.2.d.10. Delta lambda divided by delta dimension [slab, ^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

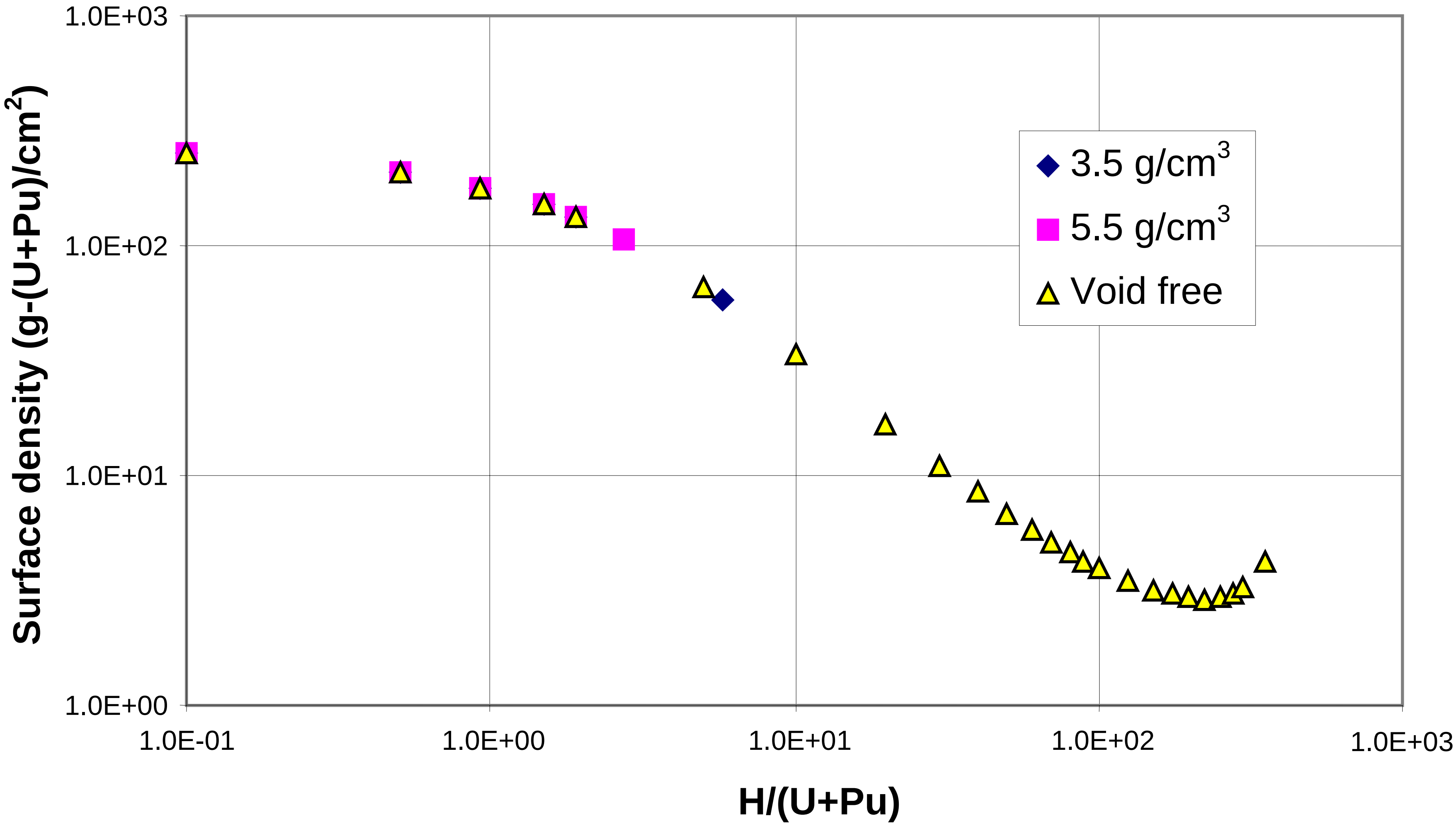

Fig. A.2.d.11. Surface density [^{235}U/U = 0.3%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

APPENDIX A.3

DATA PLOTS

(^{235}U/U = <u>0.3%</u>, ^{240}Pu/Pu = <u>20%</u>)

APPENDIX A.3

DATA PLOTS (^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%)

(a) Plutonium weight percentages: 35% and density: 3.5 g/cm^3

(b) Plutonium weight percentages: <u>12.5%</u> and density: <u>void-free</u>

Figure A.3.b.9-2. Slab thickness [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.3.b.10. Surface density [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.3.b.11. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 30.0 cm]

Figure A.3.b.12. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3 %, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 2.5 cm]

(c) Plutonium weight percentages: <u>12.5%</u>, density: <u>3.5 and 5.5 g/cm^3</u> and water reflector <u>30 cm</u>

Table A.3.c.1. MOX data [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Table A.3.c.2. MOX Data [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Figure A.3.c.1. *k*-infinity [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%]

Figure A.3.c.2. B_m^2 [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%]

Figure A.3.c.3. Sphere radius [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.3.c.4. Delta lambda divided by delta dimension [sphere, ^{235}U/U = 0.3 %, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.3.c.5. Sphere volume [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.3.c.6. U + Pu mass [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.3.c.7. MOX mass [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.3.c.8. Cylinder diameter [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.3.c.9. Delta lambda divided by delta dimension [cylinder, ^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.3.c.10. Linear density [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

Figure A.3.c.11.	Slab thickness [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]
Figure A.3.c.12.	Delta lambda divided by delta dimension [slab, ^{235}U/U = 0.3 %, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]
Figure A.3.c.13.	Surface density [^{235}U/U = 0.3 %, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

(d) Plutonium weight percentages: 12.5%, density: 3.5 and 5.5 g/cm^3 and water reflector: 2.5 cm

Table A.3.d.1.	MOX data [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]
Table A.3.d.2.	MOX data [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]
Figure A.3.d.1.	Sphere radius [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.3.d.2.	Delta lambda divided by delta dimension [sphere, ^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.3.d.3.	Sphere volume [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.3.d.4.	U + Pu mass [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.3.d.5.	MOX mass [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.3.d.6.	Cylinder diameter [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.3.d.7.	Delta lambda divided by delta dimension [cylinder, ^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.3.d.8.	Linear density [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.3.d.9.	Slab thickness [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.3.d.10.	Delta lambda divided by delta dimension [slab, ^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.3.d.11. Surface density [$^{235}U/U = 0.3\%$, $^{240}Pu/Pu = 20\%$, $Pu/(U + Pu) = 12.5\%$, water reflector: 2.5 cm]

Table A.3.a.1. MOX data [$^{235}U/U$ = 0.3%, $^{240}Pu/Pu$ = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**65.883**	**20.000**	**12.941**	**1.176**

Maximum fissile material oxide density = 3.5 g (UO_2 + PuO_2)/cm^3

Water reflector 30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 35.0 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08607	3.50000	2.03332	2.546E-03	37.783	1.434E-02	225.925	697.220	790.737	49.308	1.911E-02	5893.014	20.736	3.028E-02	63.993
0.5	1.64	3.08607	3.50000	1.84746	3.225E-03	34.683	1.546E-02	174.763	539.331	611.671	45.514	2.041E-02	5021.036	19.389	3.232E-02	59.837
0.928	3.00	3.08607	3.50000	1.74483	4.024E-03	31.802	1.664E-02	134.730	415.786	471.555	41.894	2.195E-02	4253.977	18.014	3.472E-02	55.593
1.5	4.76	3.08607	3.50000	1.64981	5.091E-03	28.942	1.771E-02	101.543	313.370	355.402	38.258	2.337E-02	3547.645	16.569	3.705E-02	51.134
1.916	6.00	3.08607	3.50000	1.59748	5.866E-03	27.336	1.826E-02	85.561	264.046	299.462	36.209	2.410E-02	3177.746	15.735	3.763E-02	48.559
5.88	16.37	3.08607	3.50000	1.38522	1.453E-02	18.784	2.220E-02	27.763	85.679	97.170	25.160	2.933E-02	1534.348	11.018	4.549E-02	34.002
10	24.98	2.08618	2.36599	1.34025	1.304E-02	19.922	1.932E-02	33.121	69.096	78.364	26.796	2.550E-02	1176.454	11.948	3.980E-02	24.925
20	39.97	1.16697	1.32349	1.35000	1.342E-02	19.546	2.026E-02	31.279	36.502	41.398	26.265	2.681E-02	632.282	11.712	4.210E-02	13.667
40	57.11	0.62032	0.70352	1.41014	1.554E-02	18.030	2.481E-02	24.550	15.229	17.271	24.156	3.291E-02	284.296	10.711	5.191E-02	6.644
50	62.47	0.50260	0.57001	1.43254	1.629E-02	17.604	2.647E-02	22.852	11.485	13.026	23.587	3.514E-02	219.605	10.475	5.549E-02	5.265
60	66.64	0.42244	0.47910	1.44976	1.684E-02	17.330	2.774E-02	21.803	9.210	10.446	23.234	3.685E-02	179.109	10.354	5.824E-02	4.374
70	69.97	0.36433	0.41320	1.46275	1.723E-02	17.163	2.870E-02	21.176	7.715	8.750	23.033	3.812E-02	151.808	**10.312**	6.028E-02	3.757
80	72.70	0.32027	0.36323	1.47232	1.750E-02	17.072	2.937E-02	20.842	6.675	7.570	22.941	3.901E-02	132.380	10.327	6.175E-02	3.308
90	74.98	0.28572	0.32404	1.47911	1.767E-02	**17.038**	2.985E-02	**20.716**	5.919	6.713	**22.928**	3.964E-02	117.970	10.384	6.273E-02	2.967
100	76.90	0.25790	0.29249	1.48365	1.776E-02	17.046	3.015E-02	20.748	5.351	6.069	22.976	4.003E-02	106.928	10.471	6.333E-02	2.700
125	80.63	0.20741	0.23523	1.48755	1.774E-02	17.203	3.030E-02	21.325	4.423	5.016	23.284	4.041E-02	88.315	10.784	6.355E-02	2.237
150	83.32	0.17345	0.19671	1.48400	1.746E-02	17.490	2.991E-02	22.412	3.887	4.409	23.775	3.962E-02	77.000	11.188	6.261E-02	1.941
200	86.94	0.13066	0.14819	1.46377	1.649E-02	18.310	2.804E-02	25.713	3.360	3.810	25.099	3.721E-02	64.644	12.170	5.860E-02	1.590
225	88.22	0.11632	0.13192	1.44977	1.590E-02	18.807	2.689E-02	27.862	3.241	3.676	25.883	3.566E-02	61.203	12.726	5.606E-02	1.480
250	89.27	0.10481	0.11887	1.43425	1.527E-02	19.352	2.566E-02	30.358	3.182	3.609	26.738	3.397E-02	58.849	13.320	5.330E-02	1.396
275	90.15	0.09537	0.10816	1.41768	1.462E-02	19.944	2.434E-02	33.228	**3.169**	**3.594**	27.659	3.220E-02	57.301	13.952	5.044E-02	1.331
300	90.90	0.08750	0.09924	1.40046	1.395E-02	20.576	2.299E-02	36.490	3.193	3.621	28.640	3.039E-02	56.368	14.577	4.768E-02	1.275
350	92.10	0.07509	0.08516	1.36499	1.262E-02	21.980	2.021E-02	44.479	3.340	3.788	30.806	2.667E-02	**55.968**	16.027	4.172E-02	1.203
400	93.02	0.06577	0.07459	1.32917	1.131E-02	23.576	1.753E-02	54.894	3.610	4.095	33.261	2.311E-02	57.147	17.629	3.608E-02	1.159
450	93.74	0.05851	0.06636	1.29377	1.003E-02	25.402	1.499E-02	68.661	4.017	4.556	36.062	1.974E-02	59.763	19.455	3.077E-02	1.138
500	94.33	0.05269	0.05976	1.25923	8.804E-03	27.512	1.261E-02	87.232	4.596	5.213	39.293	1.670E-02	63.894	21.572	2.579E-02	**1.137**
550	94.82	0.04792	0.05435	1.22578	7.630E-03	29.985	1.040E-02	112.930	5.412	6.137	43.077	1.367E-02	69.839	24.020	2.121E-02	1.151
600	95.23	0.04394	0.04983	1.19354	6.511E-03	32.940	8.374E-03	149.712	6.578	7.461	47.595	1.100E-02	78.177	26.958	1.703E-02	1.185
700	95.89	0.03769	0.04275	1.13282	4.429E-03	41.146	4.875E-03	291.795	10.998	12.473	60.142	6.399E-03	107.070	35.112	9.879E-03	1.323
800	96.38	0.03300	0.03743	1.07709	2.553E-03	56.061	2.173E-03	738.037	24.355	27.622	82.952	2.842E-03	178.342	49.958	4.381E-03	1.649
900	96.77	0.02934	0.03328	1.02601	8.516E-04	101.221	3.659E-04	4344.107	127.456	144.551	152.100	4.936E-04	533.098	95.060	7.661E-04	2.789
940	96.904	0.02805	0.03181	1.00678												
950	96.935	0.02775	0.03147	1.00208												
954	96.948	0.02764	0.03135	1.00021												
955	**96.951**	**0.02761**	**0.03131**	**0.99975**												
956	96.954	0.02758	0.03128	0.99927												
960	96.966	0.02747	0.03115	0.99741												
1000	97.084	0.02637	0.02991	0.97916												

Table A.3.a.2. MOX data [$^{235}U/U$ = 0.3%, $^{240}Pu/Pu$ = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	99.700	65.883	20.000	12.941	1.176

Maximum fissile material oxide density = 3.5 g (UO_2 + PuO_2)/cm^3

Water reflector 2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 35.0 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08607	3.50000	2.03332	2.546E-03	48.494	1.578E-02	477.709	1474.243	1671.980	68.351	2.090E-02	11323.490	36.410	3.240E-02	112.363
0.5	1.64	3.08607	3.50000	1.84746	3.225E-03	43.458	1.674E-02	343.803	1061.000	1203.310	61.372	2.197E-02	9129.333	32.845	3.417E-02	101.361
0.928	3.00	3.08607	3.50000	1.74483	4.024E-03	39.145	1.765E-02	251.255	775.390	879.391	55.353	2.320E-02	7426.448	29.709	3.614E-02	91.685
1.5	4.76	3.08607	3.50000	1.64981	5.091E-03	35.047	1.840E-02	180.322	556.486	631.126	49.640	2.421E-02	5972.494	26.734	3.779E-02	82.504
1.916	6.00	3.08607	3.50000	1.59748	5.866E-03	32.803	1.877E-02	147.854	456.288	517.489	46.515	2.470E-02	5244.230	25.112	3.857E-02	77.499
5.88	16.37	3.08607	3.50000	1.38522	1.453E-02	21.465	2.188E-02	41.428	127.850	144.998	30.660	2.884E-02	2278.482	16.781	4.483E-02	51.786
10	24.98	2.08618	2.36599	1.34025	1.304E-02	22.748	1.899E-02	49.309	102.868	116.666	32.561	2.500E-02	1737.192	17.939	3.886E-02	37.424
20	39.97	1.16697	1.32349	1.35000	1.342E-02	22.297	1.986E-02	46.434	54.188	61.456	31.855	2.617E-02	930.058	17.474	4.079E-02	20.392
40	57.11	0.62032	0.70352	1.41014	1.554E-02	20.475	2.428E-02	35.956	22.304	25.296	29.120	3.206E-02	413.132	15.806	5.008E-02	9.805
50	62.47	0.50260	0.57001	1.43254	1.629E-02	19.936	2.567E-02	33.188	16.680	18.918	28.317	3.468E-02	316.524	15.345	5.393E-02	7.712
60	66.64	0.42244	0.47910	1.44976	1.684E-02	19.570	2.717E-02	31.394	13.262	15.041	27.777	3.590E-02	255.992	15.024	5.615E-02	6.347
70	69.97	0.36433	0.41320	1.46275	1.723E-02	19.326	2.811E-02	30.237	11.016	12.494	27.422	3.715E-02	215.174	14.873	5.794E-02	5.419
80	72.70	0.32027	0.36323	1.47232	1.750E-02	19.172	2.879E-02	29.518	9.454	10.722	27.201	3.805E-02	186.118	14.751	5.936E-02	4.724
90	74.98	0.28572	0.32404	1.47911	1.767E-02	19.084	2.927E-02	29.112	8.318	9.434	27.079	3.870E-02	164.554	14.691	6.037E-02	4.197
100	76.90	0.25790	0.29249	1.48365	1.776E-02	**19.046**	2.956E-02	**28.941**	7.464	8.465	**27.033**	3.909E-02	148.023	**14.678**	6.100E-02	3.785
125	80.63	0.20741	0.23523	1.48755	1.774E-02	19.111	2.977E-02	29.235	6.064	6.877	27.154	3.935E-02	120.112	14.738	6.163E-02	3.057
150	83.32	0.17345	0.19671	1.48400	1.746E-02	19.329	2.941E-02	30.250	5.247	5.951	27.505	3.887E-02	103.058	14.994	6.086E-02	2.601
200	86.94	0.13066	0.14819	1.46377	1.649E-02	20.053	2.775E-02	33.777	4.413	5.005	28.632	3.655E-02	84.129	15.767	5.723E-02	2.060
225	88.22	0.11632	0.13192	1.44977	1.590E-02	20.515	2.666E-02	36.164	4.207	4.771	29.345	3.507E-02	78.670	16.245	5.487E-02	1.890
250	89.27	0.10481	0.11887	1.43425	1.527E-02	21.031	2.583E-02	38.964	4.084	4.632	30.139	3.346E-02	74.776	16.774	5.229E-02	1.758
275	90.15	0.09537	0.10816	1.41768	1.462E-02	21.598	2.404E-02	42.203	4.025	4.565	31.010	3.175E-02	72.029	17.317	4.963E-02	1.652
300	90.90	0.08750	0.09924	1.40046	1.395E-02	22.210	2.275E-02	45.890	**4.015**	**4.554**	31.947	3.001E-02	70.140	17.934	4.687E-02	1.569
350	92.10	0.07509	0.08516	1.36499	1.262E-02	23.580	2.003E-02	54.919	4.124	4.677	34.044	2.639E-02	**68.352**	19.308	4.112E-02	1.450
400	93.02	0.06577	0.07459	1.32917	1.131E-02	25.151	1.740E-02	66.645	4.383	4.971	36.445	2.290E-02	68.612	20.854	3.564E-02	1.372
450	93.74	0.05851	0.06636	1.29377	1.003E-02	26.958	1.488E-02	82.061	4.801	5.445	39.204	1.959E-02	70.630	22.635	3.046E-02	1.324
500	94.33	0.05269	0.05976	1.25923	8.804E-03	29.053	1.254E-02	102.716	5.412	6.138	42.403	1.648E-02	74.405	24.703	2.558E-02	1.302
550	94.82	0.04792	0.05435	1.22578	7.630E-03	31.513	1.034E-02	131.084	6.282	7.124	46.160	1.360E-02	80.193	27.136	2.107E-02	**1.300**
600	95.23	0.04394	0.04983	1.19354	6.511E-03	34.459	8.356E-03	171.387	7.531	8.541	50.658	1.096E-02	88.560	30.051	1.695E-02	1.320
700	95.89	0.03769	0.04275	1.13282	4.429E-03	42.652	4.879E-03	325.024	12.250	13.893	63.175	6.383E-03	118.142	38.169	9.848E-03	1.439
800	96.38	0.03300	0.03743	1.07709	2.553E-03	57.563	2.173E-03	798.936	26.365	29.901	85.969	2.845E-03	191.551	52.994	4.384E-03	1.749
900	96.77	0.02934	0.03328	1.02601	8.516E-04	102.757	3.587E-04	4544.885	133.347	151.232	155.110	4.940E-04	554.408	98.083	7.673E-04	2.878
940	96.904	0.02805	0.03181	1.00678												
950	96.935	0.02775	0.03147	1.00208												
954	96.948	0.02764	0.03135	1.00021												
955	**96.951**	**0.02761**	**0.03131**	**0.99975**												
956	96.954	0.02758	0.03128	0.99927												
960	96.966	0.02747	0.03115	0.99741												
1000	97.084	0.02637	0.02991	0.97916												

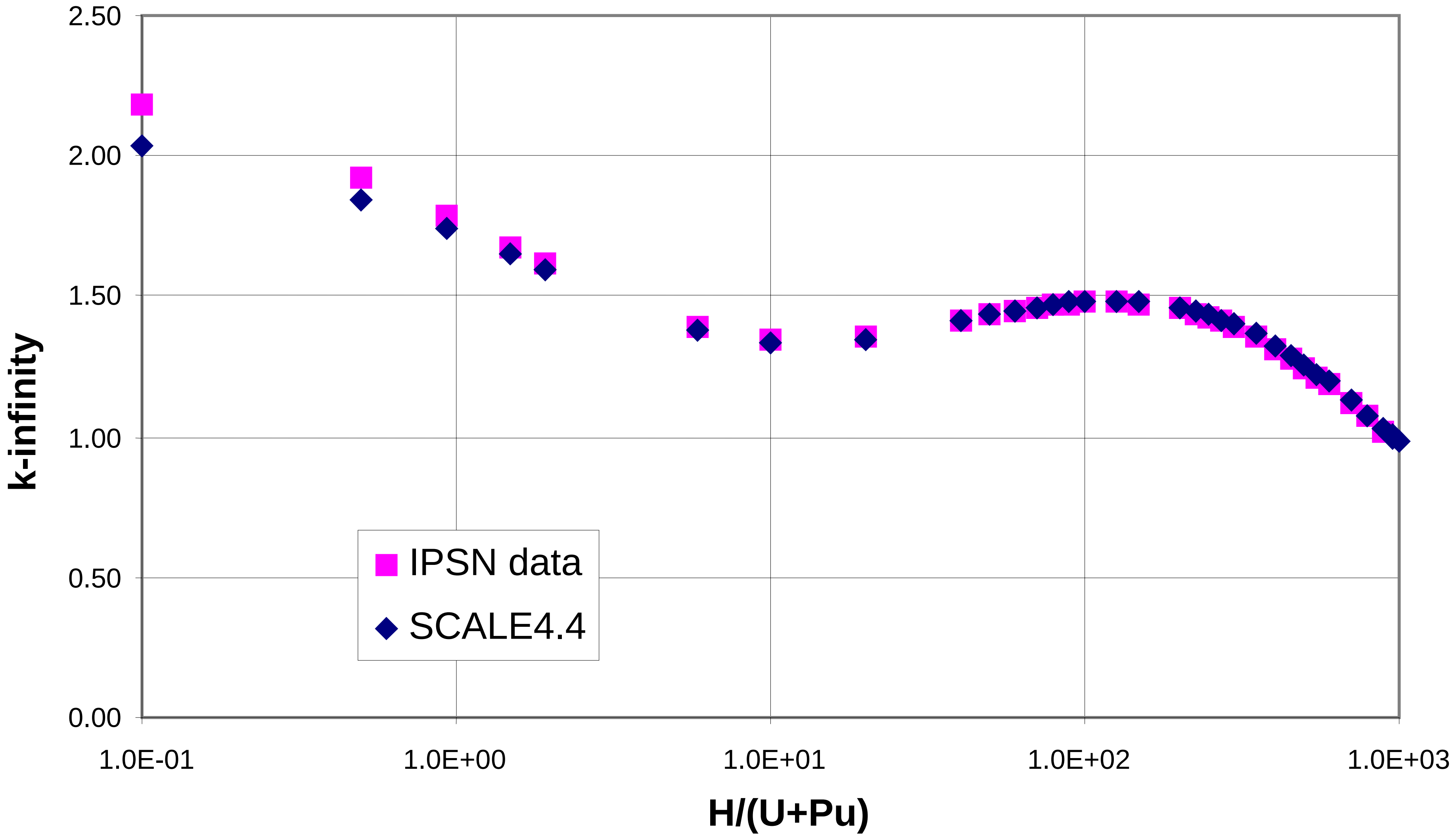

Fig. A.3.a.1. ***k*-infinity [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].**

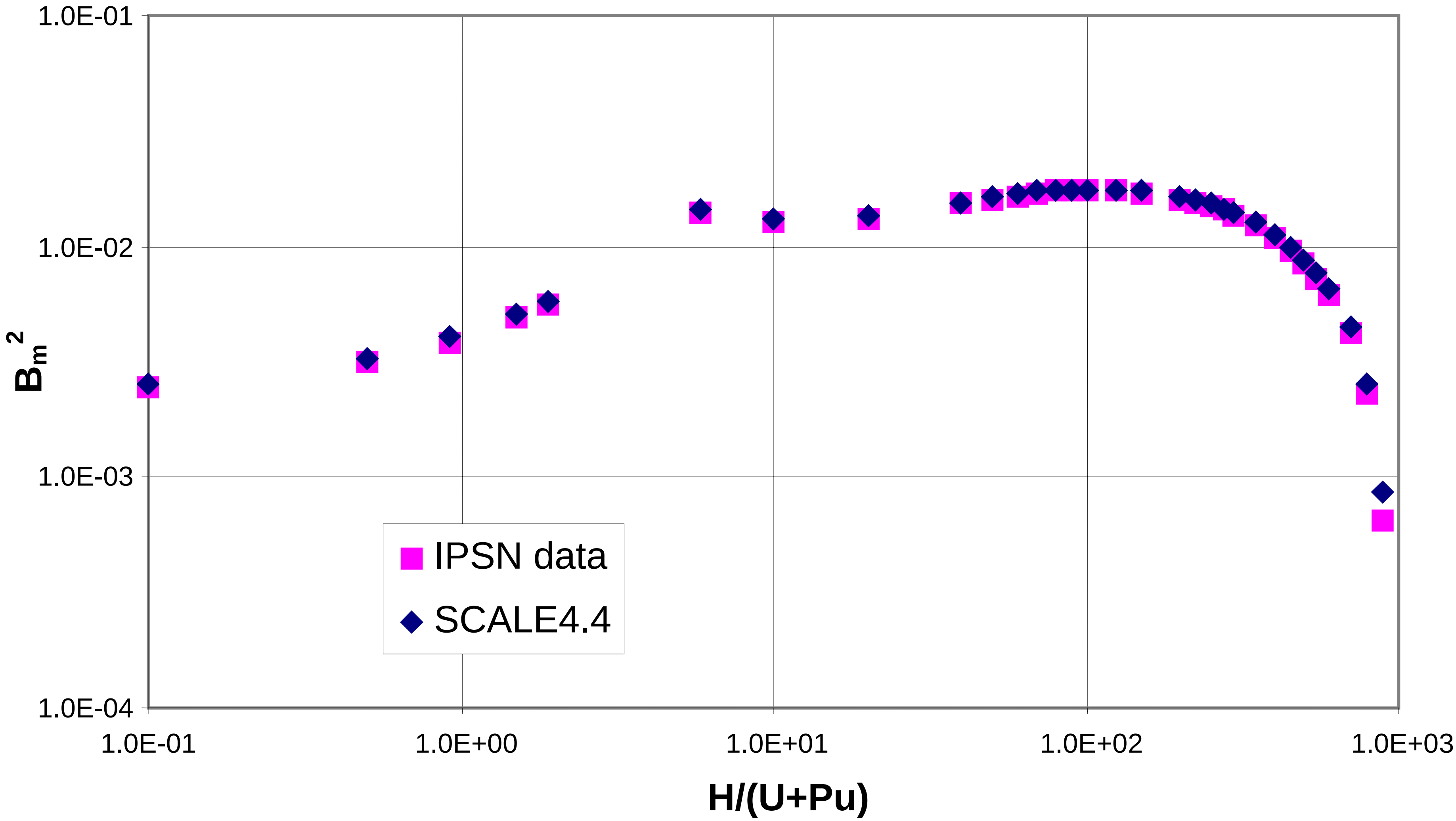

Fig. A.3.a.2. B_m^2 [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

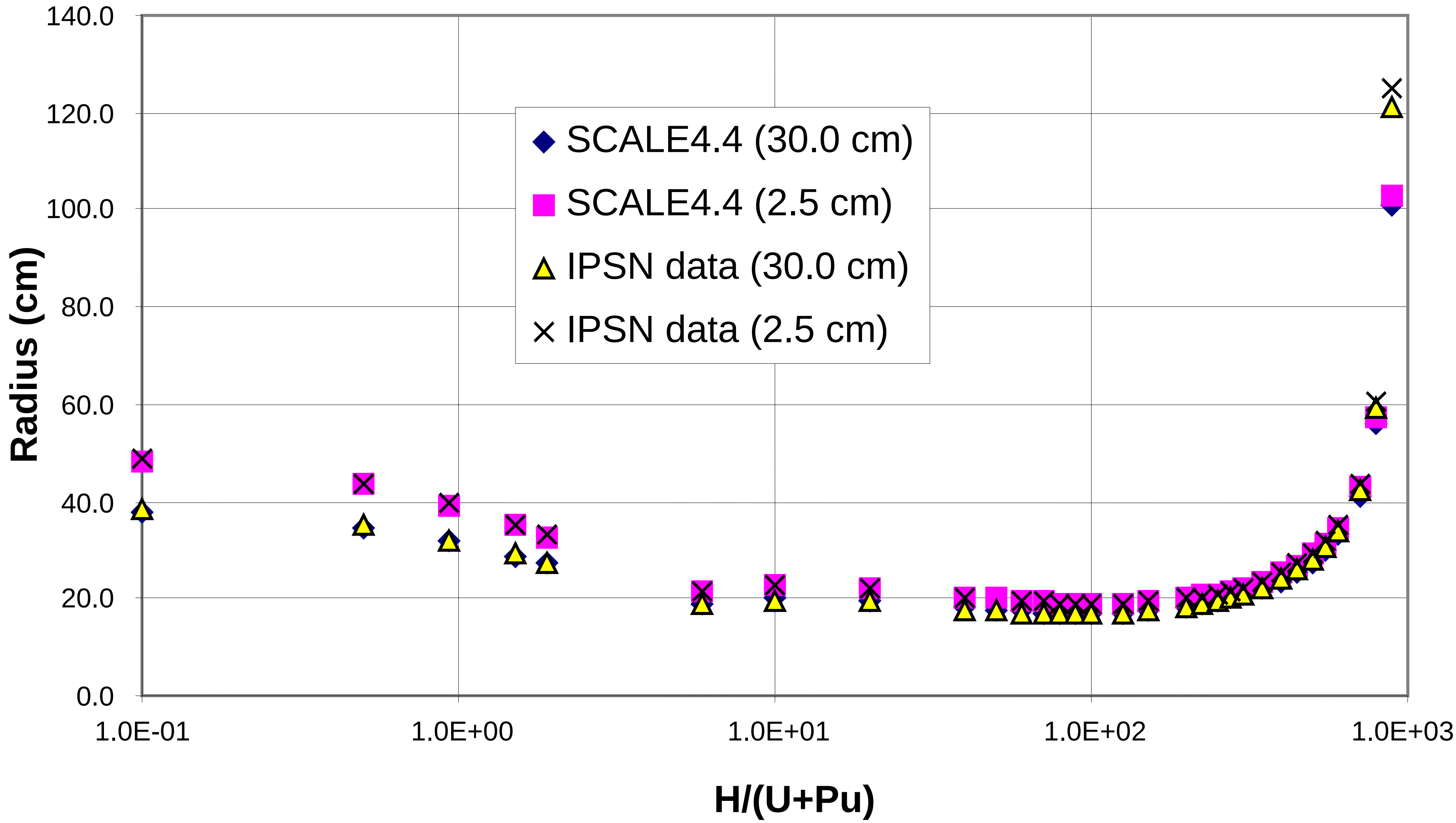

Fig. A.3.a.3-1. Sphere radius [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^{3}].

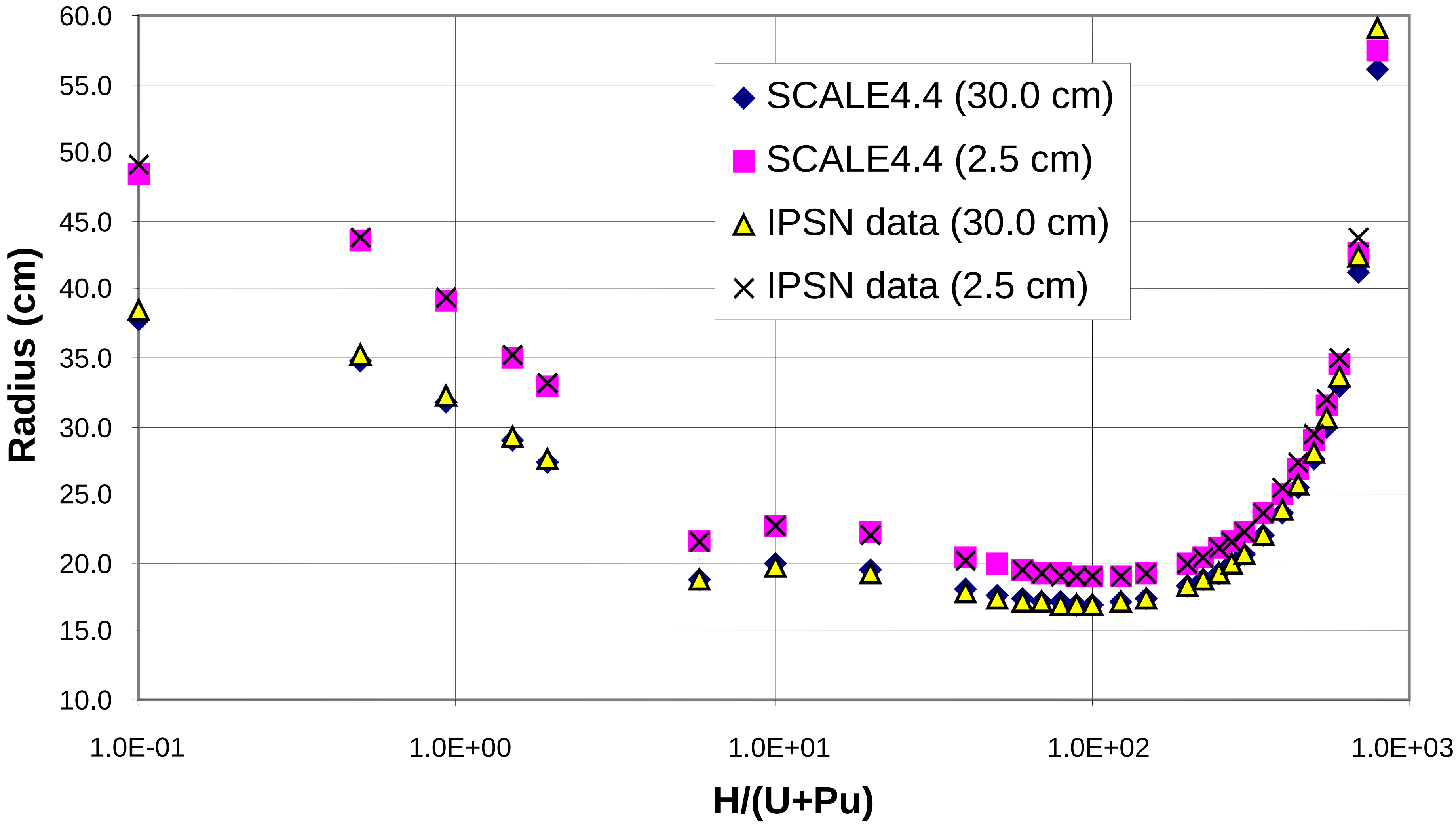

Fig. A.3.a.3-2. Sphere radius [$^{235}U/U$ = 0.3%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

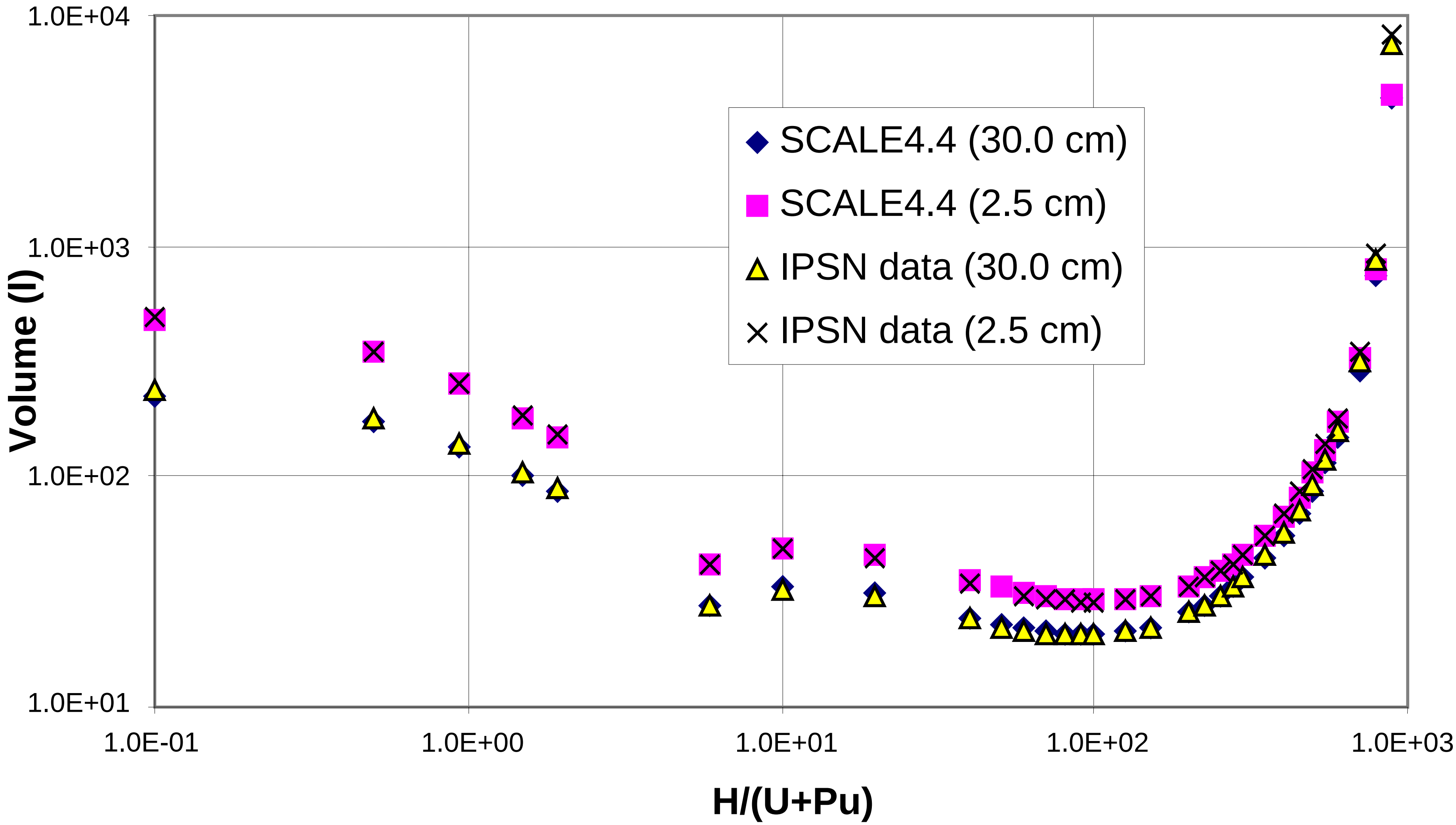

Fig. A.3.a.4. Sphere volume [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

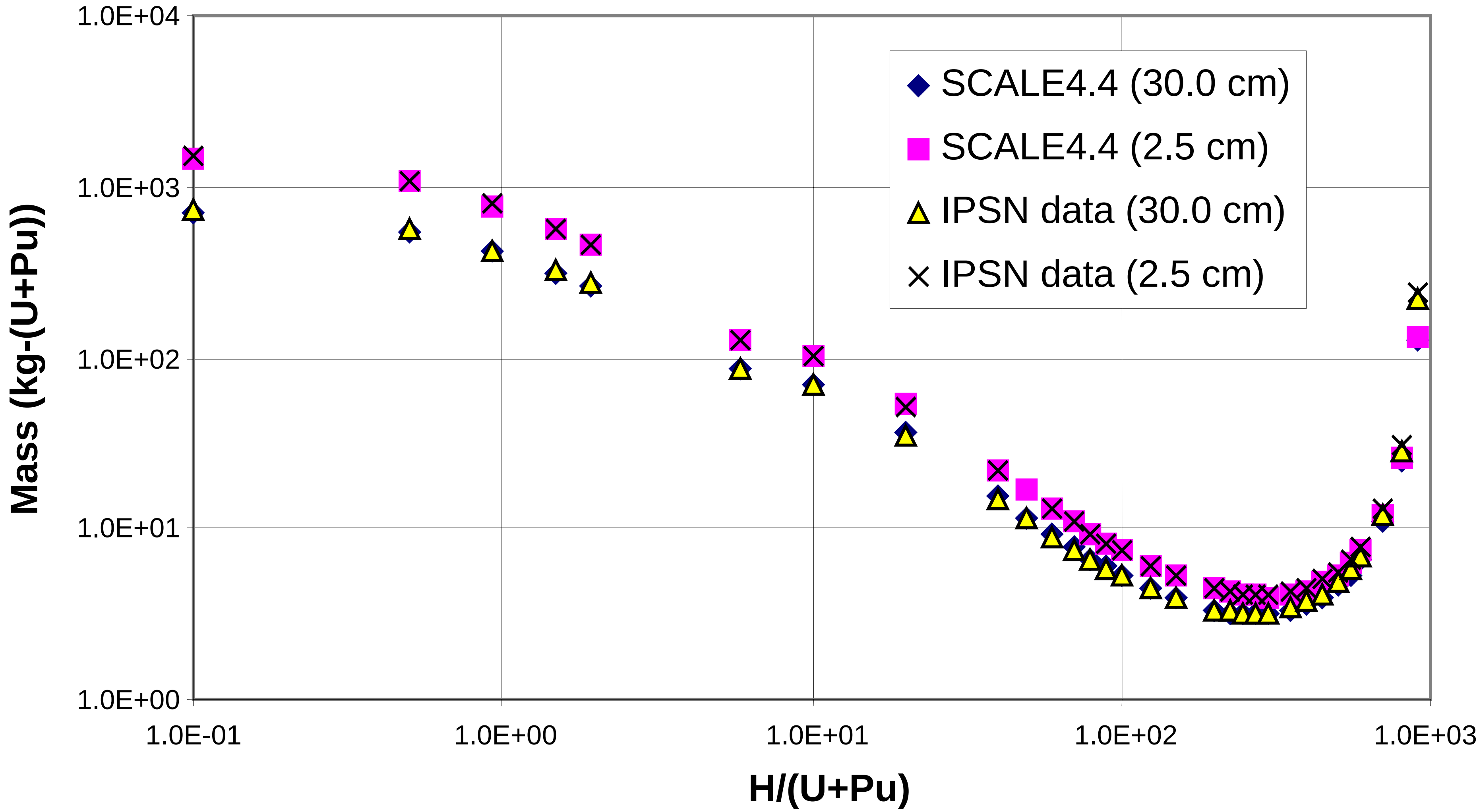

Fig. A.3.a.5. U + Pu Mass [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

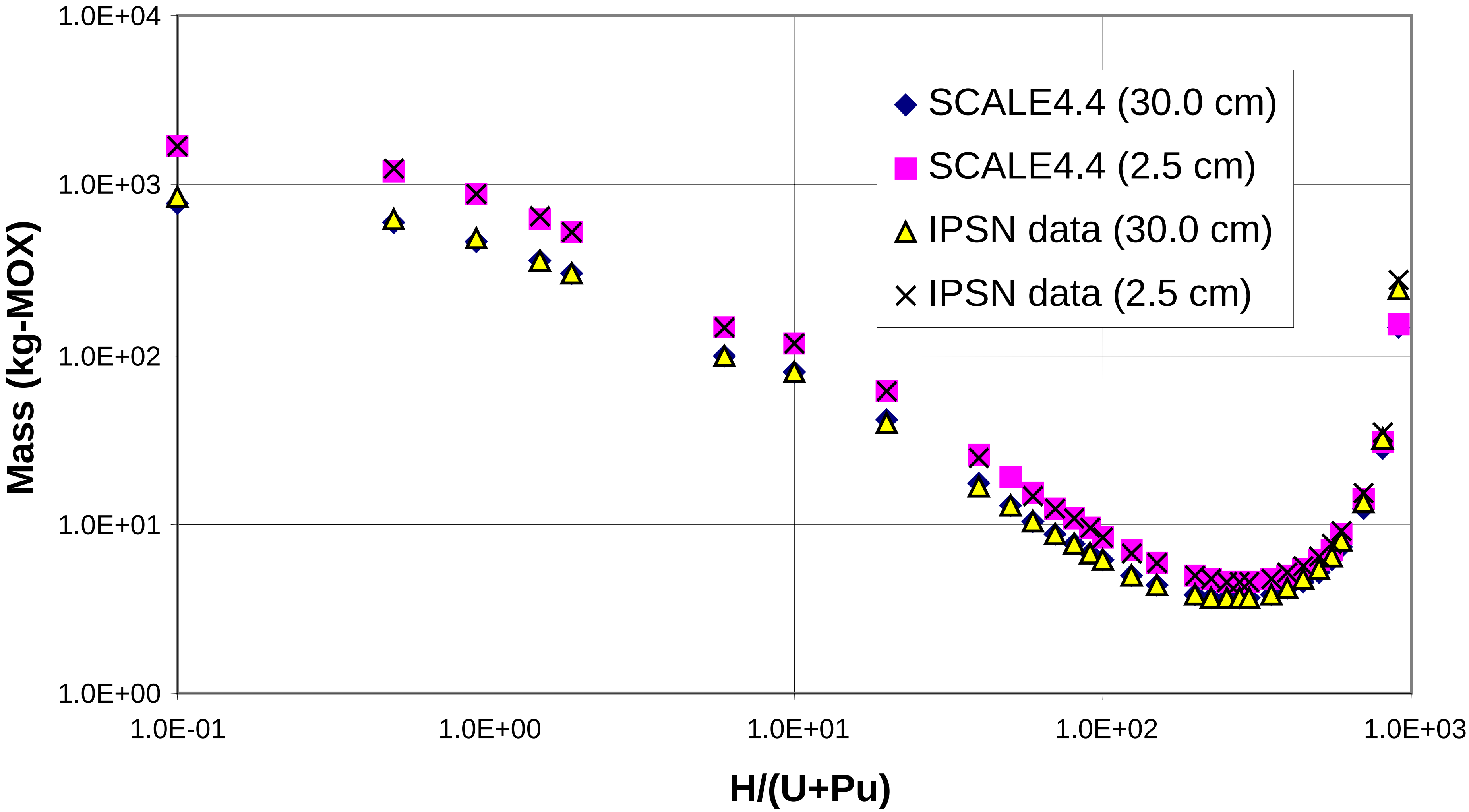

Fig. A.3.a.6. MOX mass [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

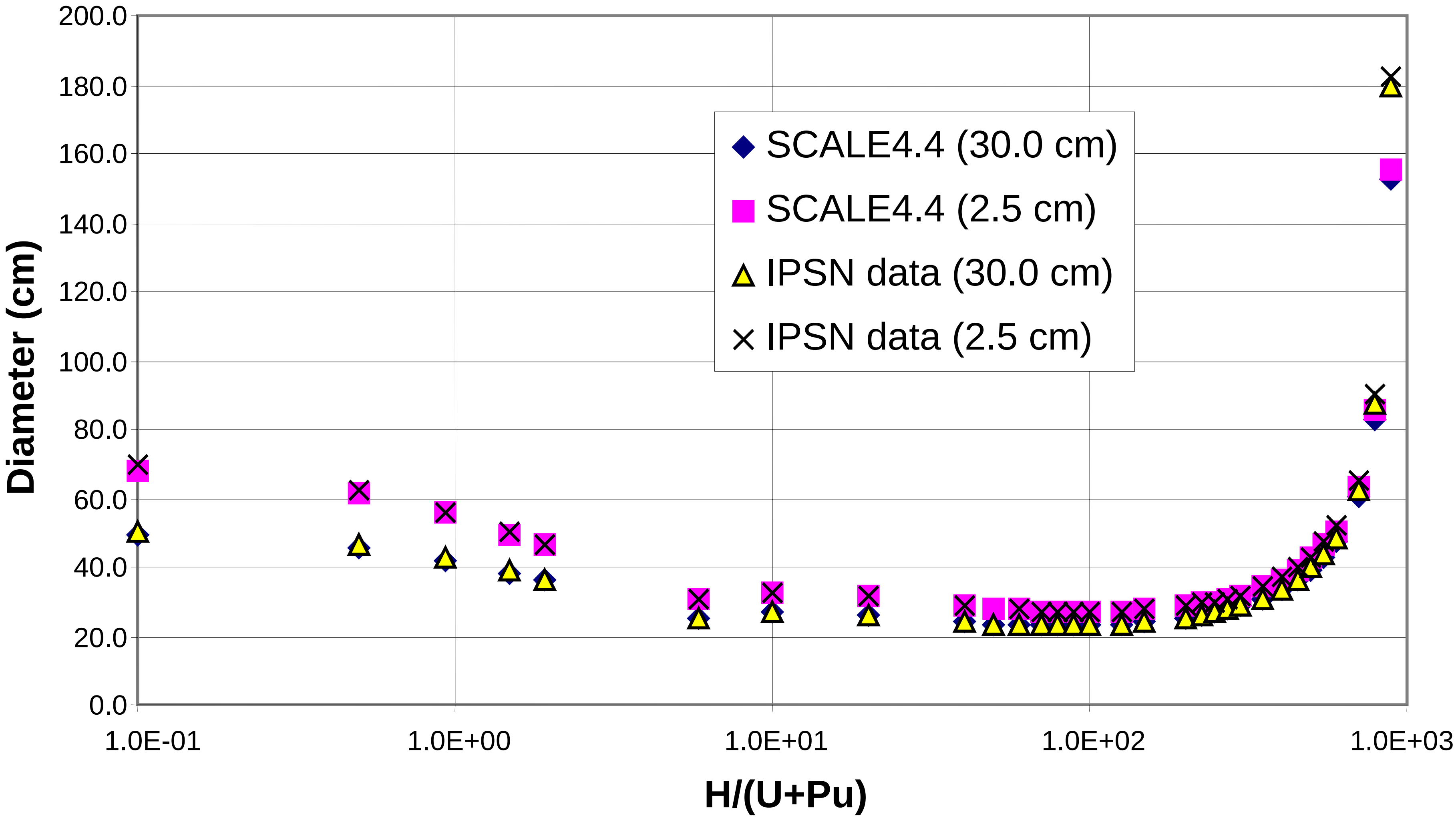

Fig. A.3.a.7-1. Cylinder diameter [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

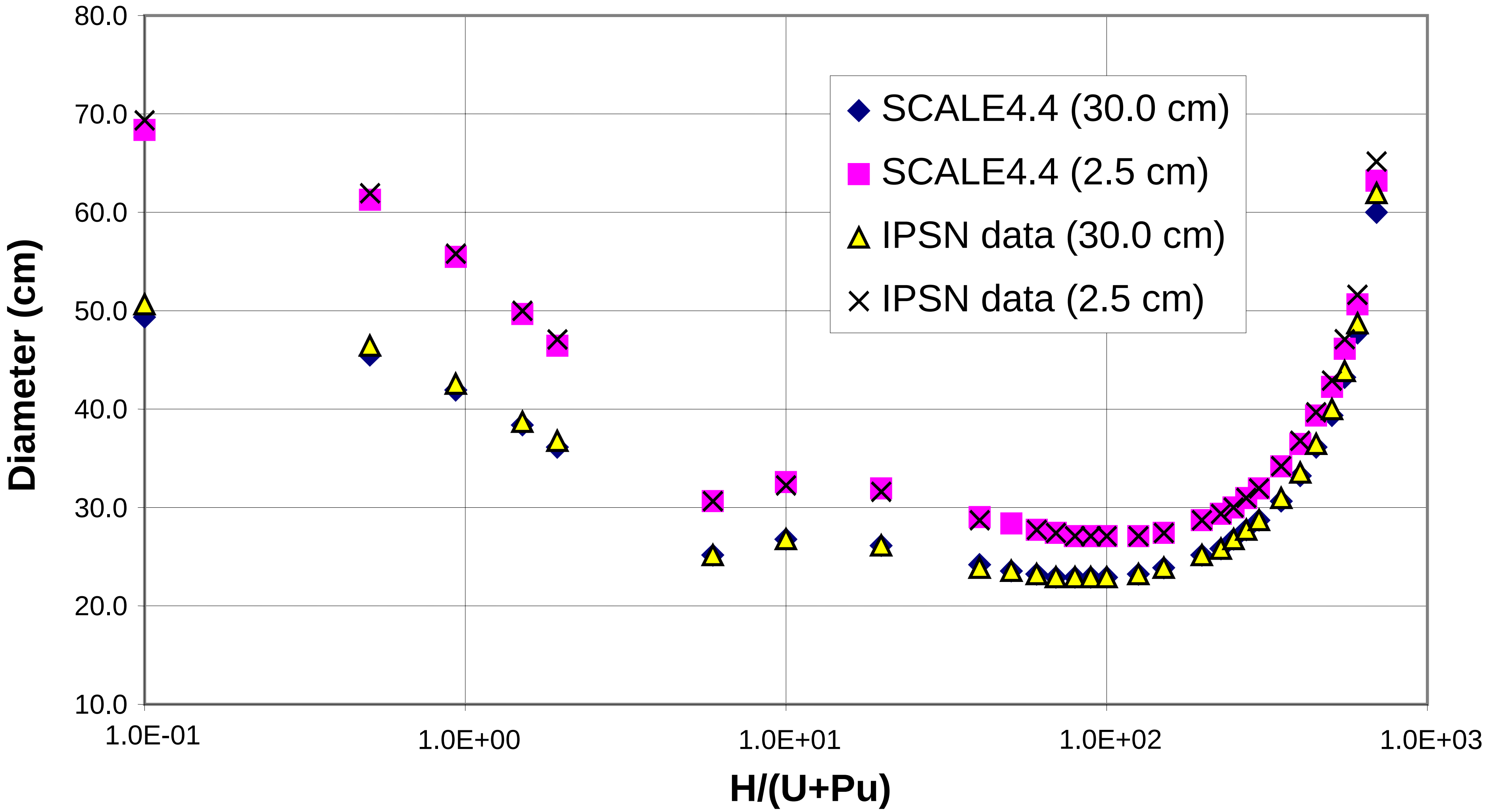

Fig. A.3.a.7-2. Cylinder diameter infinity [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

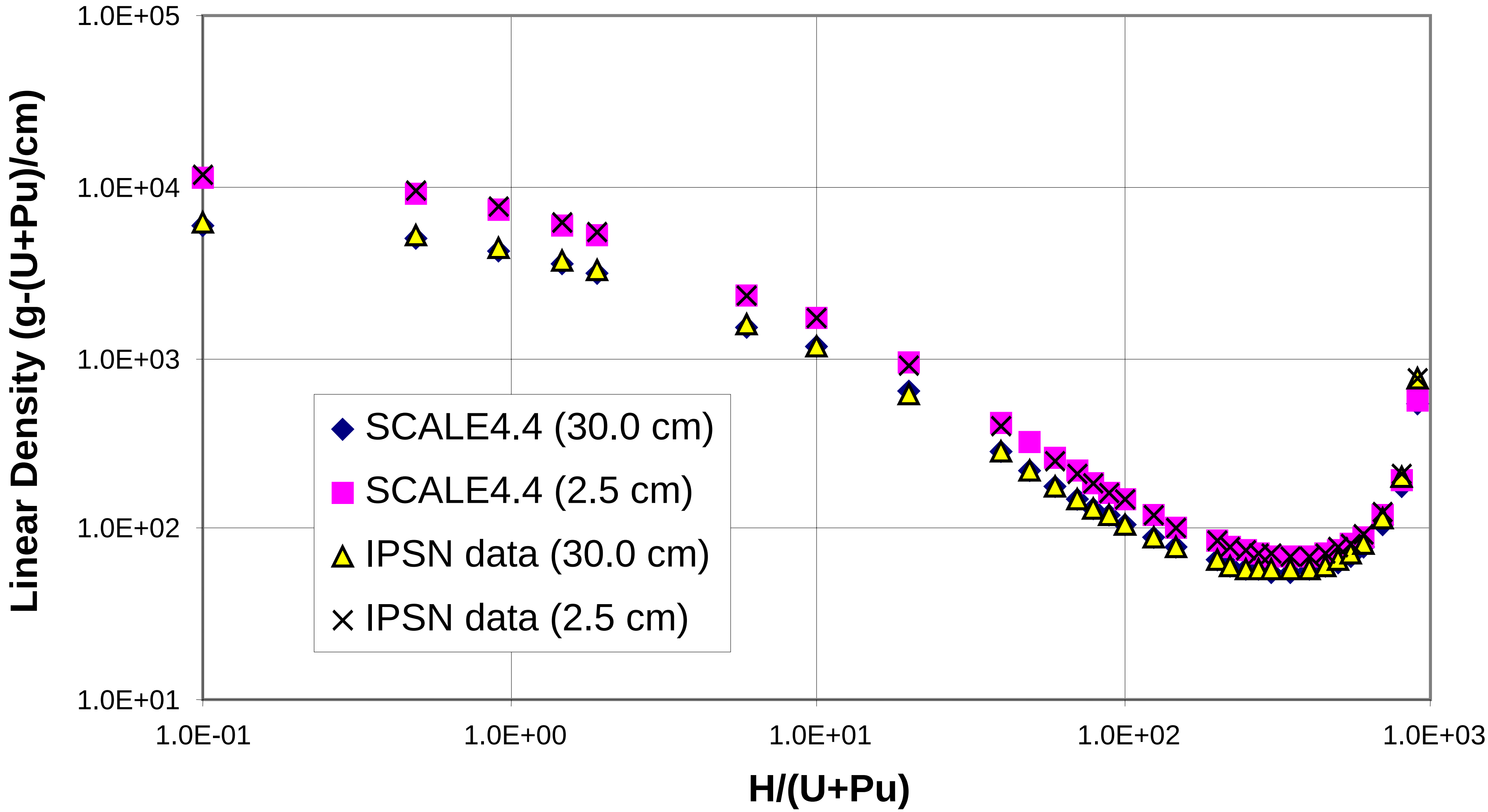

Fig. A.3.a.8. Linear density [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

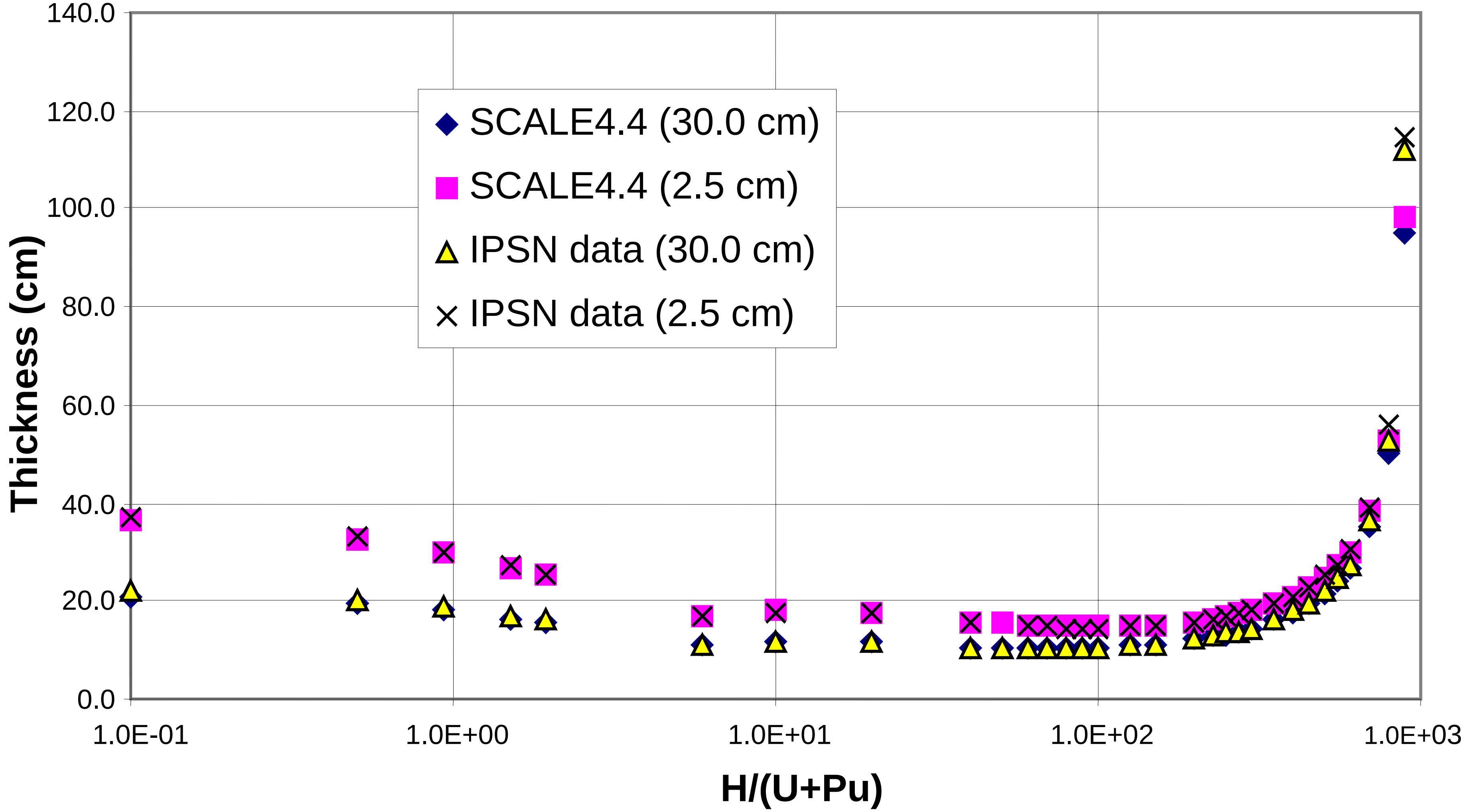

Fig. A.3.a.9-1. Slab thickness [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

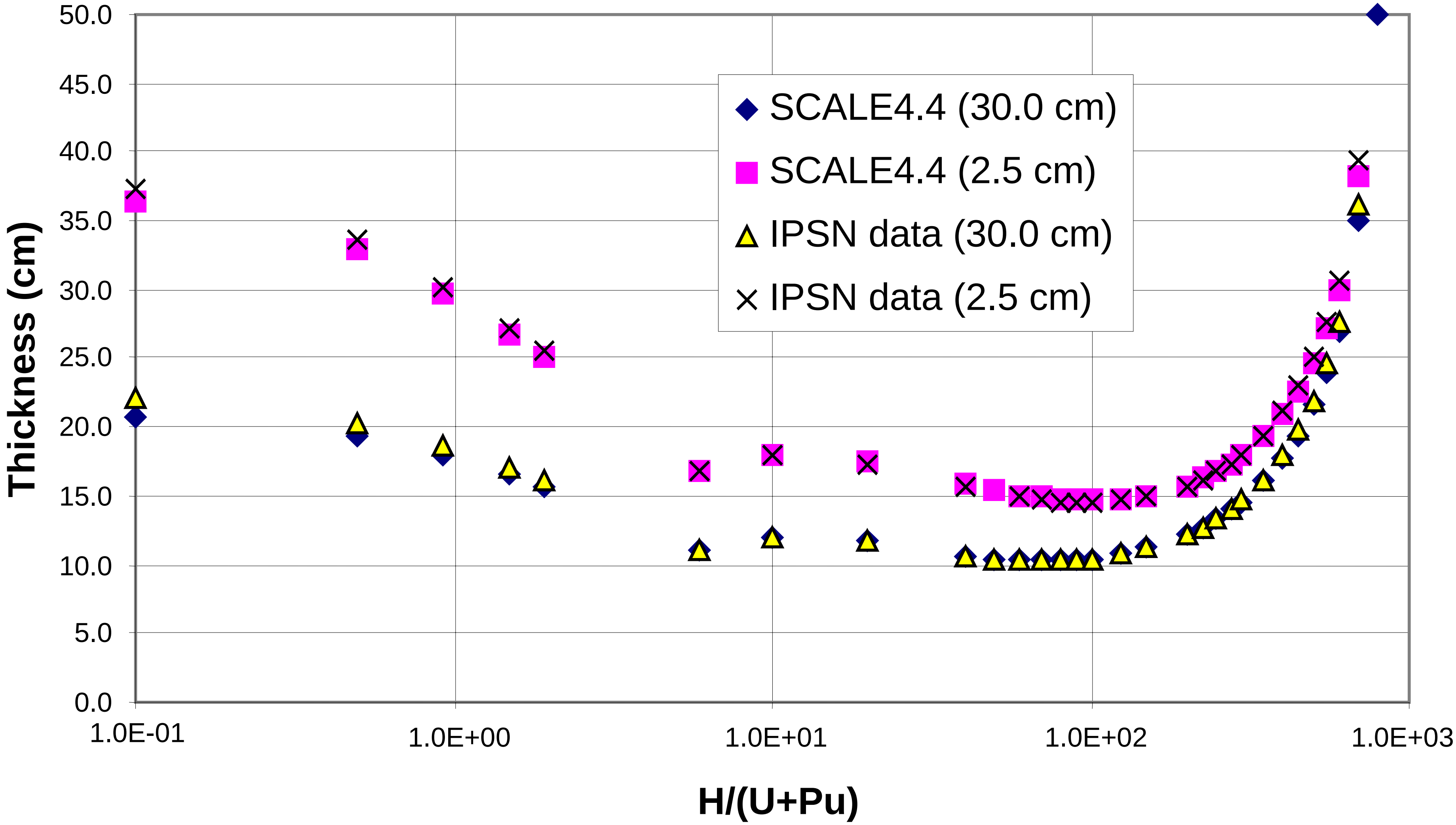

Fig. A.3.a.9-2. Slab thickness [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

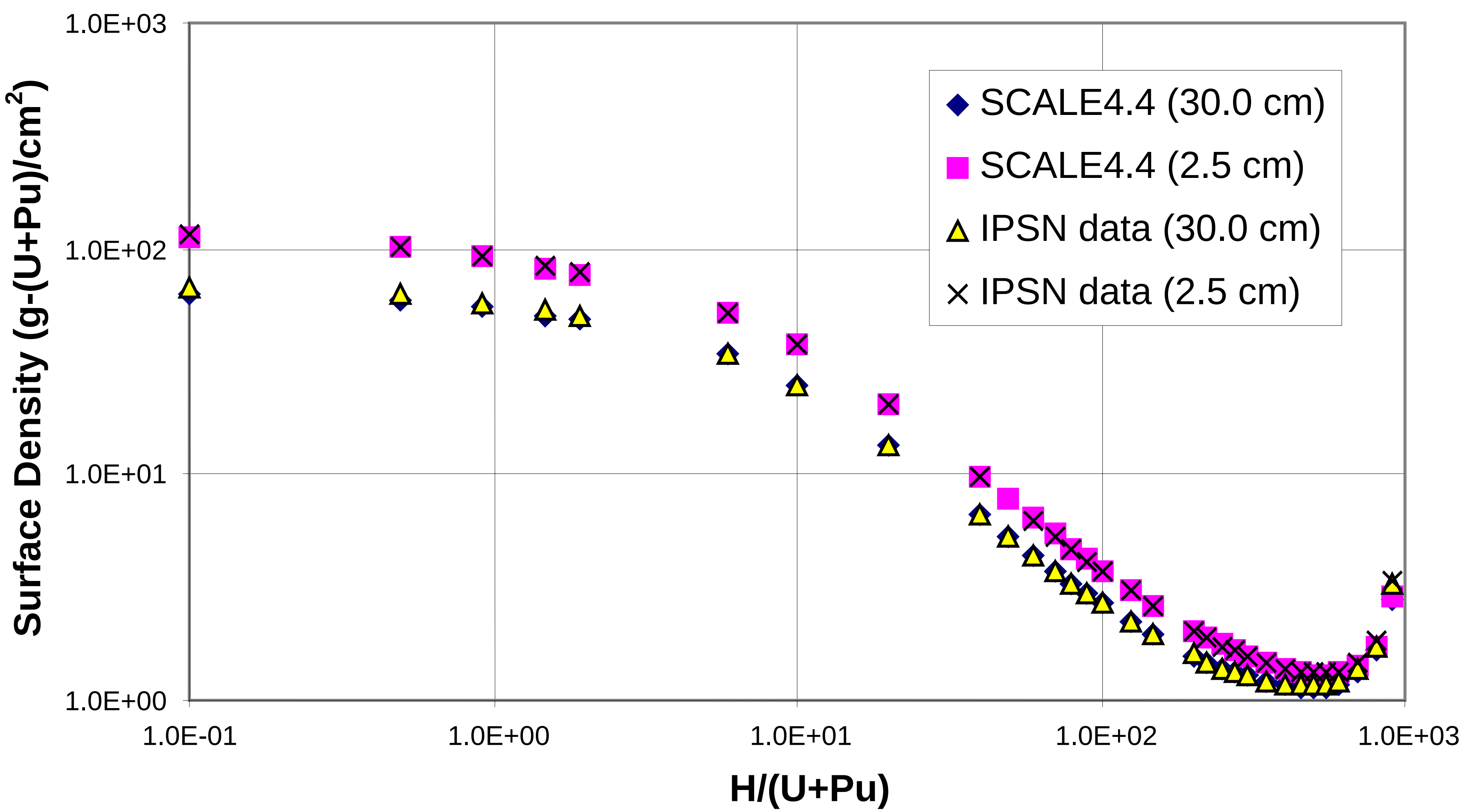

Fig. A.3.a.10. Surface density [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

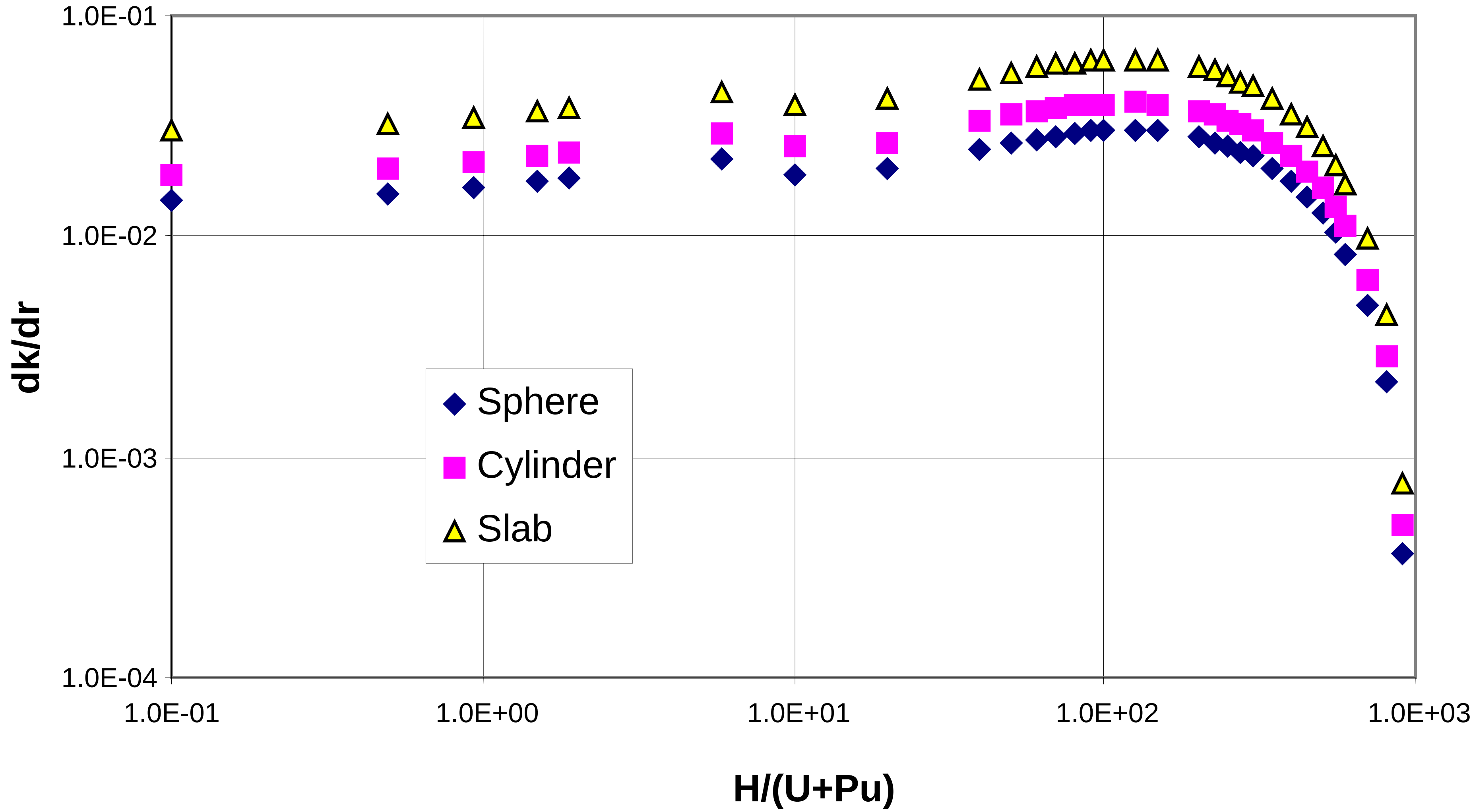

Fig. A.3.a.11. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 30.0 cm].

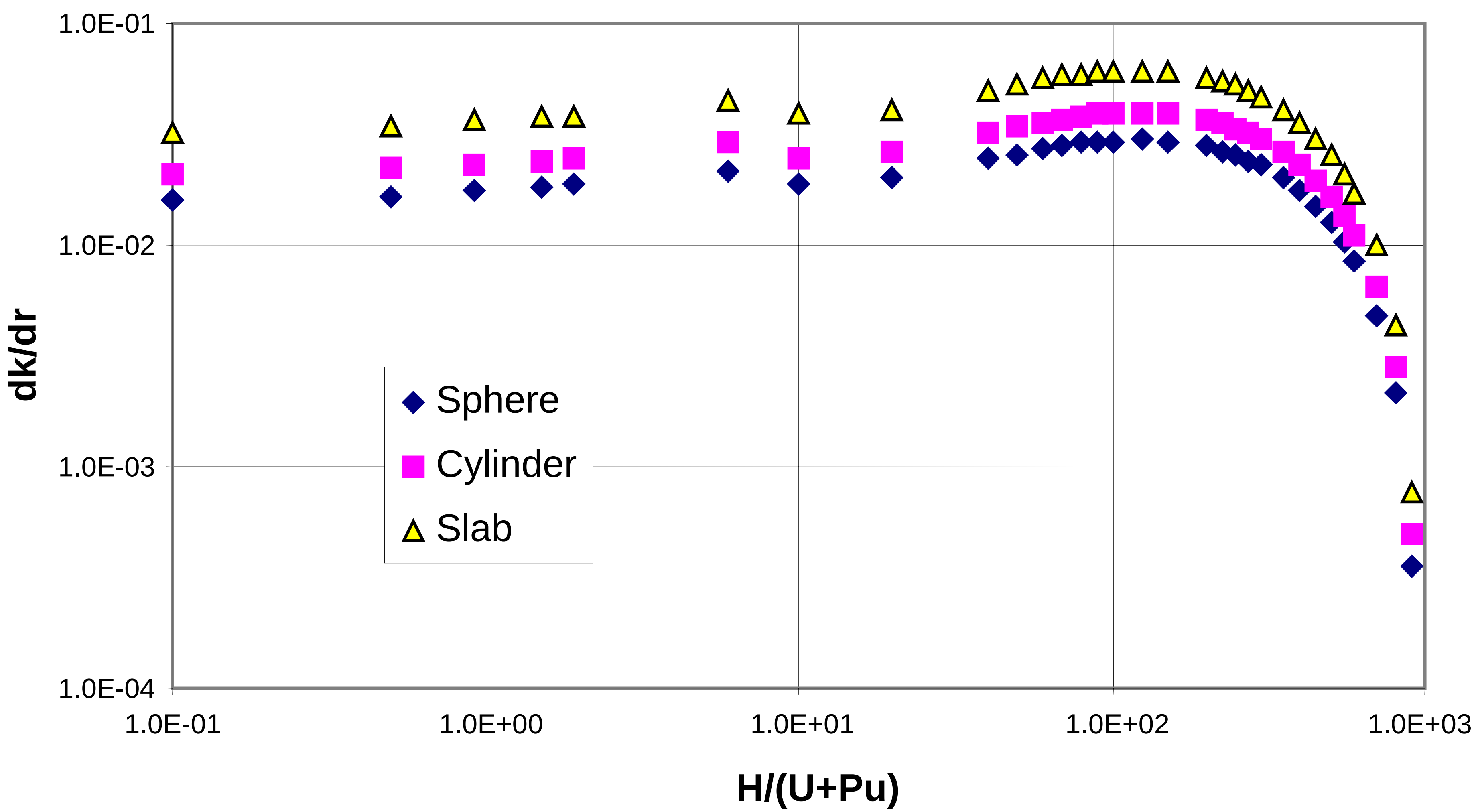

Fig. A.3.a.12. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 2.5 cm].

Table A.3.b.1. MOX data [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**65.883**	**20.000**	**12.941**	**1.176**

Fissile material oxide density void-free

Water reflector 30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	9.38049	10.64046	1.36465	6.483E-03	29.896	1.312E-02	111.927	1049.934	1190.960	41.276	1.687E-02	12552.055	20.053	2.511E-02	188.107
0.5	1.64	8.21500	9.31843	1.32204	7.365E-03	28.353	1.316E-02	95.477	784.345	889.697	39.296	1.702E-02	9962.889	19.401	2.521E-02	159.381
0.928	3.00	7.25102	8.22496	1.27789	7.311E-03	28.577	1.179E-02	97.754	708.815	804.022	39.691	1.580E-02	8971.575	19.762	2.297E-02	143.292
1.5	4.76	6.26805	7.10996	1.23905	6.967E-03	29.388	1.028E-02	106.316	666.394	755.903	40.909	1.382E-02	8238.807	20.539	2.028E-02	128.741
1.916	6.00	5.70553	6.47189	1.22254	6.791E-03	29.814	9.608E-03	111.002	633.327	718.394	41.540	1.293E-02	7732.332	20.928	1.904E-02	119.403
5	14.29	3.42610	3.88629	1.21569	7.435E-03	28.100	1.003E-02	92.941	318.425	361.196	38.961	1.244E-02	4084.689	19.353	2.017E-02	66.306
10	25.00	2.07930	2.35859	1.27507	9.879E-03	23.726	1.427E-02	55.947	116.331	131.956	32.518	1.783E-02	1726.850	15.566	2.913E-02	32.367
20	40.00	1.16409	1.32045	1.35781	1.301E-02	20.294	2.031E-02	35.009	40.754	46.228	27.591	2.560E-02	696.013	12.904	4.196E-02	15.021
30	50.00	0.80831	0.91688	1.39788	1.444E-02	19.264	2.328E-02	29.947	24.207	27.458	26.194	2.943E-02	435.577	**12.302**	4.820E-02	9.944
40	57.14	0.61910	0.70226	1.41521	1.498E-02	**19.012**	2.452E-02	**28.783**	17.820	20.213	**25.919**	3.319E-02	326.648	12.304	5.089E-02	7.617
50	62.50	0.50167	0.56905	1.41957	1.504E-02	19.112	2.480E-02	29.244	14.671	16.641	26.151	3.354E-02	269.446	12.582	5.139E-02	6.312
60	66.67	0.42168	0.47832	1.41595	1.482E-02	19.414	2.432E-02	30.651	12.925	14.661	26.669	3.307E-02	235.548	13.014	5.060E-02	5.488
70	70.00	0.36369	0.41254	1.40723	1.443E-02	19.848	2.364E-02	32.750	11.911	13.511	27.375	3.208E-02	214.051	13.547	4.902E-02	4.927
80	72.73	0.31973	0.36268	1.39515	1.392E-02	20.379	2.270E-02	35.451	11.335	12.857	28.221	3.077E-02	199.995	14.158	4.693E-02	4.527
90	75.00	0.28524	0.32355	1.38082	1.335E-02	20.992	2.156E-02	38.749	11.053	12.537	29.186	2.926E-02	190.826	14.794	4.466E-02	4.220
100	76.92	0.25747	0.29205	1.36499	1.274E-02	21.678	2.035E-02	42.672	**10.987**	**12.462**	30.256	2.760E-02	185.112	15.528	4.203E-02	3.998
125	80.65	0.20708	0.23489	1.32185	1.112E-02	23.696	1.708E-02	55.730	11.540	13.091	33.379	2.321E-02	**181.209**	17.607	3.514E-02	3.646
150	83.33	0.17318	0.19644	1.27692	9.488E-03	26.188	1.385E-02	75.227	13.028	14.778	37.212	1.887E-02	188.349	20.129	2.840E-02	3.486
175	85.37	0.14882	0.16881	1.23240	7.904E-03	29.280	1.085E-02	105.147	15.648	17.750	41.954	1.481E-02	205.728	23.230	2.216E-02	**3.457**
200	86.96	0.13046	0.14798	1.18927	6.394E-03	33.223	8.131E-03	153.599	20.039	22.730	47.989	1.112E-02	235.971	27.158	1.653E-02	3.543
225	88.24	0.11614	0.13174	1.14802	4.971E-03	38.475	5.714E-03	238.575	27.708	31.430	56.024	7.844E-03	286.303	32.388	1.160E-02	3.762
250	89.29	0.10465	0.11871	1.10880	3.631E-03	46.007	3.635E-03	407.896	42.686	48.420	67.543	5.040E-03	374.966	39.882	7.374E-03	4.174
275	90.16	0.09523	0.10802	1.07169	2.382E-03	58.231	1.957E-03	827.083	78.763	89.342	86.243	2.749E-03	556.300	52.062	3.921E-03	4.958
300	90.91	0.08737	0.09911	1.03661	1.212E-03	84.140	6.741E-04	2495.156	218.002	247.283	125.891	1.023E-03	1087.534	77.917	1.365E-03	6.808
325	91.55	0.08056	0.09138	1.00348												
326	91.57	0.08032	0.09111	1.00219												
327	91.60	0.08007	0.09082	1.00093												
328	**91.62**	**0.07983**	**0.09055**	**0.99964**												
329	91.64	0.07959	0.09028	0.99836												
330	91.67	0.07935	0.09001	0.99708												
335	91.78	0.07818	0.08868	0.99075												
350	92.105	0.07498	0.08505	0.97222												

Table A.3.b.2. MOX data [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**65.883**	**20.000**	**12.941**	**1.176**

Fissile material oxide density void-free

Water reflector 2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	9.38049	10.64046	1.36465	6.483E-03	34.298	1.365E-02	169.003	1585.333	1798.272	50.211	1.835E-02	18574.182	29.385	2.778E-02	275.649
0.5	1.64	8.21500	9.31843	1.32204	7.365E-03	32.071	1.343E-02	138.170	1135.067	1287.527	46.871	1.816E-02	14174.439	27.316	2.676E-02	224.401
0.928	3.00	7.25102	8.22496	1.27789	7.311E-03	32.172	1.191E-02	139.486	1011.416	1147.268	47.017	1.615E-02	12589.220	27.401	2.384E-02	198.685
1.5	4.76	6.26805	7.10996	1.23905	6.967E-03	32.981	1.032E-02	150.277	941.942	1068.463	48.223	1.400E-02	11448.031	28.144	2.071E-02	176.409
1.916	6.00	5.70553	6.47189	1.22254	6.791E-03	33.418	9.613E-03	156.320	891.888	1011.685	48.869	1.304E-02	10701.613	28.535	1.932E-02	162.810
5	14.29	3.42610	3.88629	1.21569	7.435E-03	31.538	9.960E-03	131.400	450.189	510.658	45.931	1.225E-02	5676.726	26.539	2.011E-02	90.926
10	25.00	2.07930	2.35859	1.27507	9.879E-03	26.731	1.410E-02	80.005	166.355	188.700	38.605	1.745E-02	2433.877	21.818	2.869E-02	45.367
20	40.00	1.16409	1.32045	1.35781	1.301E-02	22.797	2.000E-02	49.626	57.769	65.529	32.662	2.497E-02	975.329	18.081	4.103E-02	21.048
30	50.00	0.80831	0.91688	1.39788	1.444E-02	21.509	2.291E-02	41.684	33.693	38.219	30.742	2.869E-02	599.981	16.934	4.710E-02	13.688
40	57.14	0.61910	0.70226	1.41521	1.498E-02	21.098	2.415E-02	39.337	24.354	27.625	30.146	3.028E-02	441.892	16.627	4.966E-02	10.294
50	62.50	0.50167	0.56905	1.41957	1.504E-02	21.091	2.443E-02	39.296	19.714	22.362	30.158	3.063E-02	358.359	16.672	5.022E-02	8.364
60	66.67	0.42168	0.47832	1.41595	1.482E-02	21.313	2.414E-02	40.552	17.100	19.397	30.515	3.260E-02	308.394	16.933	4.955E-02	7.140
70	70.00	0.36369	0.41254	1.40723	1.443E-02	21.686	2.320E-02	42.717	15.536	17.623	31.097	3.167E-02	276.229	17.335	4.594E-02	6.305
80	72.73	0.31973	0.36268	1.39515	1.392E-02	22.169	2.242E-02	45.637	14.592	16.552	31.846	3.041E-02	254.667	17.806	4.730E-02	5.693
90	75.00	0.28524	0.32355	1.38082	1.335E-02	22.743	2.133E-02	49.278	14.056	15.944	32.730	2.894E-02	239.995	18.395	4.498E-02	5.247
100	76.92	0.25747	0.29205	1.36499	1.274E-02	23.397	2.016E-02	53.651	13.813	15.669	33.735	2.733E-02	230.127	19.060	4.245E-02	4.907
125	80.65	0.20708	0.23489	1.32185	1.112E-02	25.355	1.695E-02	68.275	14.138	16.038	36.733	2.303E-02	219.457	21.007	3.573E-02	4.350
150	83.33	0.17318	0.19644	1.27692	9.488E-03	27.806	1.378E-02	90.054	15.596	17.690	40.481	1.877E-02	222.888	23.437	2.905E-02	4.059
175	85.37	0.14882	0.16881	1.23240	7.904E-03	30.869	1.081E-02	123.209	18.336	20.799	45.161	1.475E-02	238.383	26.463	2.280E-02	3.938
200	86.96	0.13046	0.14798	1.18927	6.394E-03	34.791	8.108E-03	176.392	23.012	26.103	51.151	1.109E-02	268.089	30.351	1.710E-02	3.960
225	88.24	0.11614	0.13174	1.14802	4.971E-03	40.028	5.699E-03	268.652	31.201	35.392	59.153	7.835E-03	319.172	35.540	1.207E-02	4.128
250	89.29	0.10465	0.11871	1.10880	3.631E-03	47.549	3.650E-03	450.323	47.126	53.456	70.647	5.044E-03	410.224	43.010	7.739E-03	4.501
275	90.16	0.09523	0.10802	1.07169	2.382E-03	59.768	1.951E-03	894.301	85.164	96.603	89.332	2.679E-03	596.862	55.169	4.134E-03	5.254
300	90.91	0.08737	0.09911	1.03661	1.212E-03	85.676	6.734E-04	2634.306	230.159	261.074	128.967	1.023E-03	1141.329	81.008	1.560E-03	7.078
325	91.55	0.08056	0.09138	1.00348												
326	91.57	0.08032	0.09111	1.00219												
327	91.60	0.08007	0.09082	1.00093												
328	91.62	0.07983	0.09055	0.99964												
329	91.64	0.07959	0.09028	0.99836												
330	91.67	0.07935	0.09001	0.99708												
335	91.78	0.07818	0.08868	0.99075												
350	92.105	0.07498	0.08505	0.97222												

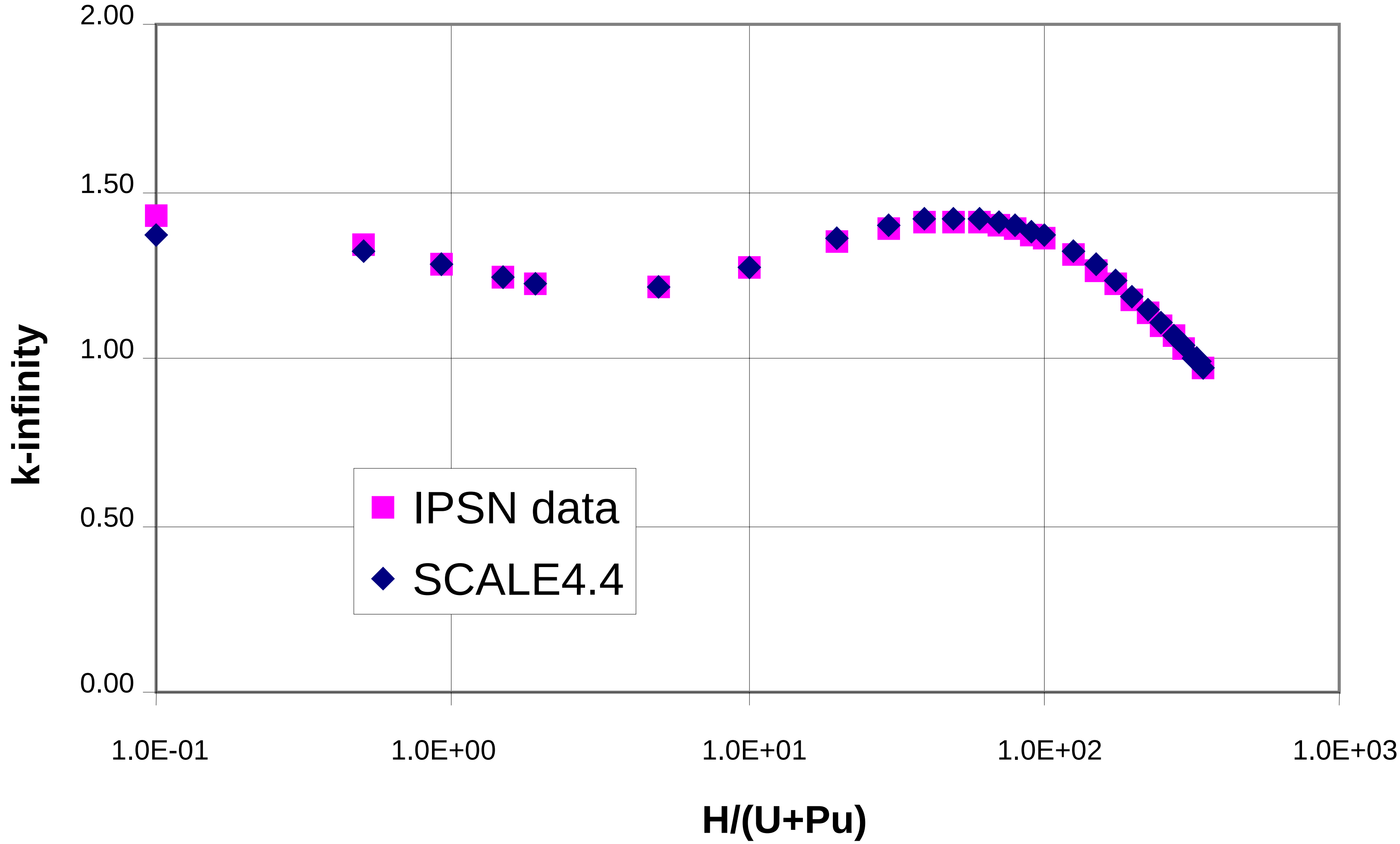

Fig. A.3.b.1. *k*-infinity [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

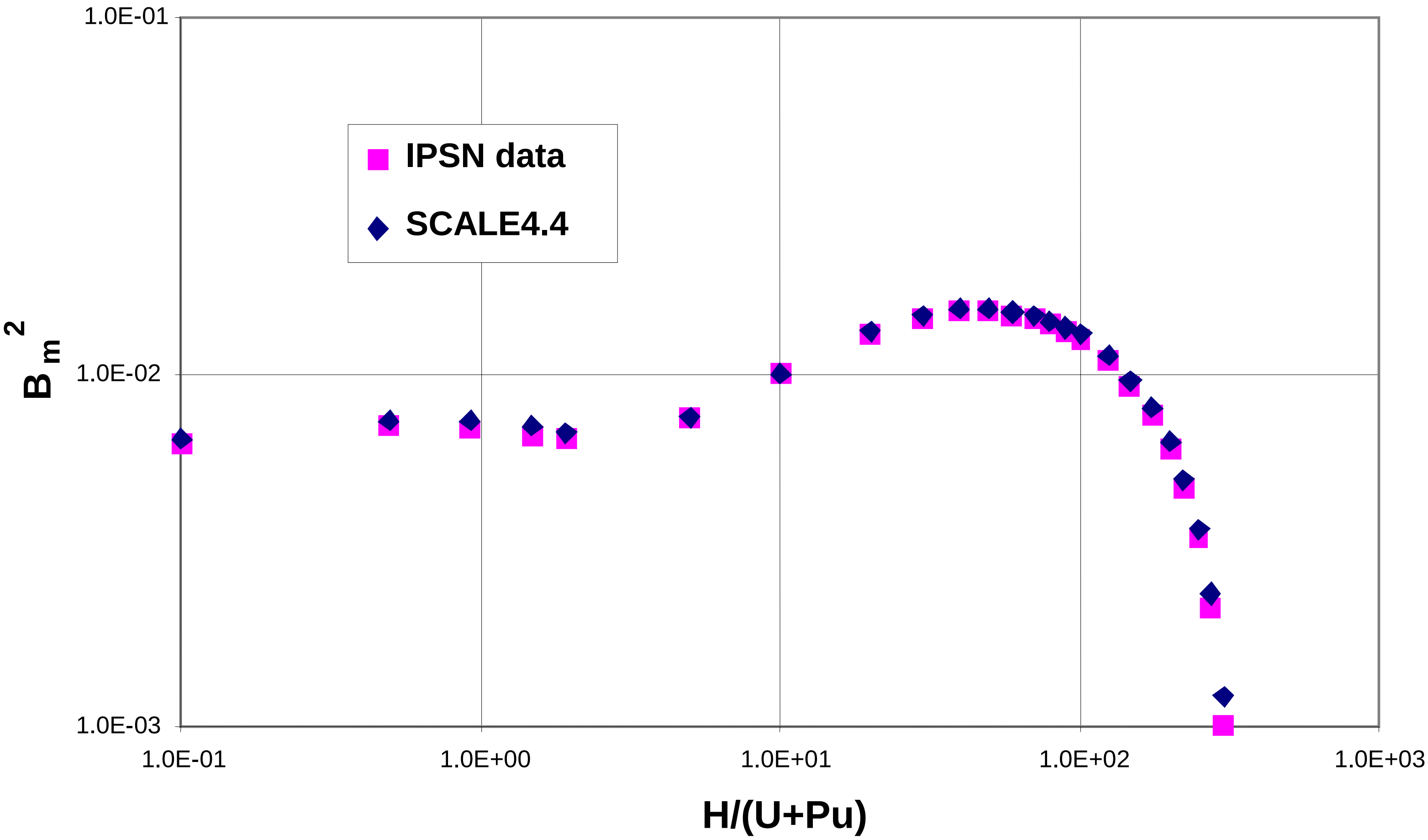

Fig. A.3.b.2. B_m^2 [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

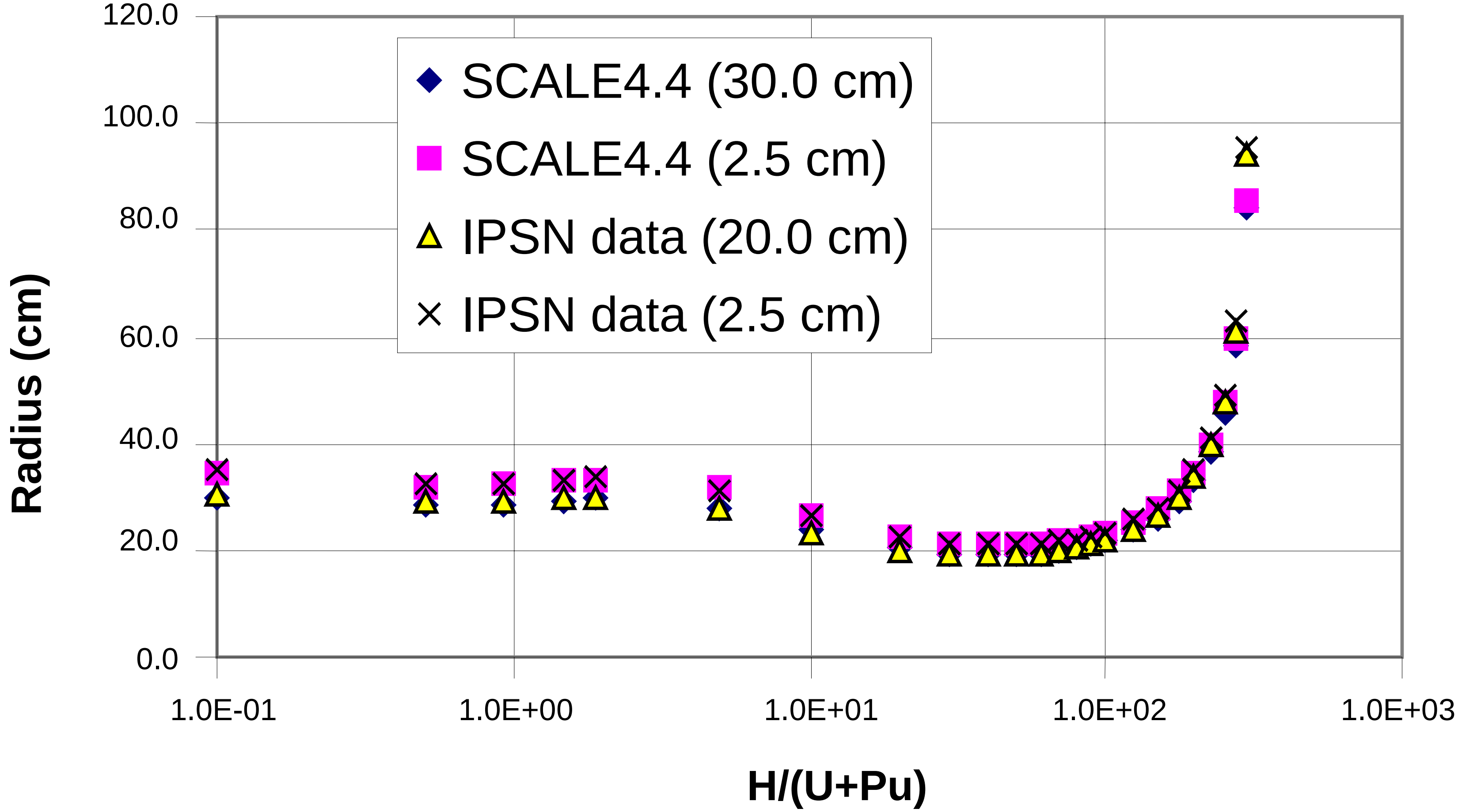

Fig. A.3.b.3-1. Sphere radius [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

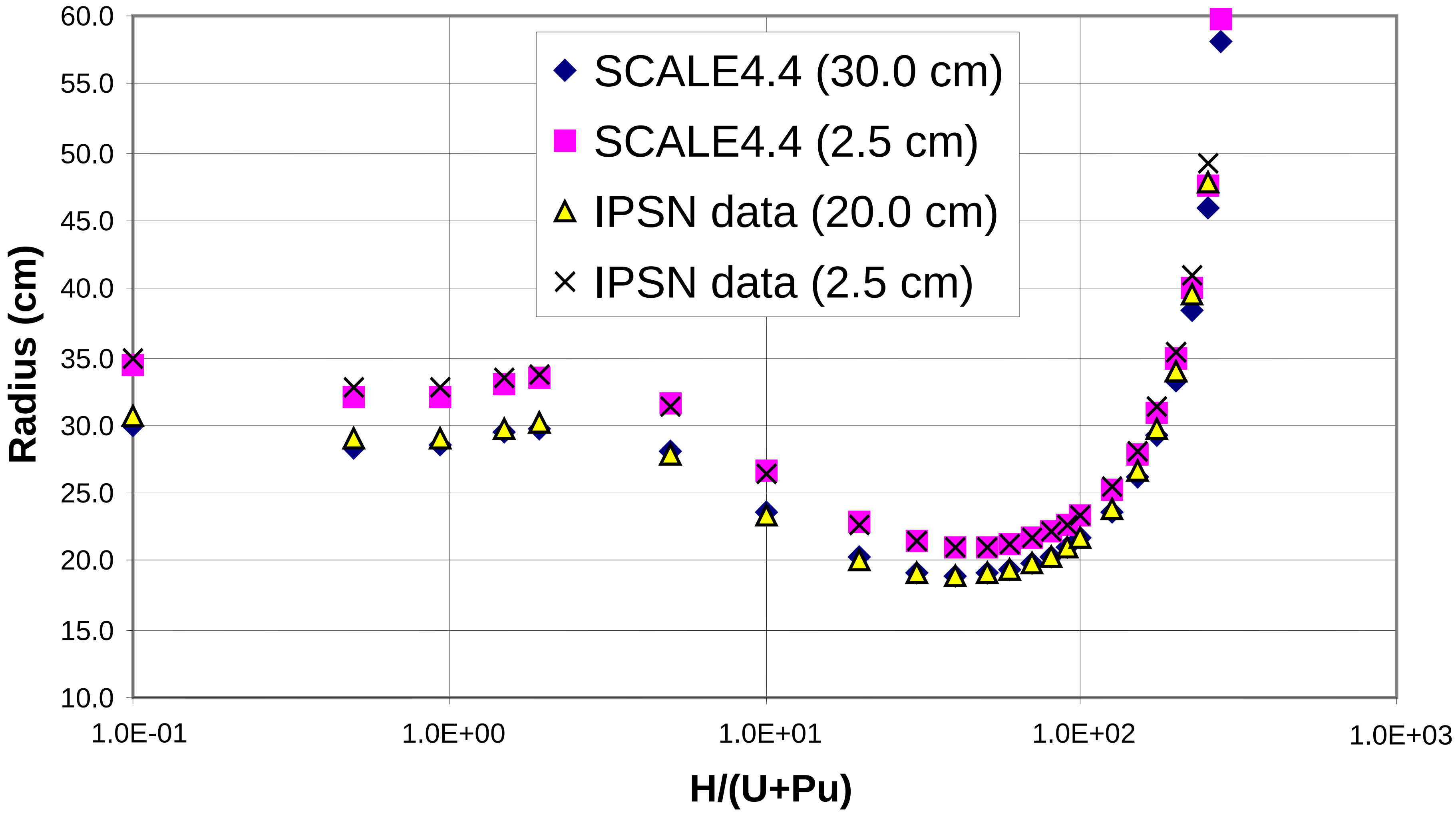

Fig. A.3.b.3-2. Sphere radius [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

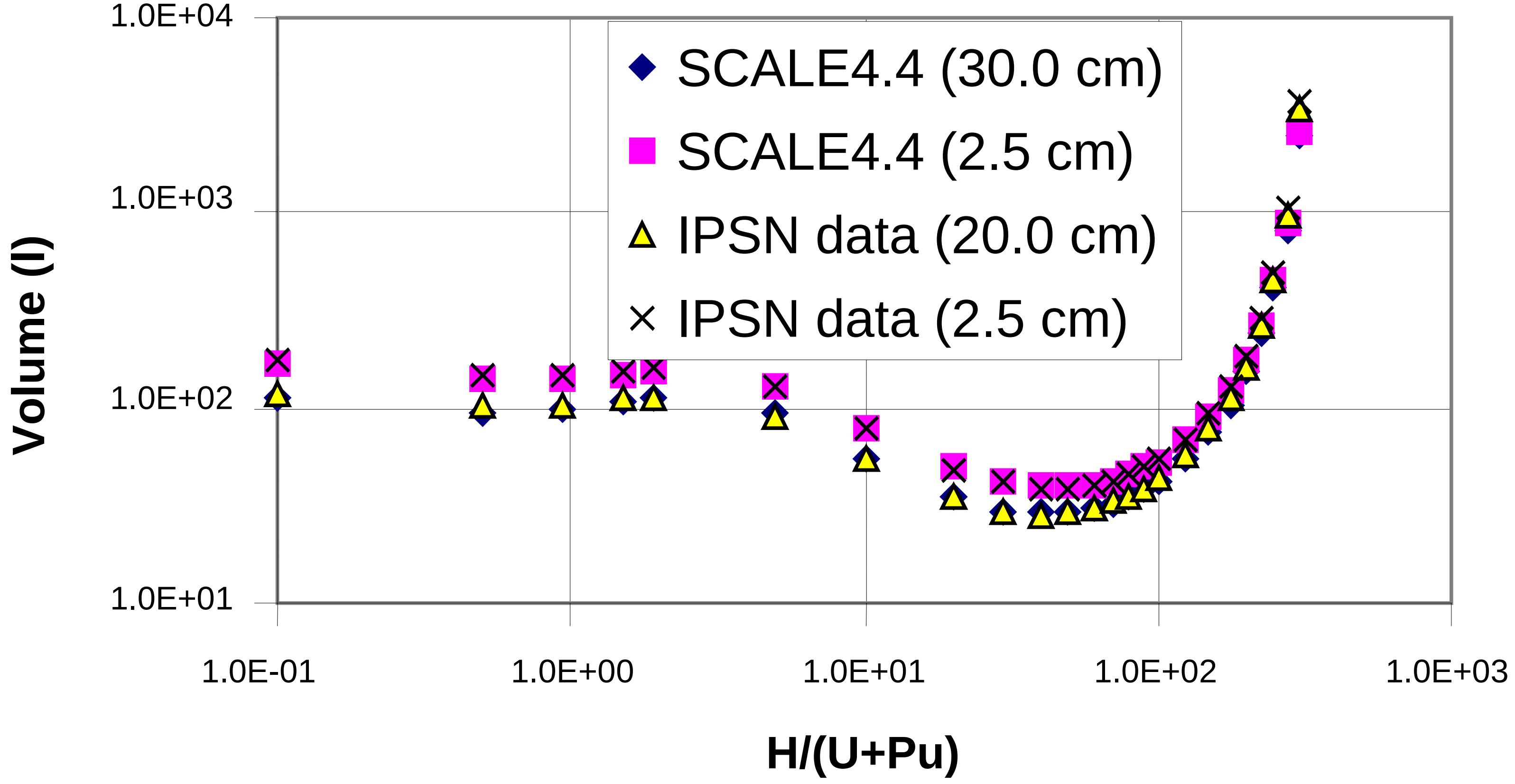

Fig. A.3.b.4. Sphere volume [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

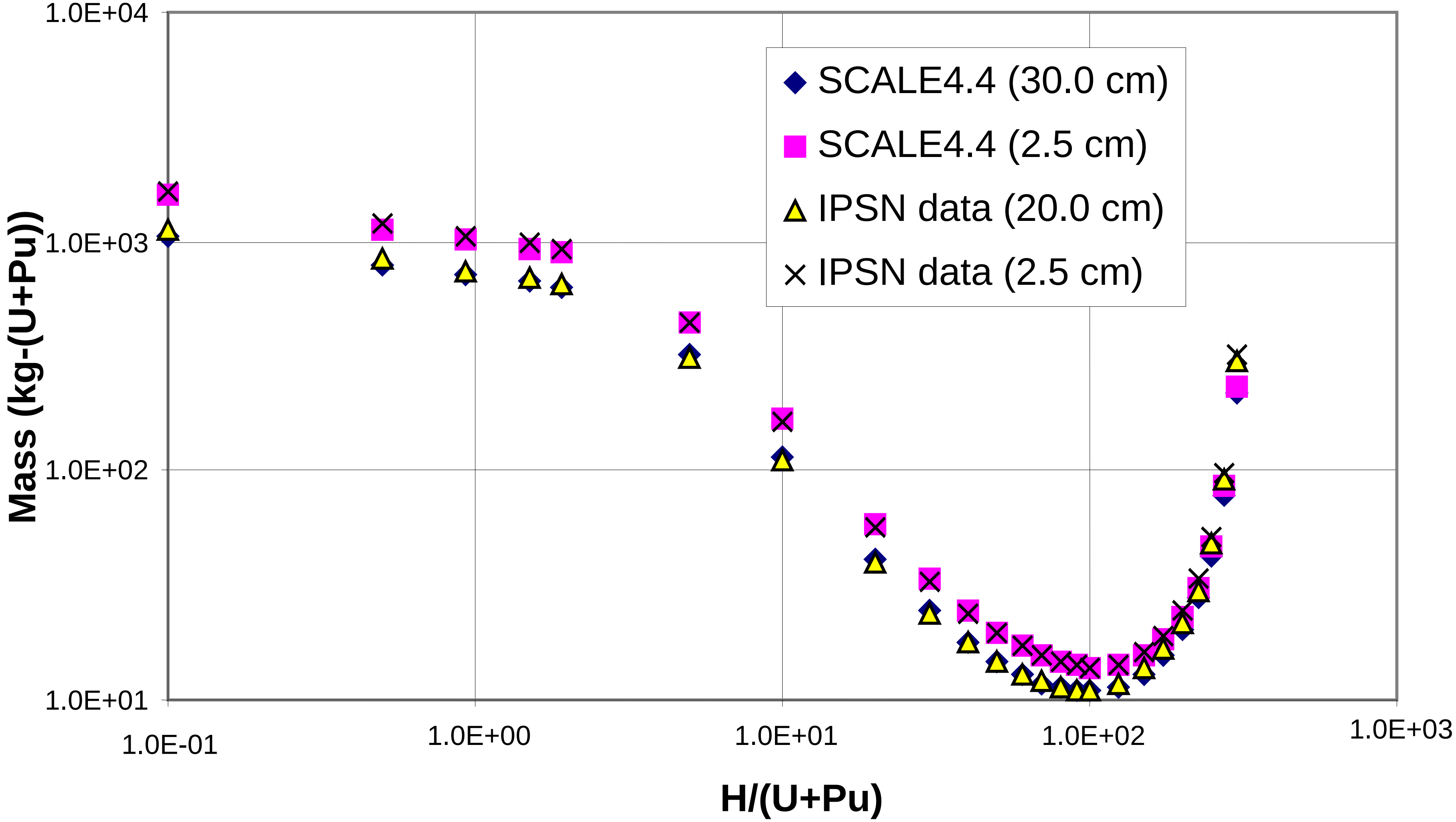

Fig. A.3.b.5. U + Pu mass [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

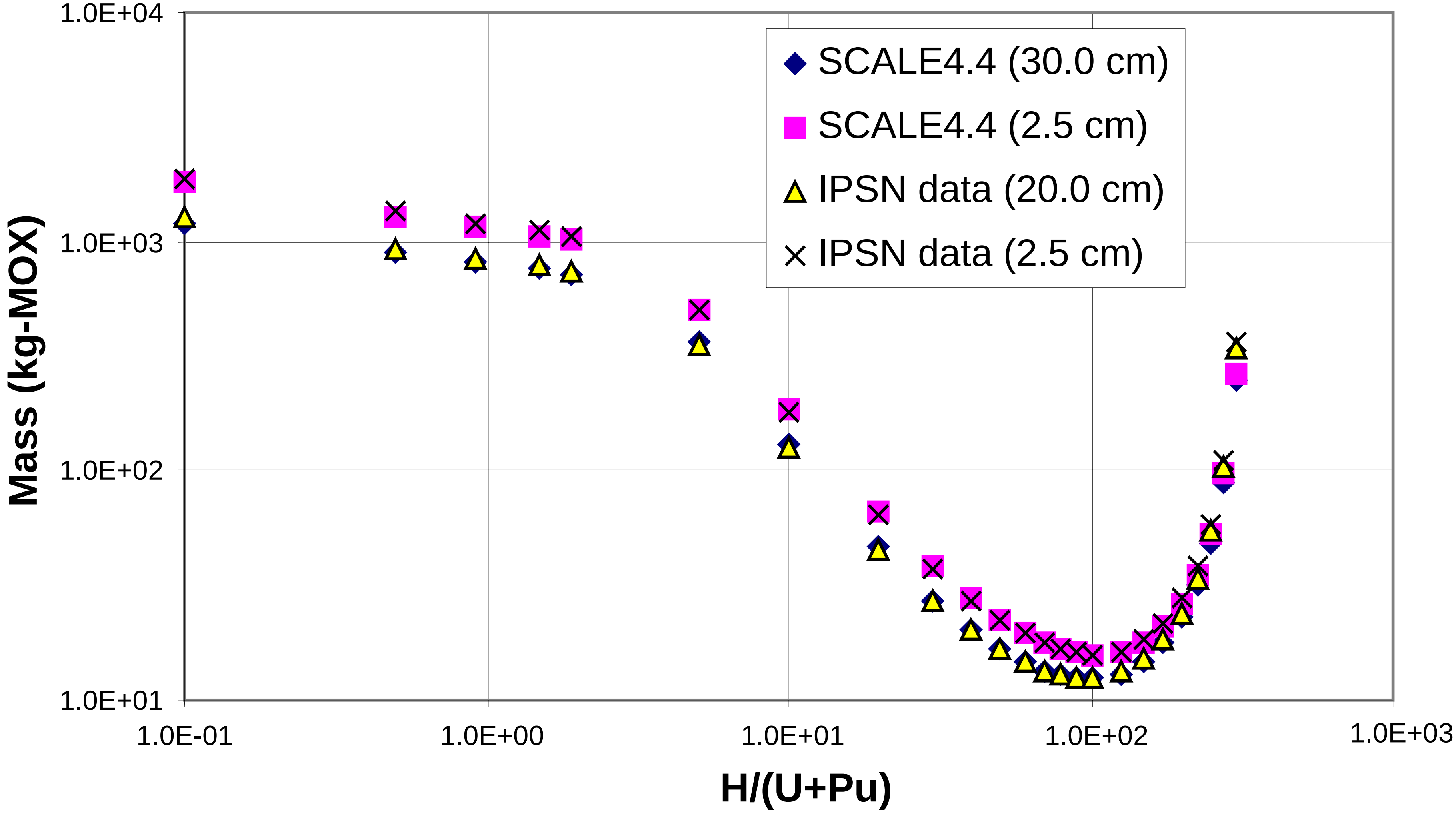

Fig. A.3.b.6. MOX mass [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

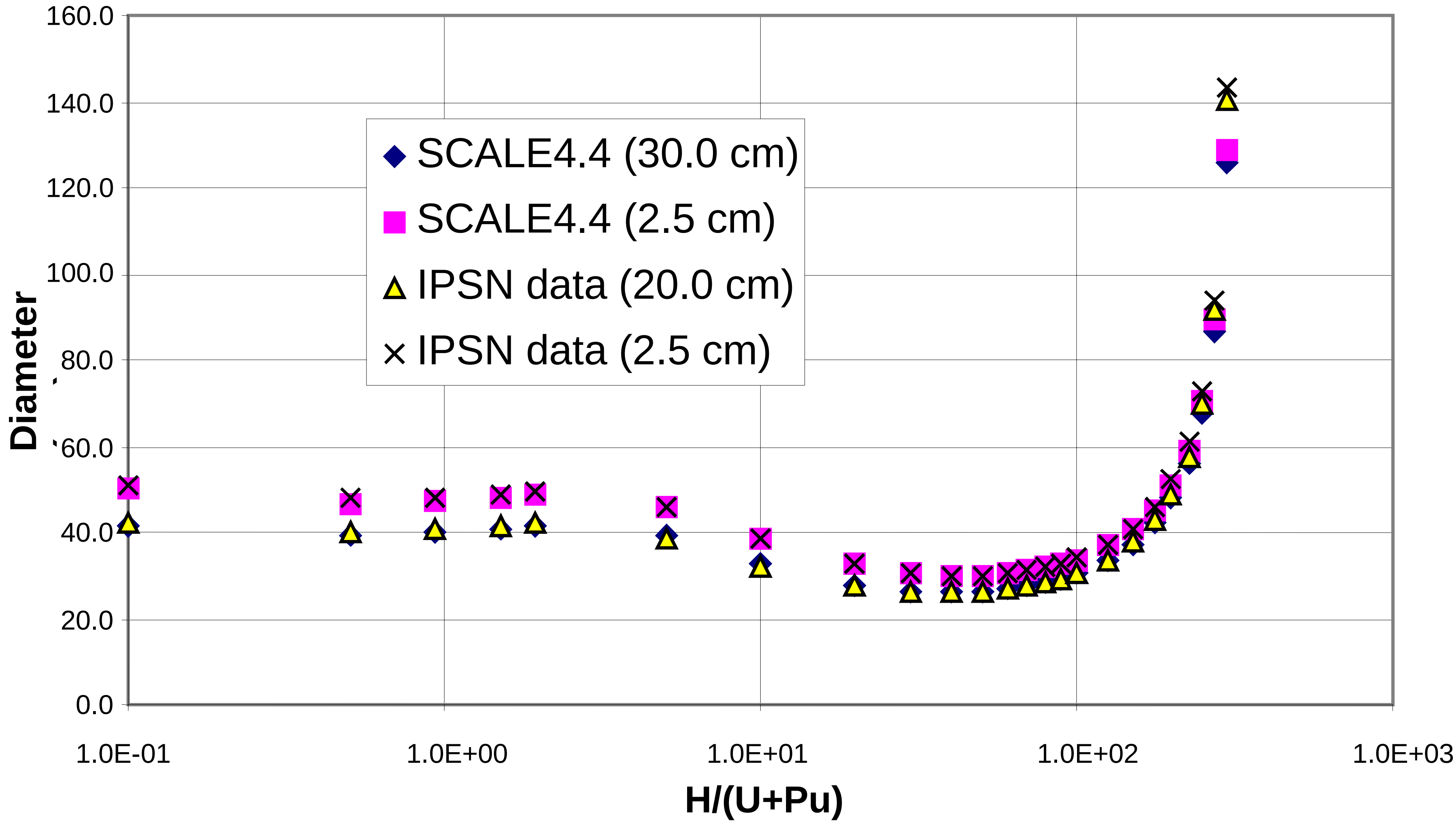

Fig. A.3.b.7-1. Cylinder diameter [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

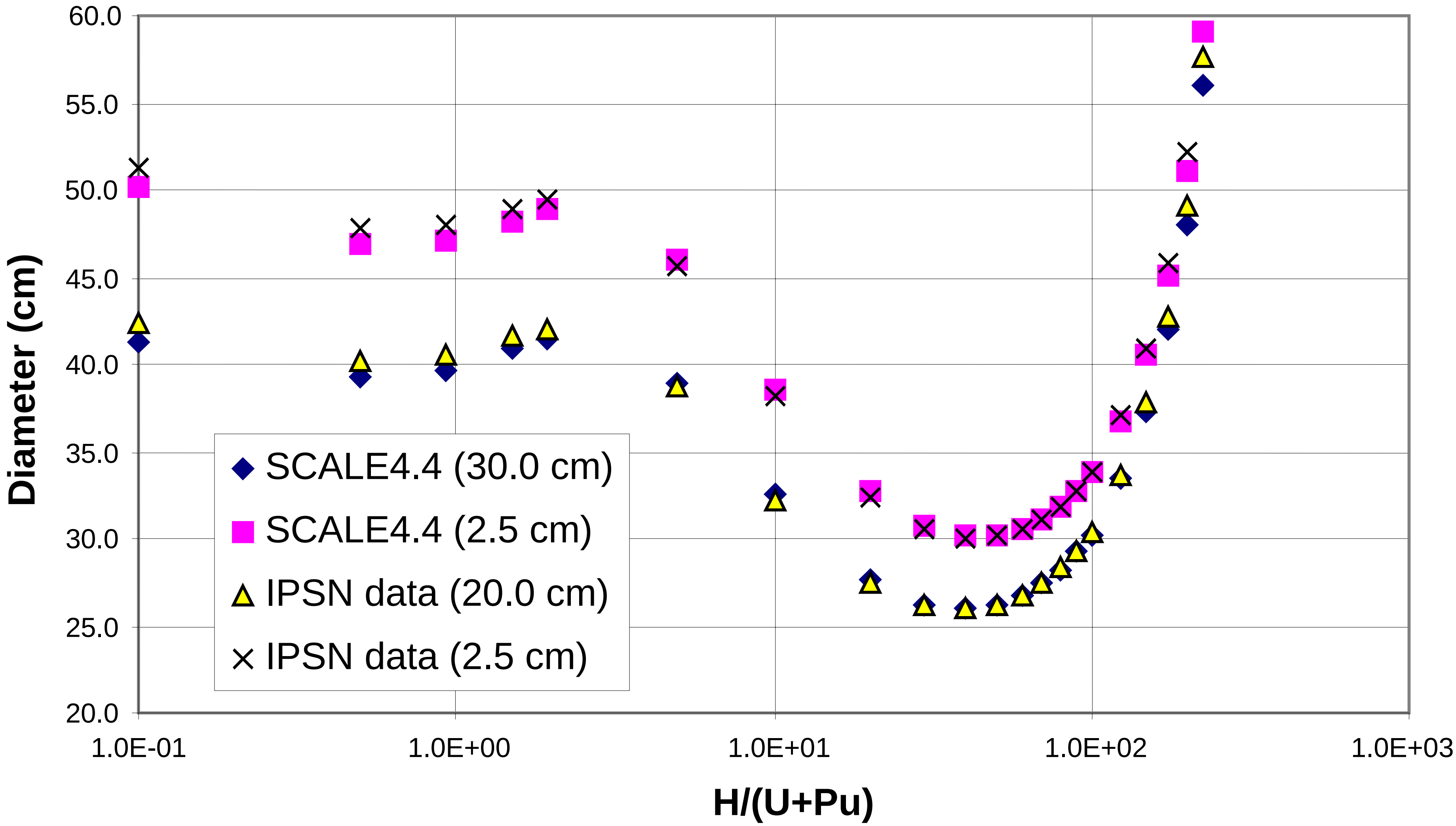

Fig. A.3.b.7-2. Cylinder diameter infinity [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

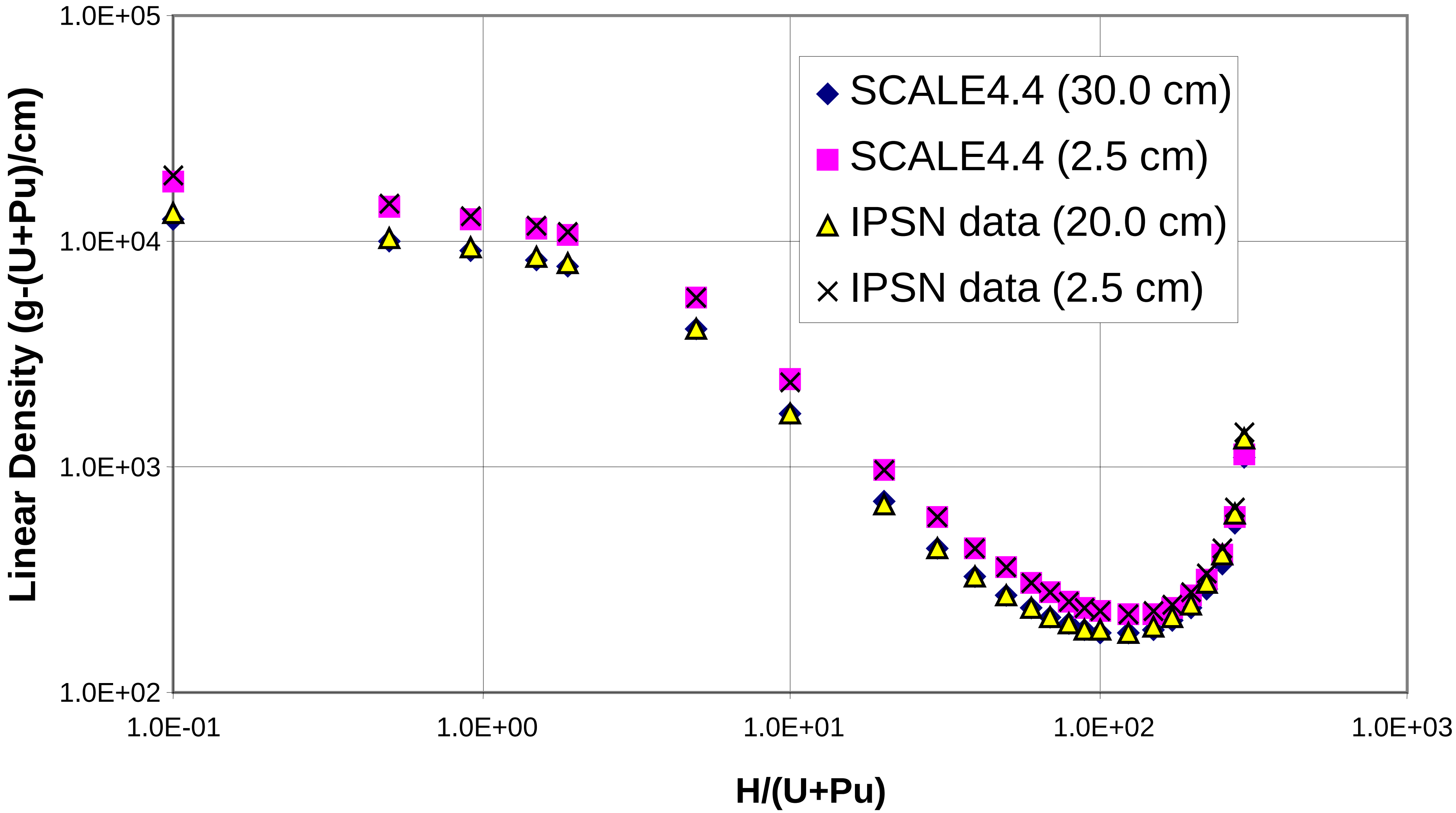

Fig. A.3.b.8. Linear density [$^{235}U/U$ = 0.3%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, void-free].

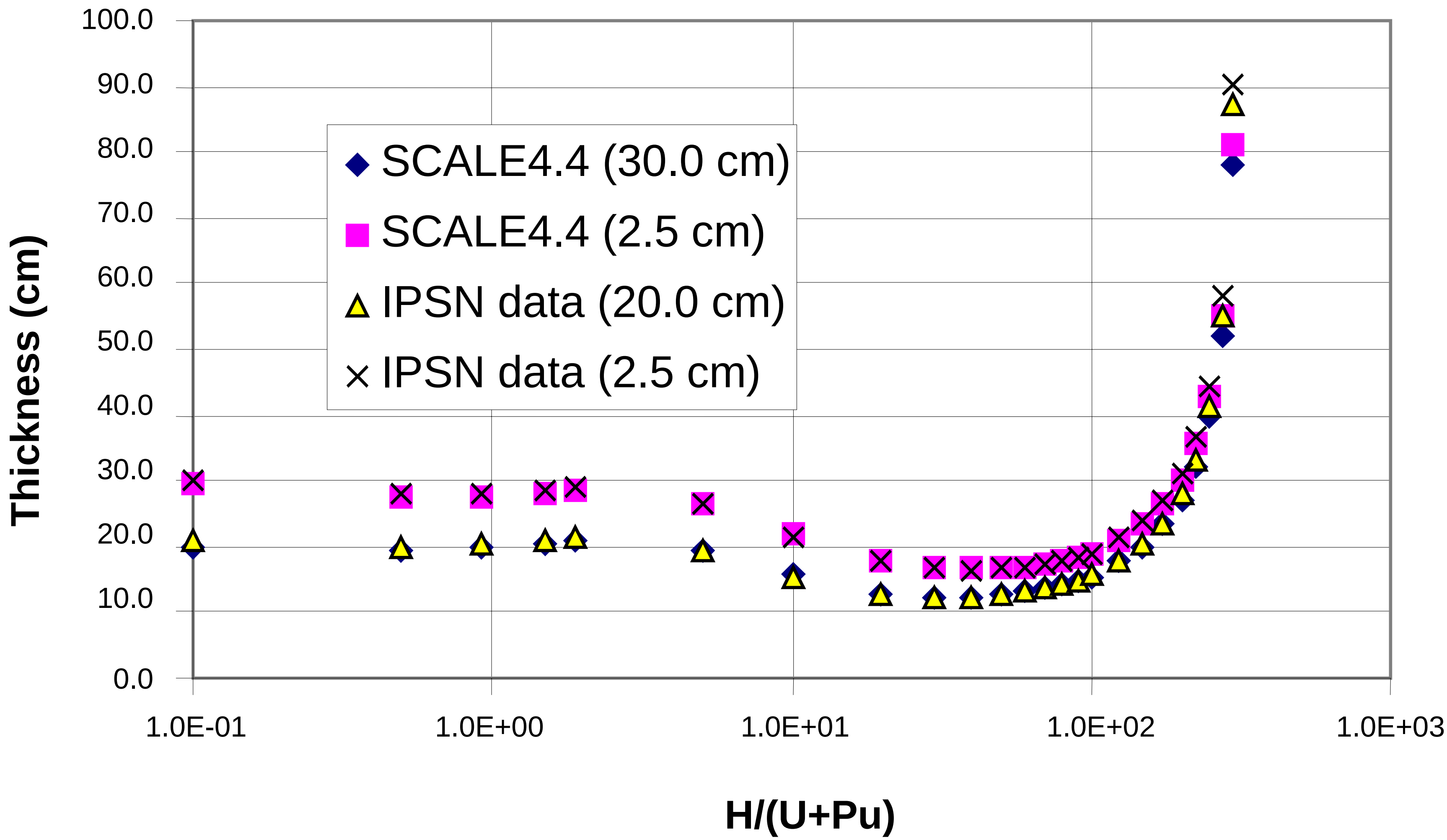

Fig. A.3.b.9-1. Slab thickness [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

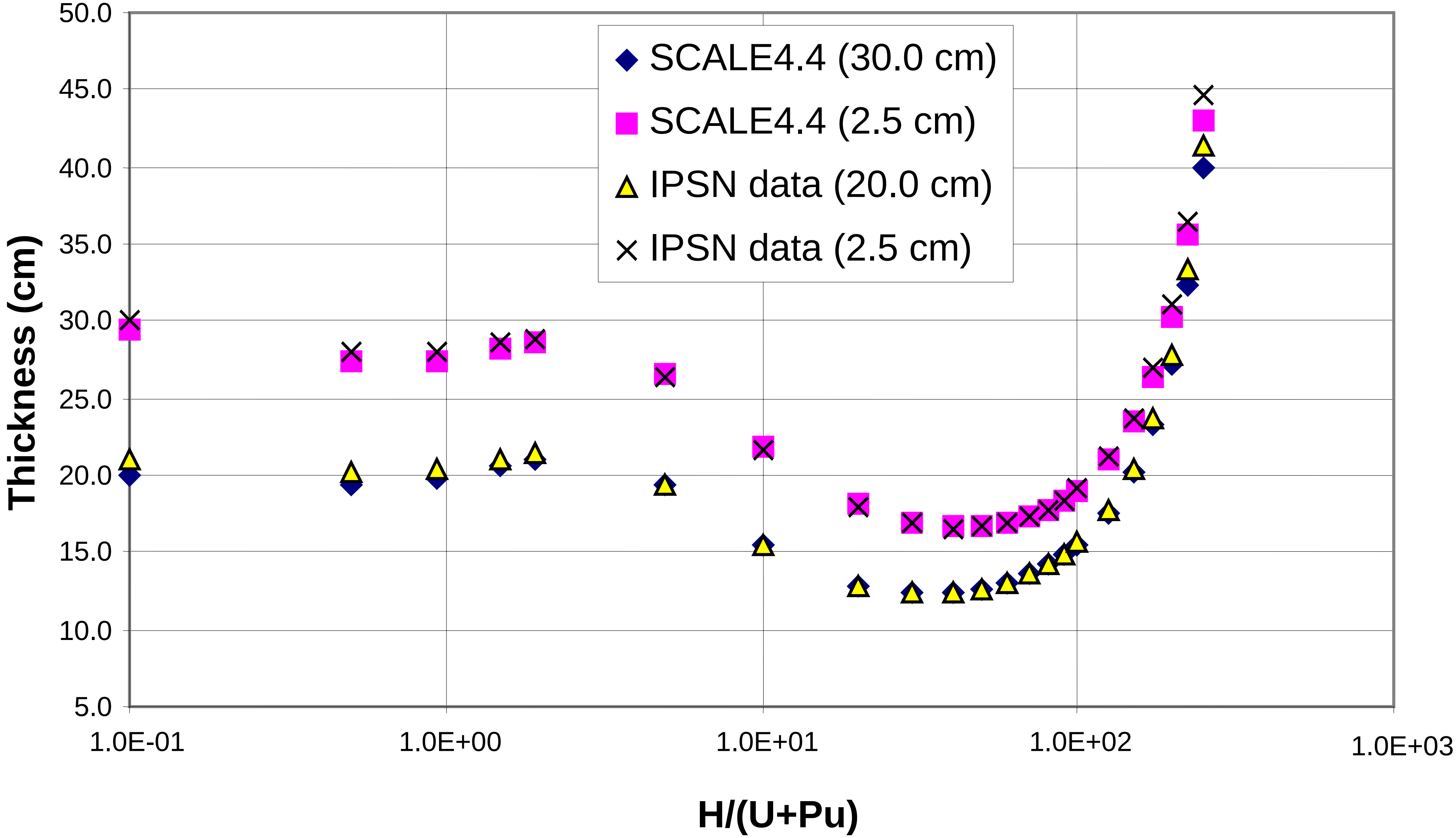

Fig. A.3.b.9-2. Slab thickness [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

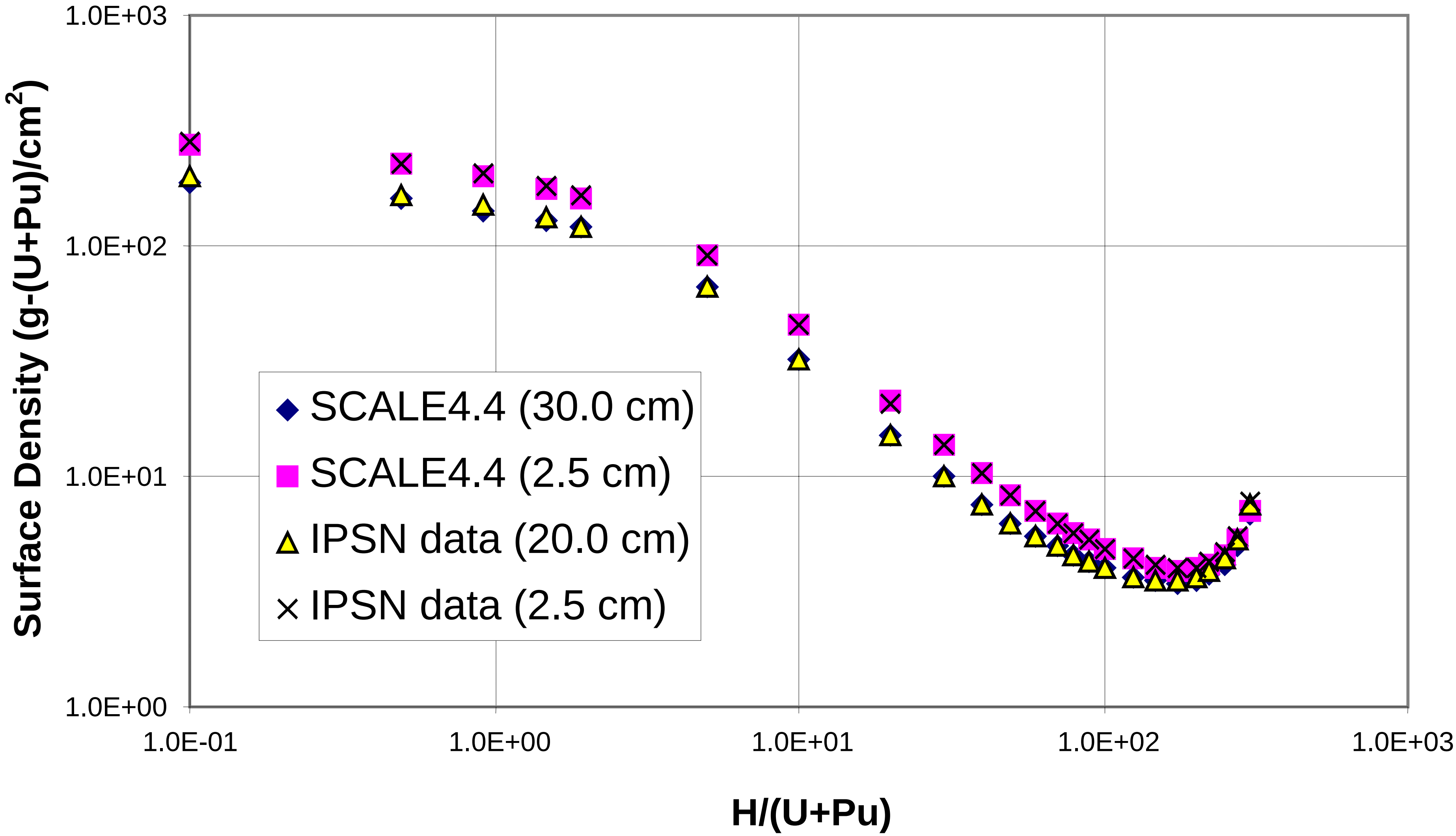

Fig. A.3.b.10. Surface density [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

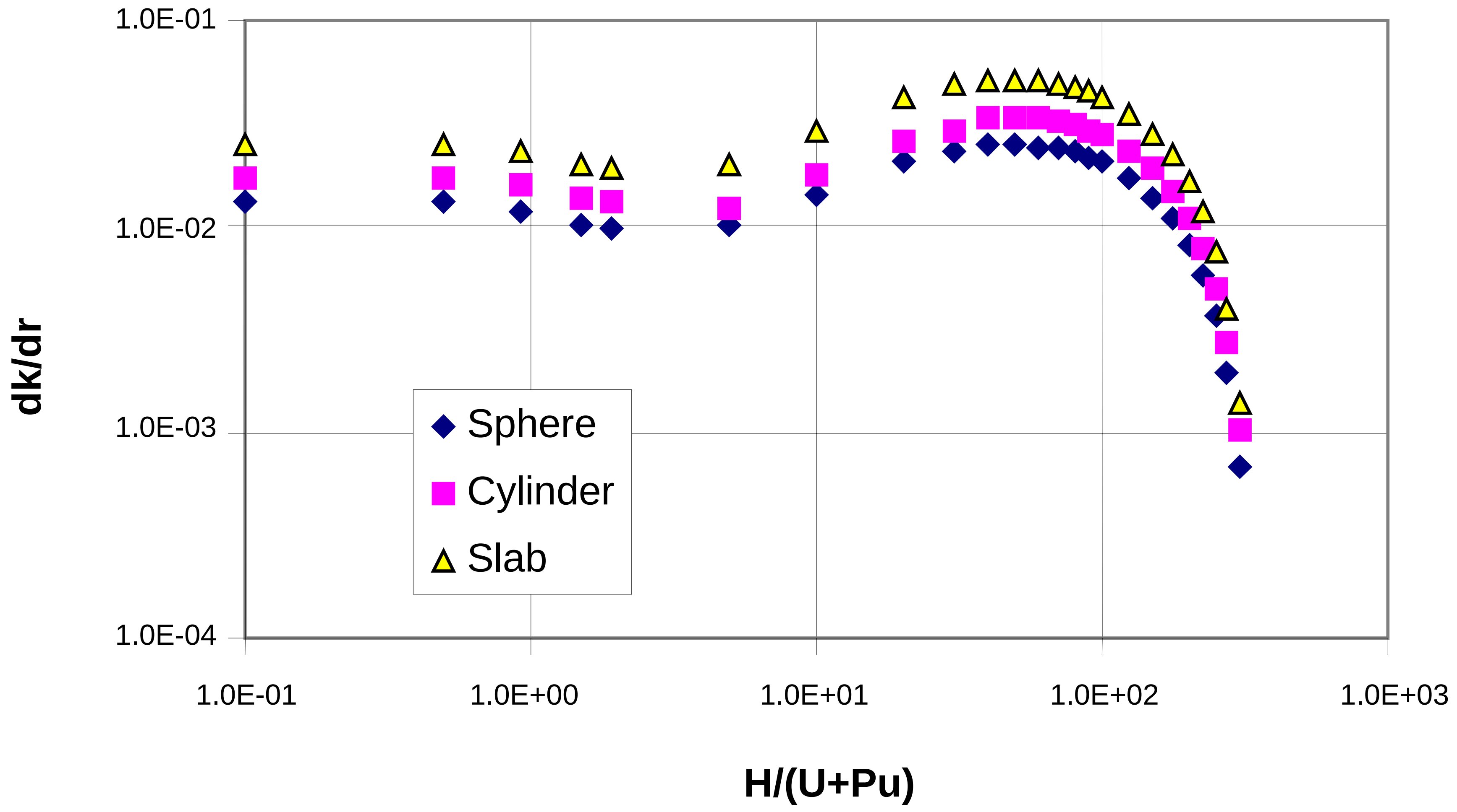

Fig. A.3.b.11. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 30.0 cm].

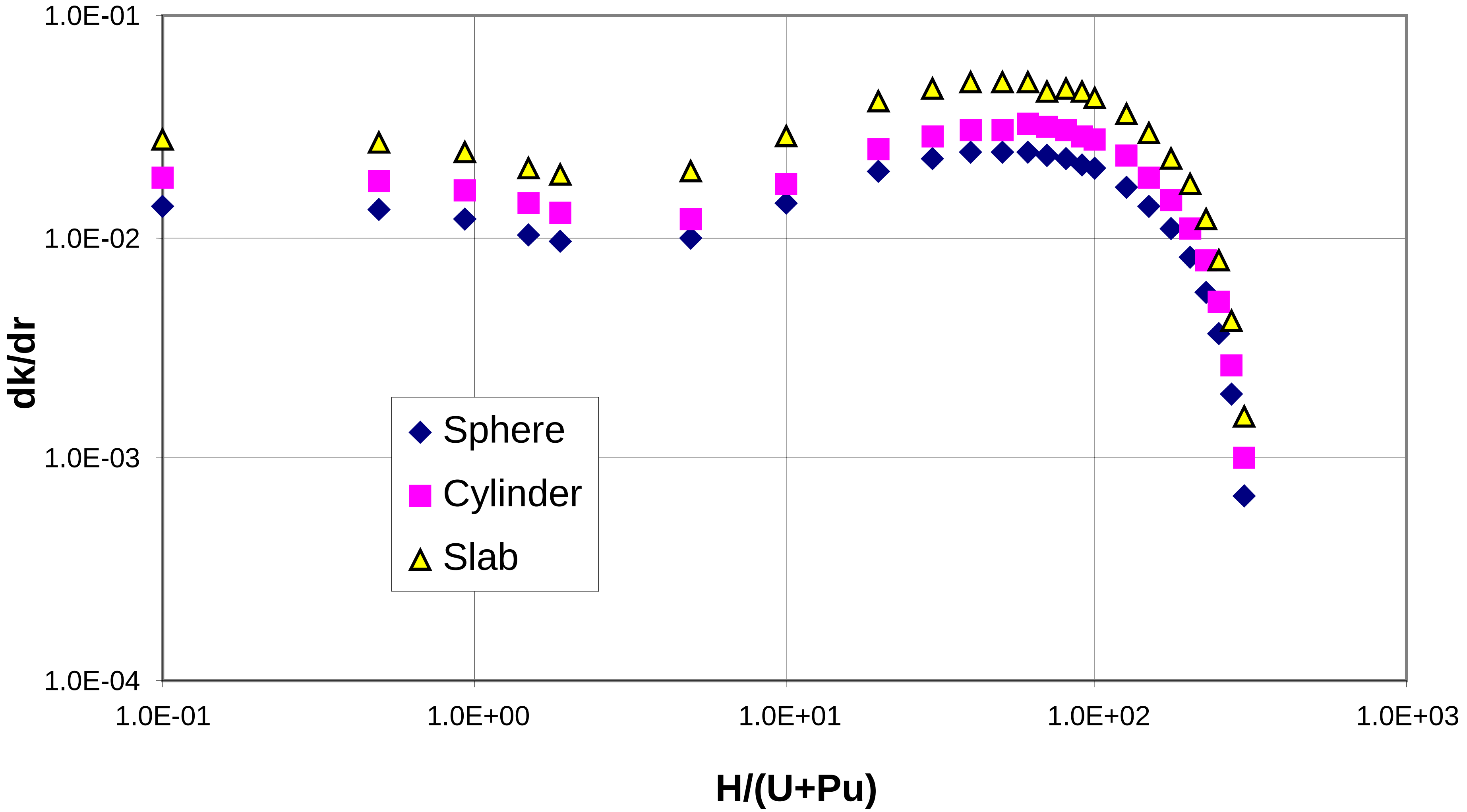

Fig. A.3.b.12. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.3 %, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 2.5 cm].

Table A.3.c.1. MOX data [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**65.883**	**20.000**	**12.941**	**1.176**

Fissile material oxide density
3.5 g (UO_2 + PuO_2)/cm^3

Water reflector
30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08555	3.50000	1.36465	7.014E-04	86.013	4.075E-03	2665.523	8224.614	9329.330	119.288	5.345E-03	34484.140	61.169	8.194E-03	188.739
0.5	1.64	3.08555	3.50000	1.32204	1.039E-03	72.106	4.734E-03	1570.347	4845.389	5496.214	100.311	6.223E-03	24384.656	51.871	9.569E-03	160.050
0.928	3.00	3.08555	3.50000	1.27788	1.324E-03	64.588	4.854E-03	1128.590	3482.324	3950.064	90.010	6.389E-03	19633.806	46.656	9.855E-03	143.959
1.5	4.76	3.08555	3.50000	1.23904	1.689E-03	57.849	4.898E-03	810.912	2502.114	2838.193	80.721	6.489E-03	15790.349	41.863	1.005E-02	129.170
1.916	6.00	3.08555	3.50000	1.22253	1.986E-03	53.630	5.064E-03	646.118	1993.632	2261.414	74.911	6.669E-03	13599.153	38.798	1.037E-02	119.713
5.84	16.29	3.08555	3.50000	1.22495	7.827E-03	27.238	1.053E-02	84.649	261.190	296.273	37.655	1.374E-02	3436.047	18.593	2.202E-02	57.370
10	25.00	2.07930	2.35859	1.27507	9.879E-03	23.726	1.427E-02	55.947	116.331	131.956	32.518	1.783E-02	1726.850	15.566	2.913E-02	32.367
20	40.00	1.16409	1.32045	1.35781	1.301E-02	20.294	2.031E-02	35.009	40.754	46.228	27.591	2.560E-02	696.013	12.904	4.196E-02	15.021
30	50.00	0.80831	0.91688	1.39788	1.444E-02	19.264	2.328E-02	29.947	24.207	27.458	26.194	2.943E-02	435.577	**12.302**	4.820E-02	9.944
40	57.14	0.61910	0.70226	1.41521	1.498E-02	**19.012**	2.452E-02	**28.783**	17.820	20.213	**25.919**	3.319E-02	326.648	12.304	5.089E-02	7.617
50	62.50	0.50167	0.56905	1.41957	1.504E-02	19.112	2.480E-02	29.244	14.671	16.641	26.151	3.354E-02	269.446	12.582	5.139E-02	6.312
60	66.67	0.42168	0.47832	1.41595	1.482E-02	19.414	2.432E-02	30.651	12.925	14.661	26.669	3.307E-02	235.548	13.014	5.060E-02	5.488
70	70.00	0.36369	0.41254	1.40723	1.443E-02	19.848	2.364E-02	32.750	11.911	13.511	27.375	3.208E-02	214.051	13.547	4.902E-02	4.927
80	72.73	0.31973	0.36268	1.39515	1.392E-02	20.379	2.270E-02	35.451	11.335	12.857	28.221	3.077E-02	199.995	14.158	4.693E-02	4.527
90	75.00	0.28524	0.32355	1.38082	1.335E-02	20.992	2.156E-02	38.749	11.053	12.537	29.186	2.926E-02	190.826	14.794	4.466E-02	4.220
100	76.92	0.25747	0.29205	1.36499	1.274E-02	21.678	2.035E-02	42.672	**10.987**	**12.462**	30.256	2.760E-02	185.112	15.528	4.203E-02	3.998
125	80.65	0.20708	0.23489	1.32185	1.112E-02	23.696	1.708E-02	55.730	11.540	13.091	33.379	2.321E-02	**181.209**	17.607	3.514E-02	3.646
150	83.33	0.17318	0.19644	1.27692	9.488E-03	26.188	1.385E-02	75.227	13.028	14.778	37.212	1.887E-02	188.349	20.129	2.840E-02	3.486
175	85.37	0.14882	0.16881	1.23240	7.904E-03	29.280	1.085E-02	105.147	15.648	17.750	41.954	1.481E-02	205.728	23.230	2.216E-02	**3.457**
200	86.96	0.13046	0.14798	1.18927	6.394E-03	33.223	8.131E-03	153.599	20.039	22.730	47.989	1.112E-02	235.971	27.158	1.653E-02	3.543
225	88.24	0.11614	0.13174	1.14802	4.971E-03	38.475	5.714E-03	238.575	27.708	31.430	56.024	7.844E-03	286.303	32.388	1.160E-02	3.762
250	89.29	0.10465	0.11871	1.10880	3.631E-03	46.007	3.635E-03	407.896	42.686	48.420	67.543	5.040E-03	374.966	39.882	7.374E-03	4.174
275	90.16	0.09523	0.10802	1.07169	2.382E-03	58.231	1.957E-03	827.083	78.763	89.342	86.243	2.749E-03	556.300	52.062	3.921E-03	4.958
300	90.91	0.08737	0.09911	1.03661	1.212E-03	84.140	6.741E-04	2495.156	218.002	247.283	125.891	1.023E-03	1087.534	77.917	1.365E-03	6.808
325	91.55	0.08056	0.09138	1.00348												
326	91.57	0.08032	0.09111	1.00219												
327	91.60	0.08007	0.09082	1.00093												
328	**91.62**	**0.07983**	**0.09055**	**0.99964**												
329	91.64	0.07959	0.09028	0.99836												
330	91.67	0.07935	0.09001	0.99708												
335	91.78	0.07818	0.08868	0.99075												
350	92.105	0.07498	0.08505	0.97222												

* [grey shading] means the data are the same as the data of Table A.3.b.1.

Table A.3.c.2. MOX data [$^{235}U/U$ = 0.3%, $^{240}Pu/Pu$ = 20%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**65.883**	**20.000**	**12.941**	**1.176**

Fissile material oxide density
5.5 g ($UO_2 + PuO_2$)/cm^3

Water reflector
30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	4.84873	5.50000	1.36463	1.733E-03	55.759	6.609E-03	726.170	3520.999	3993.934	77.261	8.540E-03	22731.797	38.896	1.290E-02	188.595
0.5	1.64	4.84873	5.50000	1.32203	2.567E-03	46.706	7.753E-03	426.783	2069.352	2347.304	64.963	9.936E-03	16071.254	32.995	1.505E-02	159.985
0.928	3.00	4.84873	5.50000	1.27787	3.271E-03	41.859	8.022E-03	307.213	1489.592	1689.672	58.261	1.026E-02	12926.455	29.632	1.559E-02	143.678
1.5	4.76	4.84873	5.50000	1.23903	4.172E-03	37.516	7.982E-03	221.181	1072.448	1216.498	52.290	1.040E-02	10412.497	26.653	1.575E-02	129.235
1.916	6.00	4.84873	5.50000	1.22253	4.904E-03	34.804	8.308E-03	176.599	856.279	971.292	48.533	1.099E-02	8970.137	24.701	1.625E-02	119.770
2.73	8.34	4.84873	5.50000	1.20757	6.683E-03	30.050	8.978E-03	113.659	551.103	625.126	41.876	1.218E-02	6677.897	21.147	1.815E-02	102.538
5	14.29	3.42610	3.88629	1.21569	7.435E-03	28.100	1.003E-02	92.941	318.425	361.196	38.961	1.244E-02	4084.689	19.353	2.017E-02	66.306
10	25.00	2.07930	2.35859	1.27507	9.879E-03	23.726	1.427E-02	55.947	116.331	131.956	32.518	1.783E-02	1726.850	15.566	2.913E-02	32.367
20	40.00	1.16409	1.32045	1.35781	1.301E-02	20.294	2.031E-02	35.009	40.754	46.228	27.591	2.560E-02	696.013	12.904	4.196E-02	15.021
30	50.00	0.80831	0.91688	1.39788	1.444E-02	19.264	2.328E-02	29.947	24.207	27.458	26.194	2.943E-02	435.577	**12.302**	4.820E-02	9.944
40	57.14	0.61910	0.70226	1.41521	1.498E-02	**19.012**	2.452E-02	**28.783**	17.820	20.213	**25.919**	3.319E-02	326.648	12.304	5.089E-02	7.617
50	62.50	0.50167	0.56905	1.41957	1.504E-02	19.112	2.480E-02	29.244	14.671	16.641	26.151	3.354E-02	269.446	12.582	5.139E-02	6.312
60	66.67	0.42168	0.47832	1.41595	1.482E-02	19.414	2.432E-02	30.651	12.925	14.661	26.669	3.307E-02	235.548	13.014	5.060E-02	5.488
70	70.00	0.36369	0.41254	1.40723	1.443E-02	19.848	2.364E-02	32.750	11.911	13.511	27.375	3.208E-02	214.051	13.547	4.902E-02	4.927
80	72.73	0.31973	0.36268	1.39515	1.392E-02	20.379	2.270E-02	35.451	11.335	12.857	28.221	3.077E-02	199.995	14.158	4.693E-02	4.527
90	75.00	0.28524	0.32355	1.38082	1.335E-02	20.992	2.156E-02	38.749	11.053	12.537	29.186	2.926E-02	190.826	14.794	4.466E-02	4.220
100	76.92	0.25747	0.29205	1.36499	1.274E-02	21.678	2.035E-02	42.672	**10.987**	**12.462**	30.256	2.760E-02	185.112	15.528	4.203E-02	3.998
125	80.65	0.20708	0.23489	1.32185	1.112E-02	23.696	1.708E-02	55.730	11.540	13.091	33.379	2.321E-02	**181.209**	17.607	3.514E-02	3.646
150	83.33	0.17318	0.19644	1.27692	9.488E-03	26.188	1.385E-02	75.227	13.028	14.778	37.212	1.887E-02	188.349	20.129	2.840E-02	3.486
175	85.37	0.14882	0.16881	1.23240	7.904E-03	29.280	1.085E-02	105.147	15.648	17.750	41.954	1.481E-02	205.728	23.230	2.216E-02	**3.457**
200	86.96	0.13046	0.14798	1.18927	6.394E-03	33.223	8.131E-03	153.599	20.039	22.730	47.989	1.112E-02	235.971	27.158	1.653E-02	3.543
225	88.24	0.11614	0.13174	1.14802	4.971E-03	38.475	5.714E-03	238.575	27.708	31.430	56.024	7.844E-03	286.303	32.388	1.160E-02	3.762
250	89.29	0.10465	0.11871	1.10880	3.631E-03	46.007	3.635E-03	407.896	42.686	48.420	67.543	5.040E-03	374.966	39.882	7.374E-03	4.174
275	90.16	0.09523	0.10802	1.07169	2.382E-03	58.231	1.957E-03	827.083	78.763	89.342	86.243	2.749E-03	556.300	52.062	3.921E-03	4.958
300	90.91	0.08737	0.09911	1.03661	1.212E-03	84.140	6.741E-04	2495.156	218.002	247.283	125.891	1.023E-03	1087.534	77.917	1.365E-03	6.808
325	91.55	0.08056	0.09138	1.00348												
326	91.57	0.08032	0.09111	1.00219												
327	91.60	0.08007	0.09082	1.00093												
328	**91.62**	**0.07983**	**0.09055**	**0.99964**												
329	91.64	0.07959	0.09028	0.99836												
330	91.67	0.07935	0.09001	0.99708												
335	91.78	0.07818	0.08868	0.99075												
350	92.105	0.07498	0.08505	0.97222												

* [grey shading] means the data are the same as the data of Table A.3.b.1.

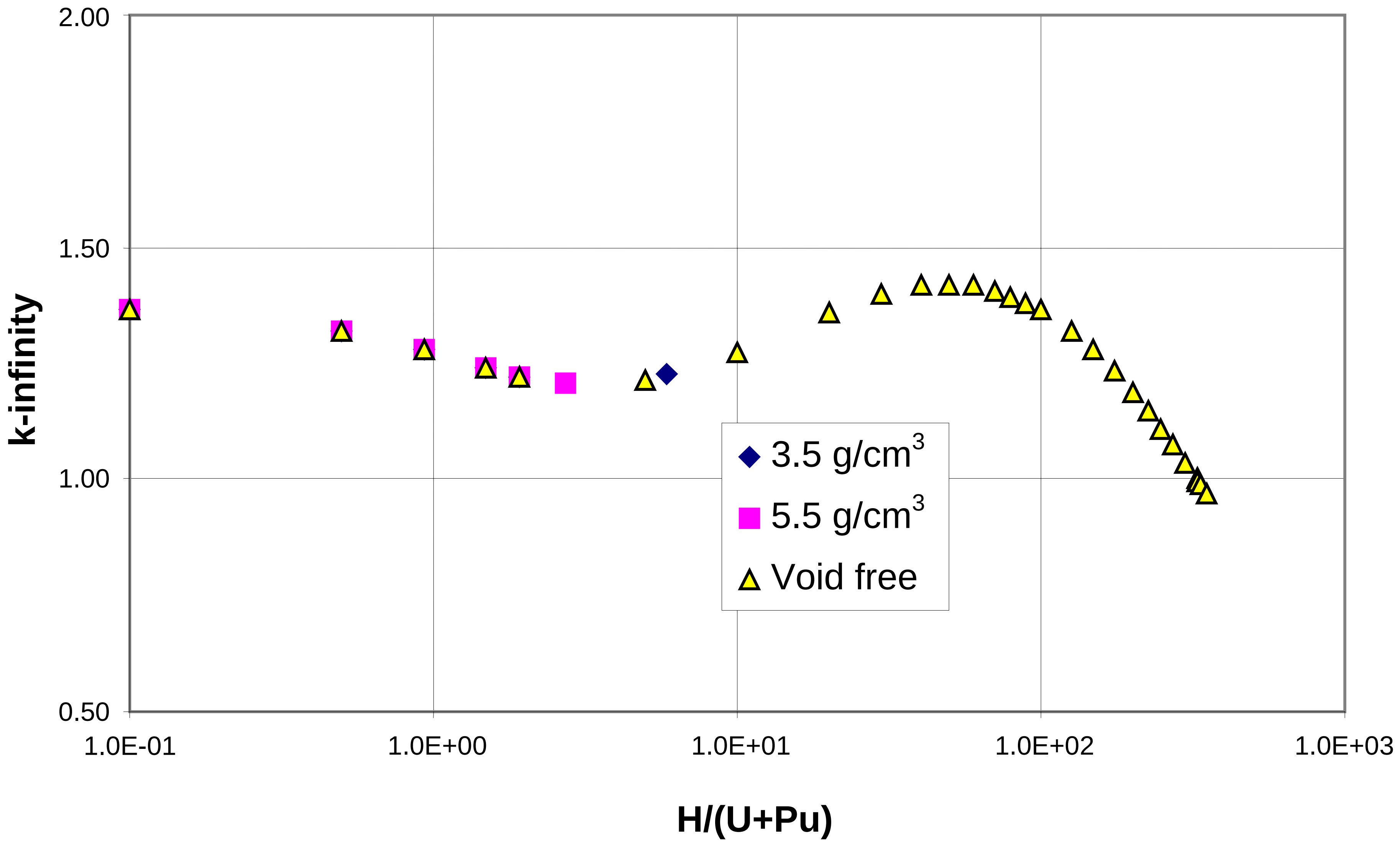

Fig. A.3.c.1. ***k*-infinity [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%].**

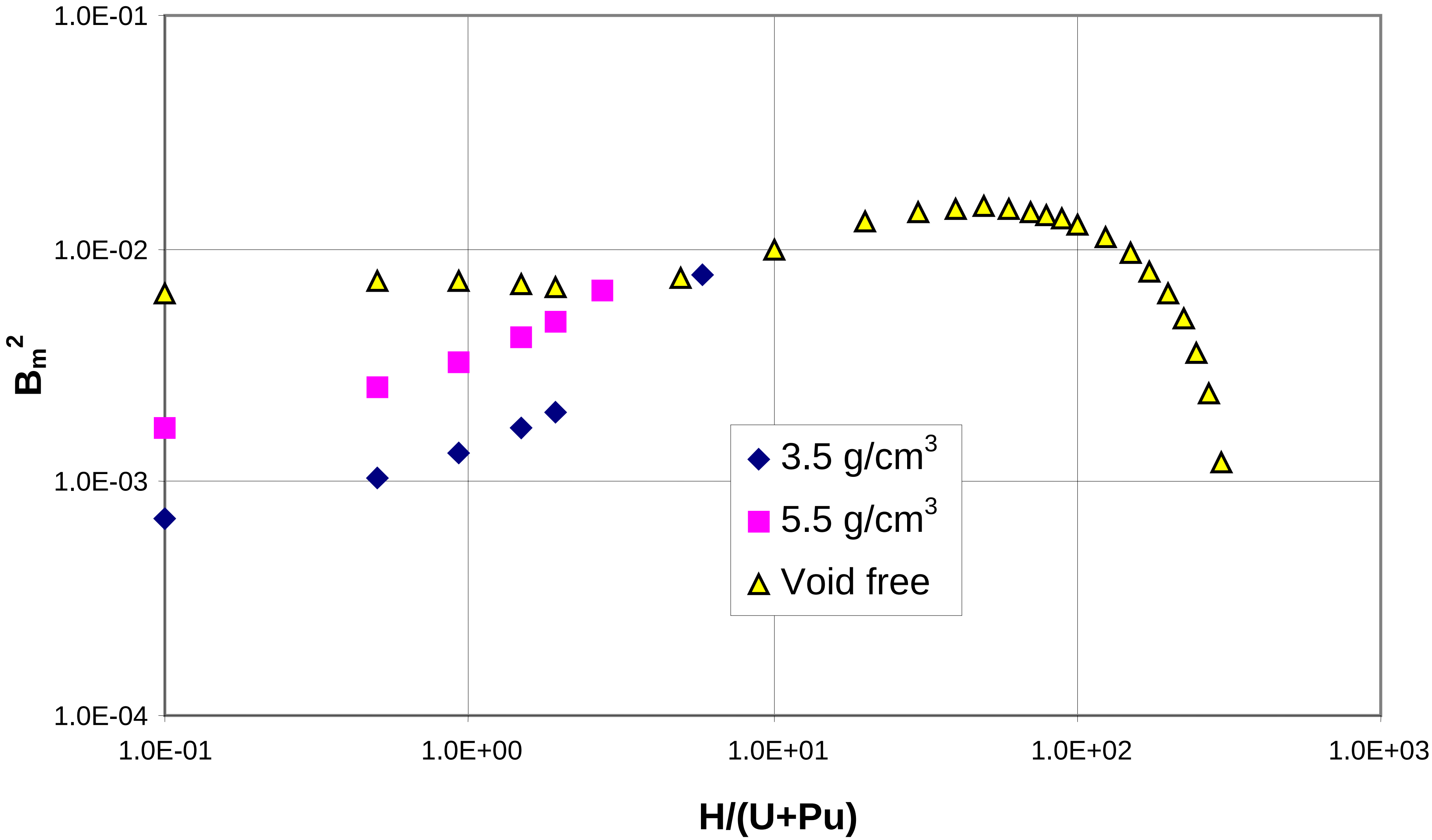

Fig. A.3.c.2. B_m^2 [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%].

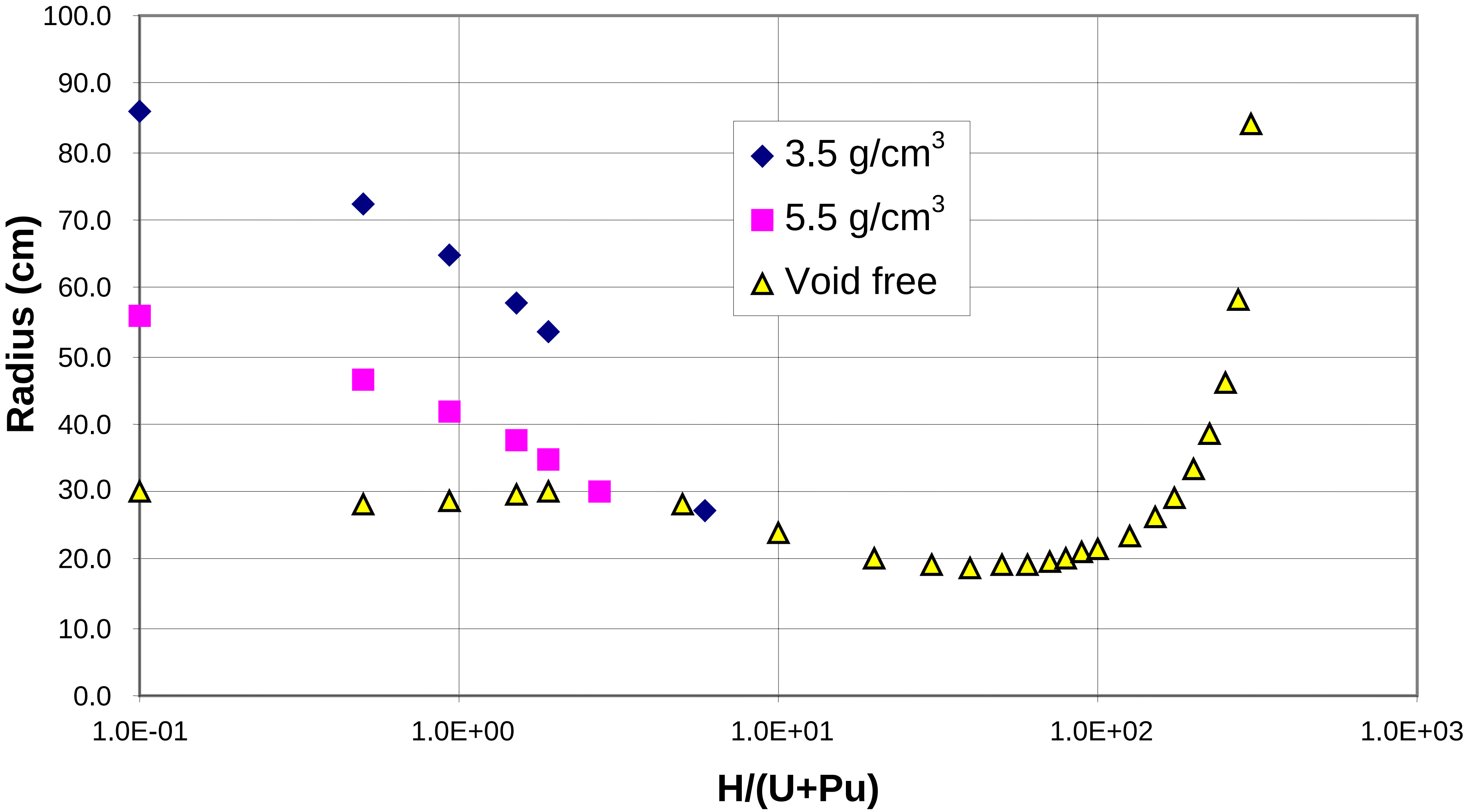

Fig. A.3.c.3. Sphere radius [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

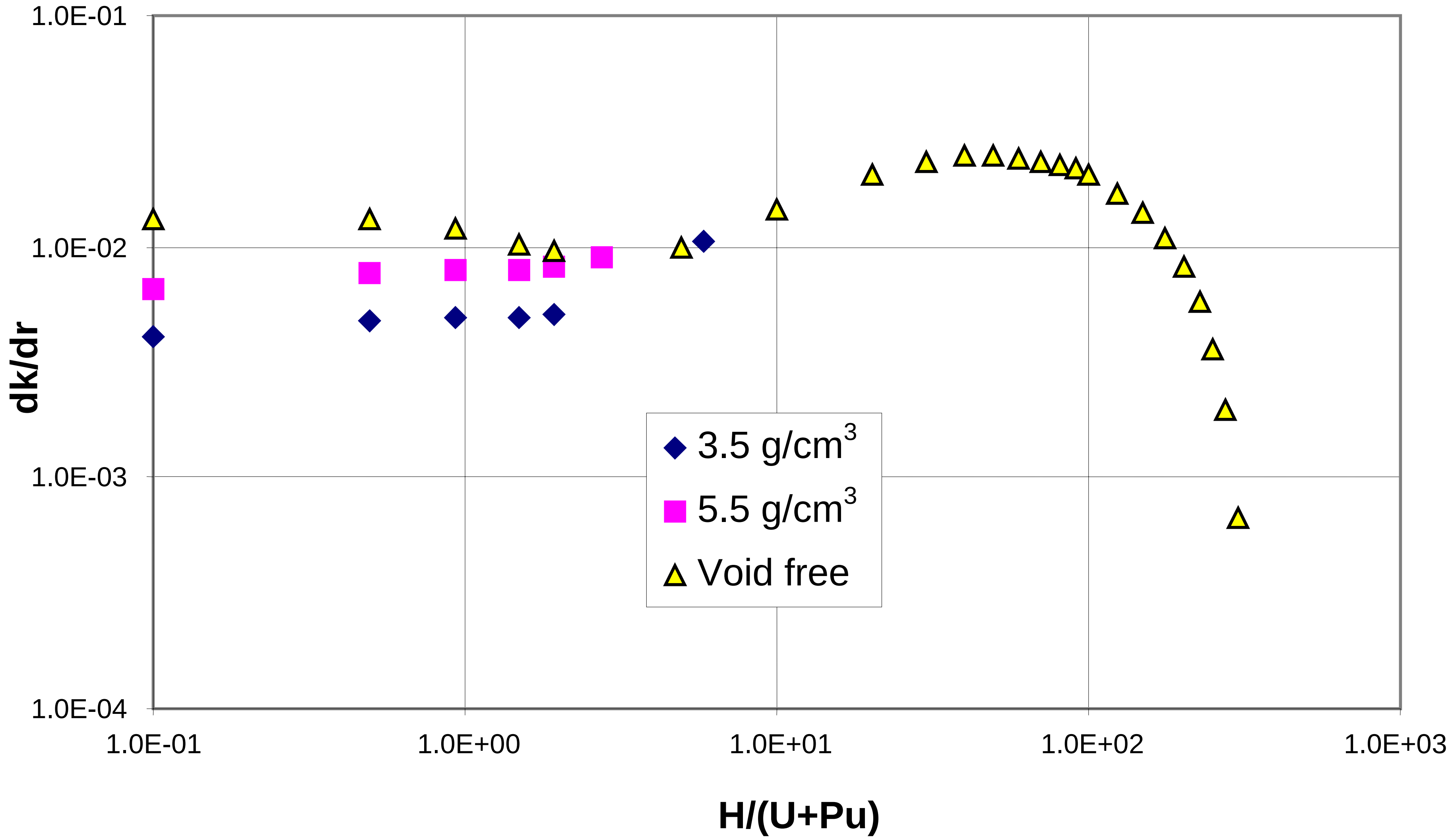

Fig. A.3.c.4. Delta lambda divided by delta dimension [sphere, ^{235}U/U = 0.3 %, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

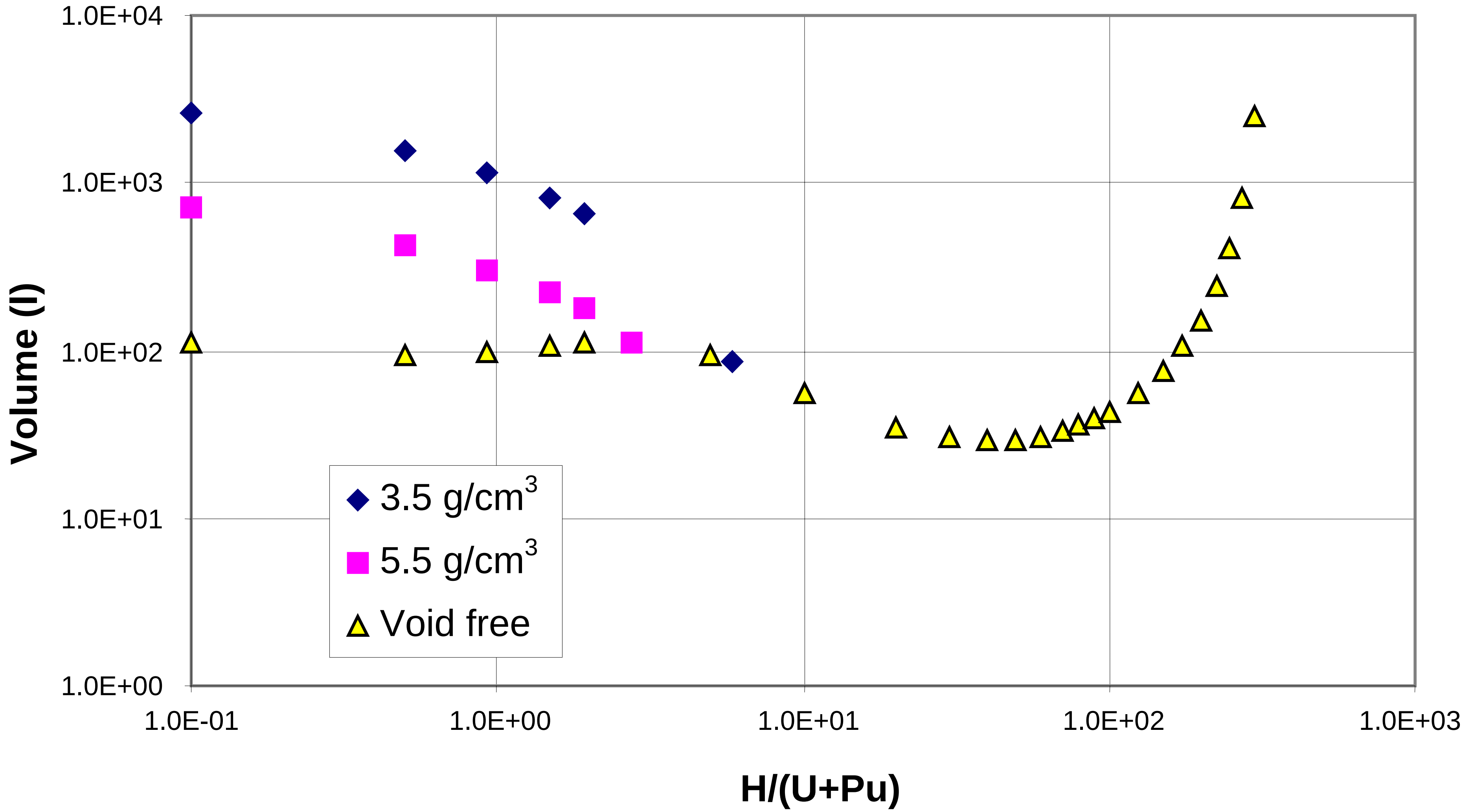

Fig. A.3.c.5. Sphere volume [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

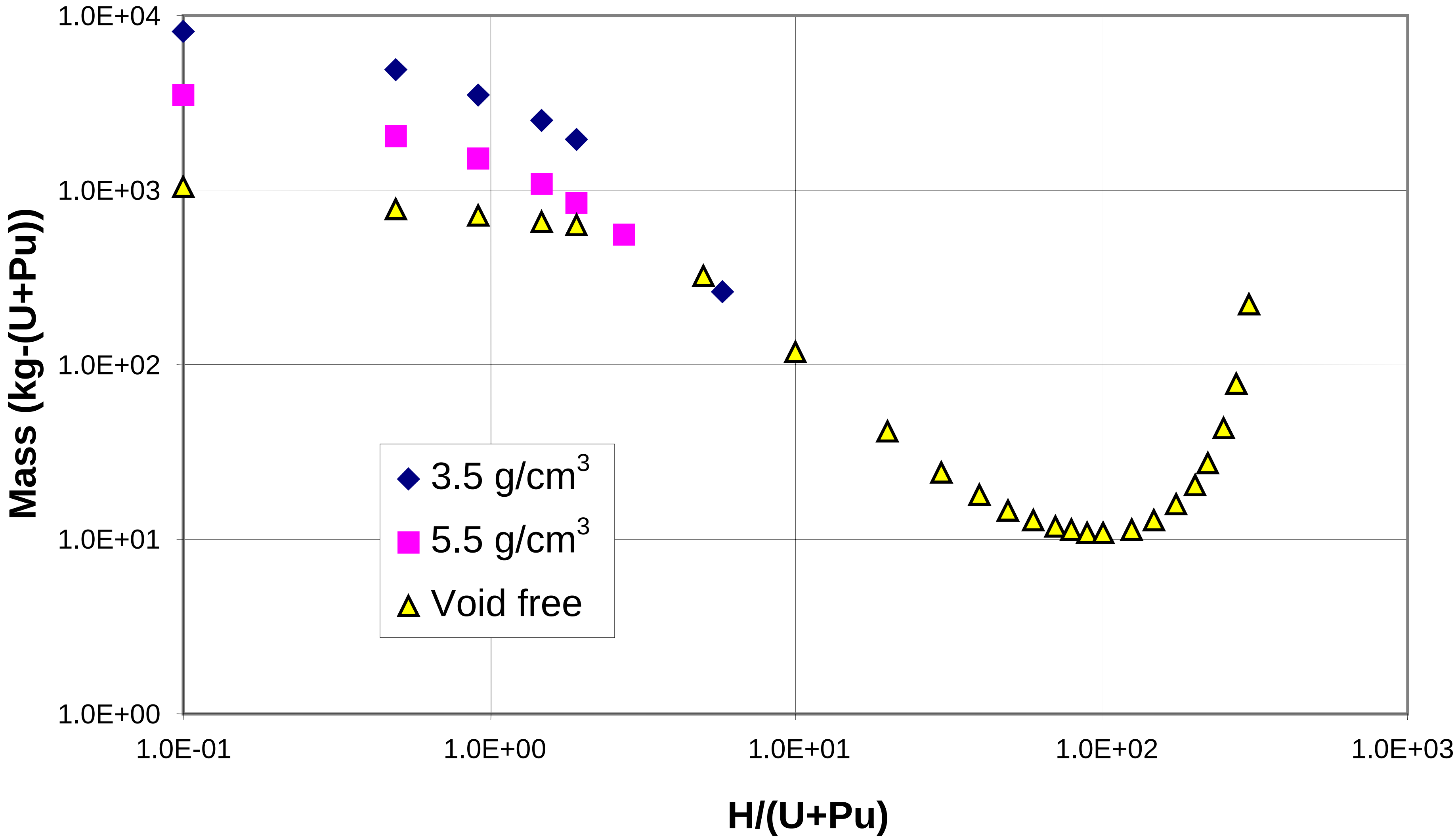

Fig. A.3.c.6. U + Pu mass [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

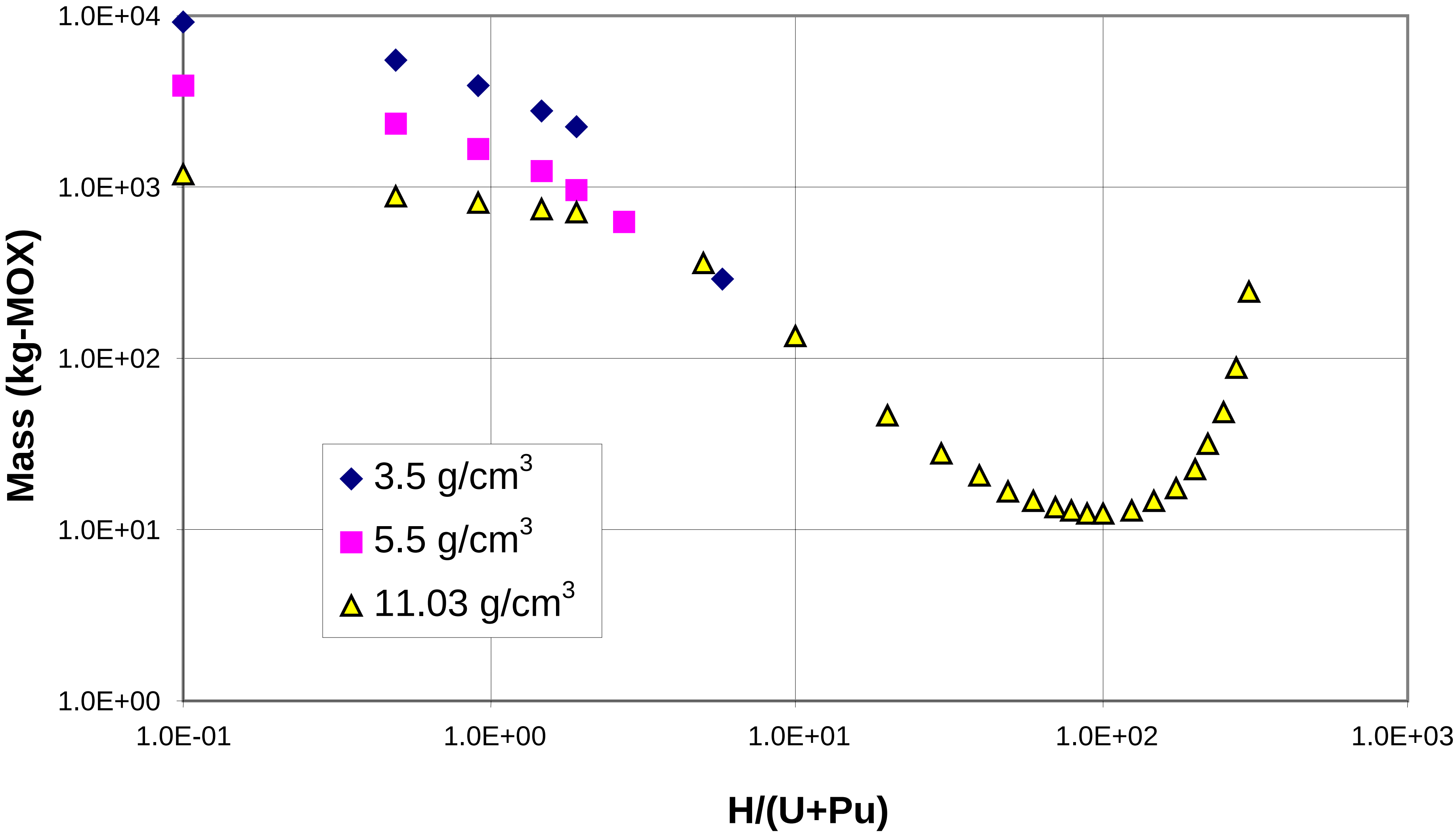

Fig. A.3.c.7. MOX mass [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

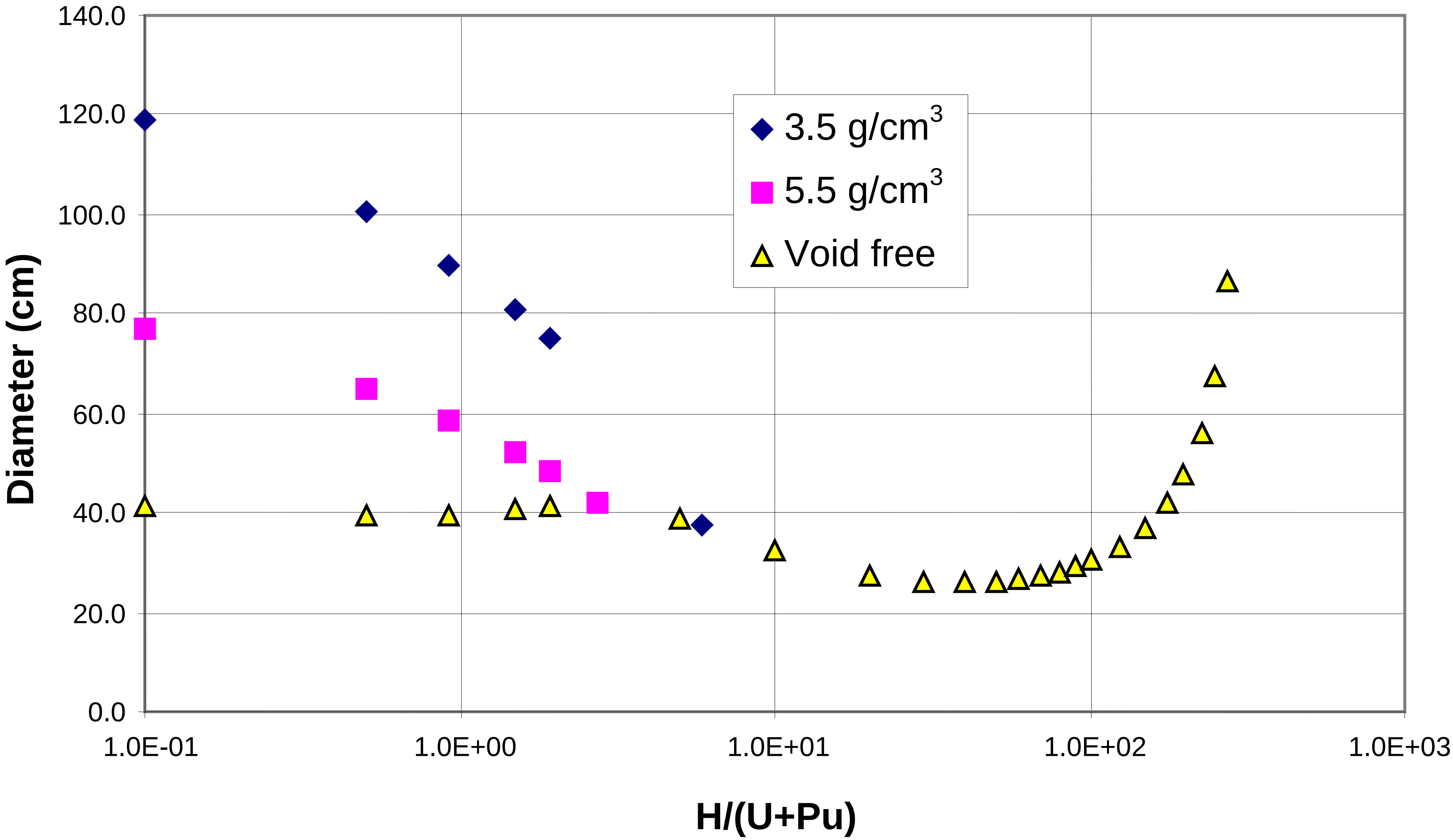

Fig. A.3.c.8. Cylinder diameter [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

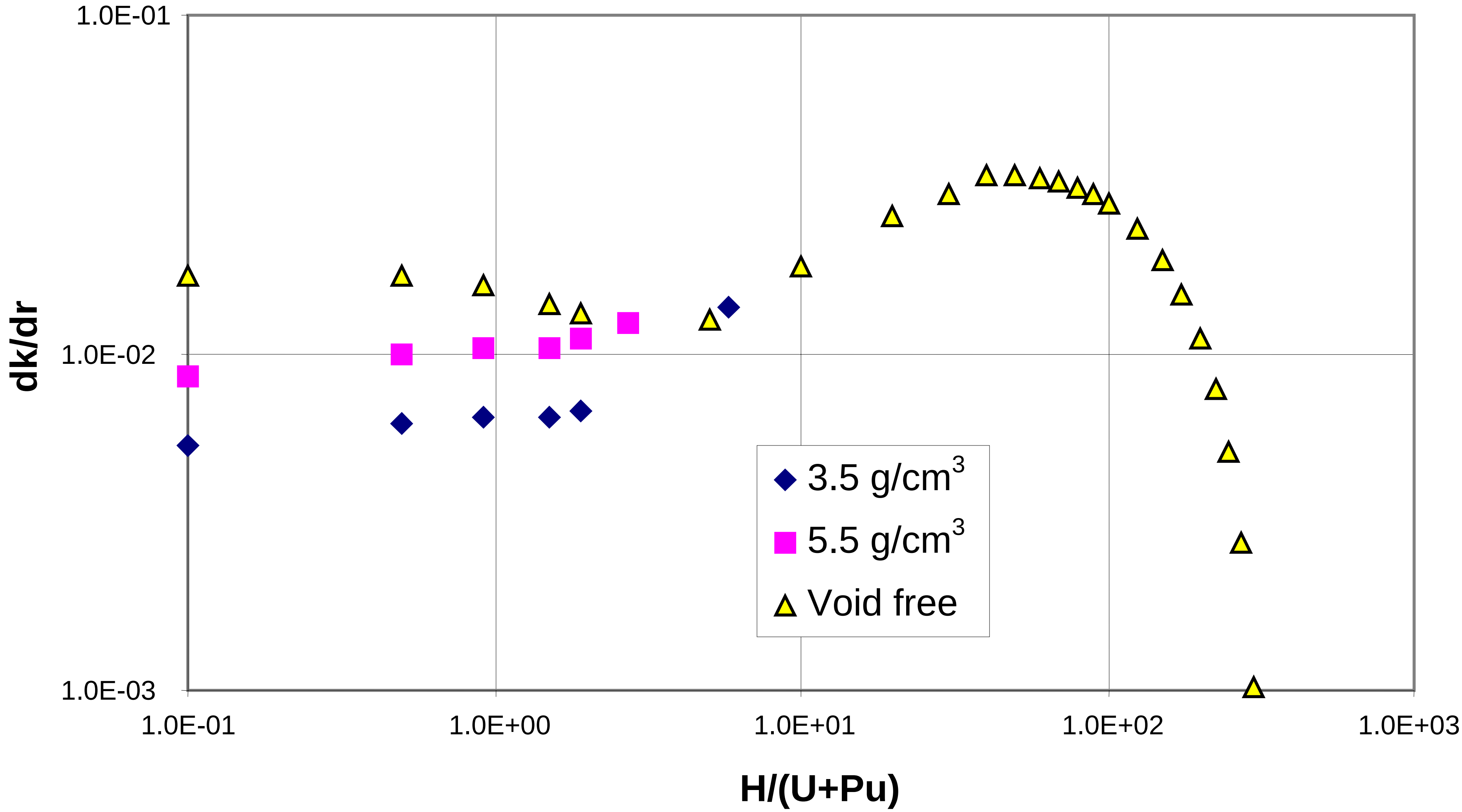

Fig. A.3.c.9. Delta lambda divided by delta dimension [cylinder, ^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

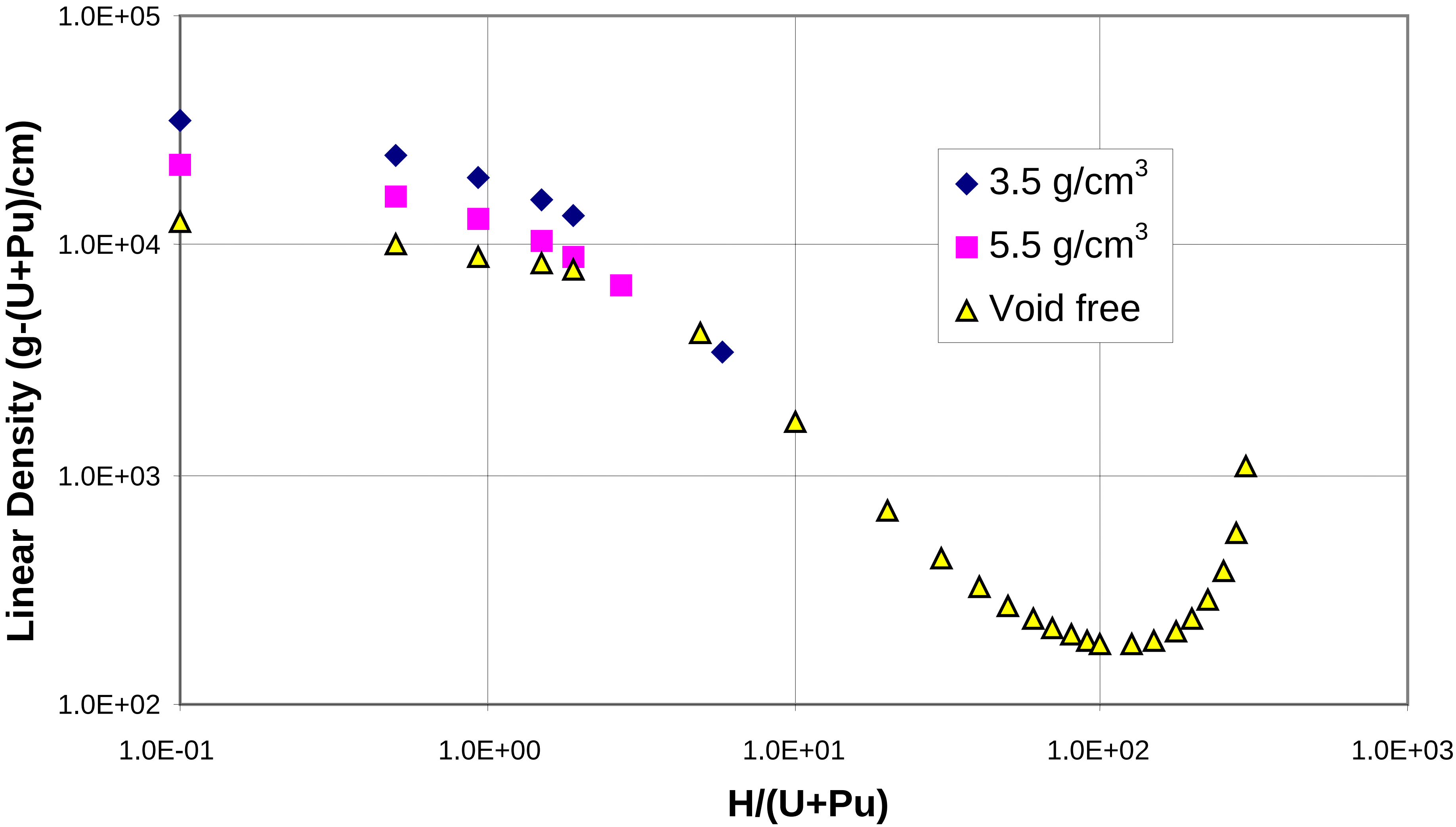

Fig. A.3.c.10. Linear density [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

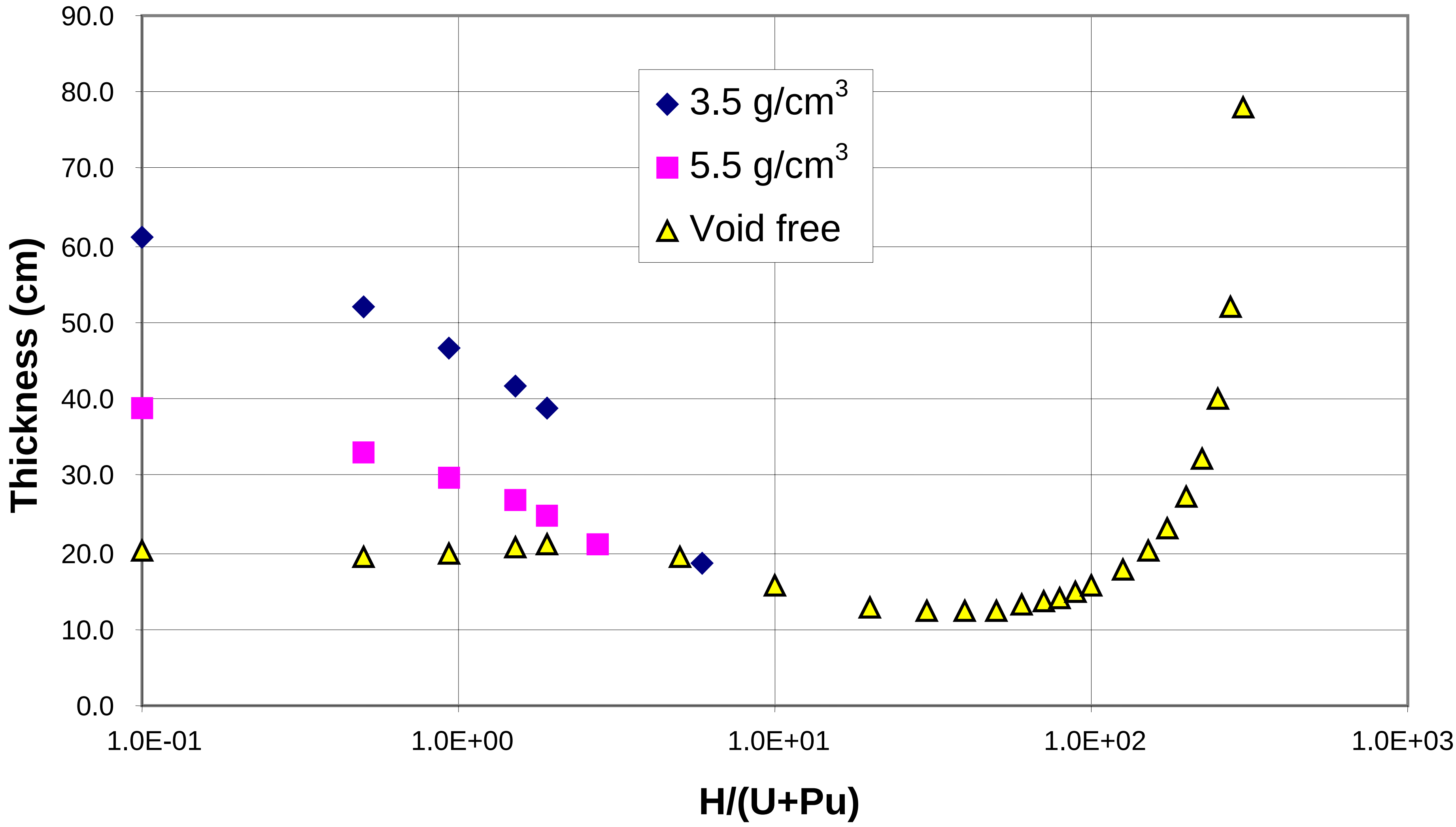

Fig. A.3.c.11. Slab thickness [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

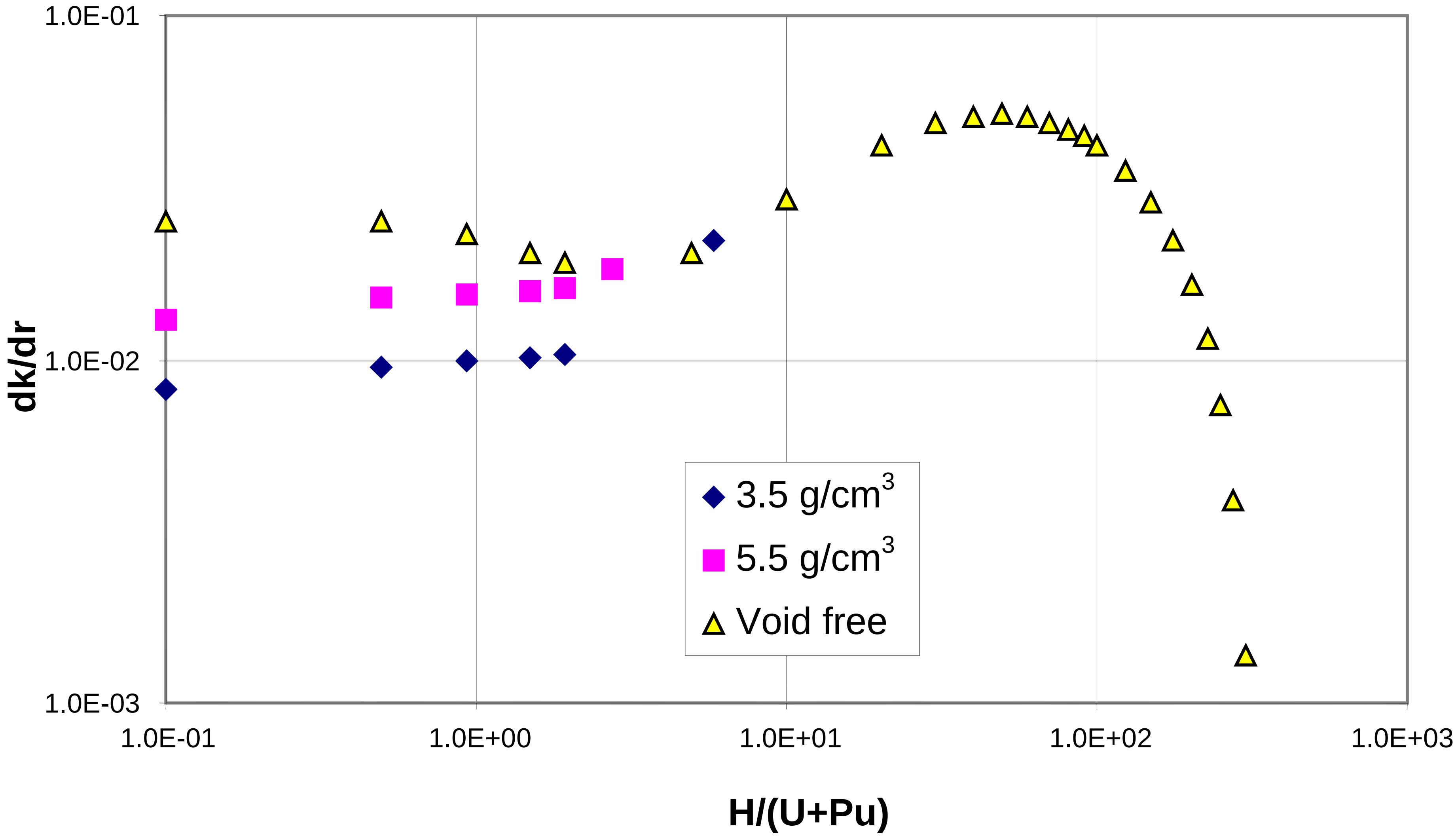

Fig. A.3.c.12. Delta lambda divided by delta dimension [slab, ^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

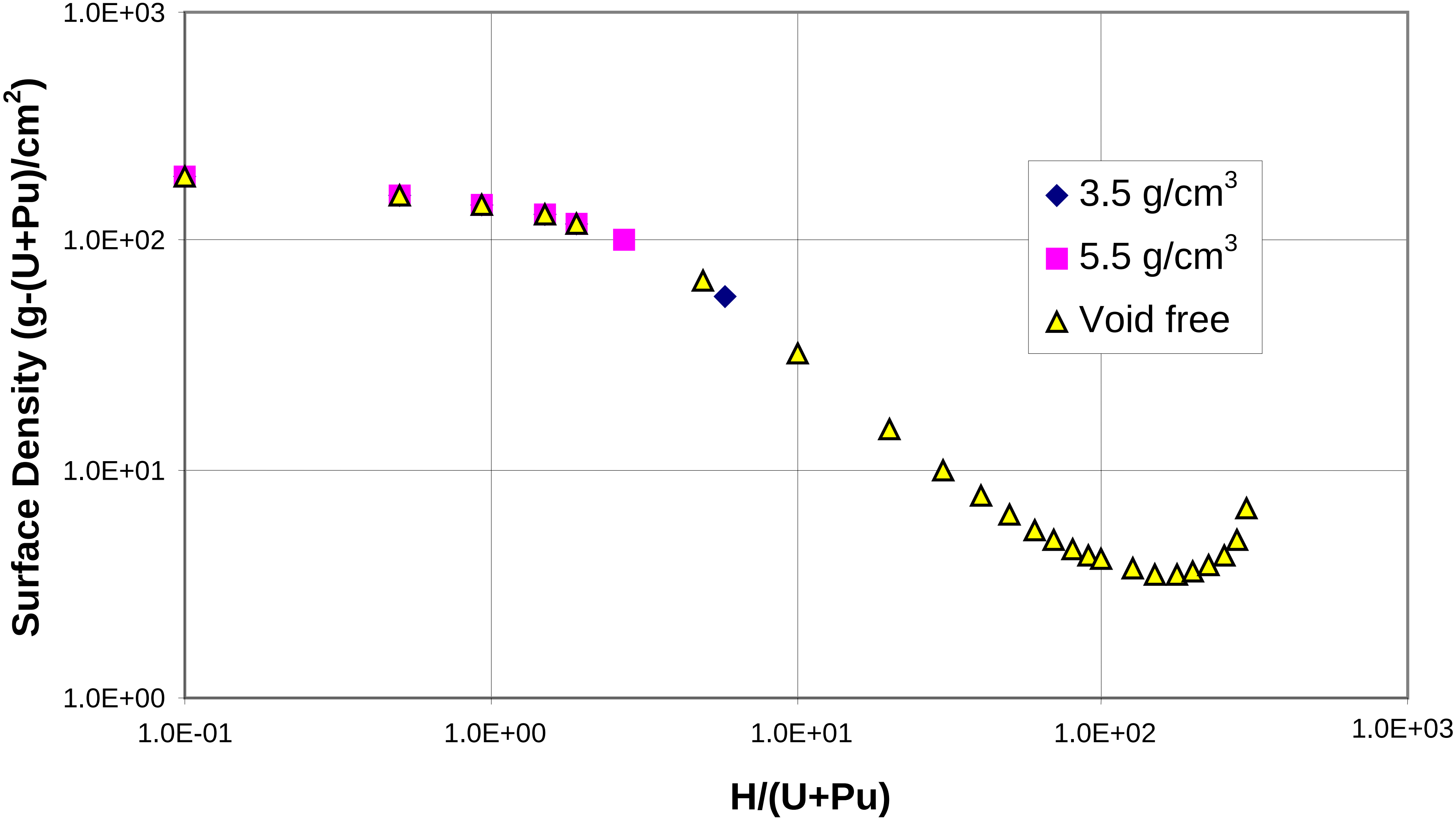

Fig. A.3.c.13. Surface density [^{235}U/U = 0.3 %, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

Table A.3.d.1. MOX data [$^{235}U/U$ = 0.3%, $^{240}Pu/Pu$ = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**65.883**	**20.000**	**12.941**	**1.176**

Fissile material oxide density
3.5 g (UO_2 + PuO_2)/cm^3

Water reflector
2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08555	3.50000	1.36465	7.014E-04	103.573	4.501E-03	4654.020	14360.229	16289.071	151.837	5.856E-03	55869.793	89.517	8.966E-03	276.210
0.5	1.64	3.08555	3.50000	1.32204	1.039E-03	84.872	5.064E-03	2560.819	7901.544	8962.866	124.197	6.600E-03	37380.386	72.888	1.016E-02	224.900
0.928	3.00	3.08555	3.50000	1.27788	1.324E-03	75.230	5.073E-03	1783.418	5502.832	6241.963	110.041	6.628E-03	29344.646	64.526	1.024E-02	199.100
1.5	4.76	3.08555	3.50000	1.23904	1.689E-03	66.724	5.060E-03	1244.345	3839.492	4355.206	97.620	6.632E-03	23094.075	57.286	1.019E-02	176.759
1.916	6.00	3.08555	3.50000	1.22253	1.986E-03	61.556	5.203E-03	976.993	3014.563	3419.474	90.094	6.766E-03	19670.556	52.845	1.048E-02	163.057
5.84	16.29	3.08555	3.50000	1.22495	7.827E-03	30.590	1.038E-02	119.907	369.979	419.674	44.489	1.411E-02	4796.499	25.600	2.044E-02	78.990
10	25.00	2.07930	2.35859	1.27507	9.879E-03	26.731	1.410E-02	80.005	166.355	188.700	38.605	1.745E-02	2433.877	21.818	2.869E-02	45.367
20	40.00	1.16409	1.32045	1.35781	1.301E-02	22.797	2.000E-02	49.626	57.769	65.529	32.662	2.497E-02	975.329	18.081	4.103E-02	21.048
30	50.00	0.80831	0.91688	1.39788	1.444E-02	21.509	2.291E-02	41.684	33.693	38.219	30.742	2.869E-02	599.981	16.934	4.710E-02	13.688
40	57.14	0.61910	0.70226	1.41521	1.498E-02	21.098	2.415E-02	39.337	24.354	27.625	**30.146**	3.028E-02	441.892	**16.627**	4.966E-02	10.294
50	62.50	0.50167	0.56905	1.41957	1.504E-02	**21.091**	2.443E-02	**39.296**	19.714	22.362	30.158	3.063E-02	358.359	16.672	5.022E-02	8.364
60	66.67	0.42168	0.47832	1.41595	1.482E-02	21.313	2.414E-02	40.552	17.100	19.397	30.515	3.260E-02	308.394	16.933	4.955E-02	7.140
70	70.00	0.36369	0.41254	1.40723	1.443E-02	21.686	2.320E-02	42.717	15.536	17.623	31.097	3.167E-02	276.229	17.335	4.594E-02	6.305
80	72.73	0.31973	0.36268	1.39515	1.392E-02	22.169	2.242E-02	45.637	14.592	16.552	31.846	3.041E-02	254.667	17.806	4.730E-02	5.693
90	75.00	0.28524	0.32355	1.38082	1.335E-02	22.743	2.133E-02	49.278	14.056	15.944	32.730	2.894E-02	239.995	18.395	4.498E-02	5.247
100	76.92	0.25747	0.29205	1.36499	1.274E-02	23.397	2.016E-02	53.651	**13.813**	**15.669**	33.735	2.733E-02	230.127	19.060	4.245E-02	4.907
125	80.65	0.20708	0.23489	1.32185	1.112E-02	25.355	1.695E-02	68.275	14.138	16.038	36.733	2.303E-02	**219.457**	21.007	3.573E-02	4.350
150	83.33	0.17318	0.19644	1.27692	9.488E-03	27.806	1.378E-02	90.054	15.596	17.690	40.481	1.877E-02	222.888	23.437	2.905E-02	4.059
175	85.37	0.14882	0.16881	1.23240	7.904E-03	30.869	1.081E-02	123.209	18.336	20.799	45.161	1.475E-02	238.383	26.463	2.280E-02	**3.938**
200	86.96	0.13046	0.14798	1.18927	6.394E-03	34.791	8.108E-03	176.392	23.012	26.103	51.151	1.109E-02	268.089	30.351	1.710E-02	3.960
225	88.24	0.11614	0.13174	1.14802	4.971E-03	40.028	5.699E-03	268.652	31.201	35.392	59.153	7.835E-03	319.172	35.540	1.207E-02	4.128
250	89.29	0.10465	0.11871	1.10880	3.631E-03	47.549	3.650E-03	450.323	47.126	53.456	70.647	5.044E-03	410.224	43.010	7.739E-03	4.501
275	90.16	0.09523	0.10802	1.07169	2.382E-03	59.768	1.951E-03	894.301	85.164	96.603	89.332	2.679E-03	596.862	55.169	4.134E-03	5.254
300	90.91	0.08737	0.09911	1.03661	1.212E-03	85.676	6.734E-04	2634.306	230.159	261.074	128.967	1.023E-03	1141.329	81.008	1.560E-03	7.078
325	91.55	0.08056	0.09138	1.00348												
326	91.57	0.08032	0.09111	1.00219												
327	91.60	0.08007	0.09082	1.00093												
328	**91.62**	**0.07983**	**0.09055**	**0.99964**												
329	91.64	0.07959	0.09028	0.99836												
330	91.67	0.07935	0.09001	0.99708												
335	91.78	0.07818	0.08868	0.99075												
350	92.105	0.07498	0.08505	0.97222												

* (grey shading) means the data are the same as the data of Table A.3.b.2.

Table A.3.d.2. MOX data [$^{235}U/U$ = 0.3%, $^{240}Pu/Pu$ = 20%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.300	**99.700**	**65.883**	**20.000**	**12.941**	**1.176**

Fissile material oxide density
5.5 g ($UO_2 + PuO_2$)/cm^3

Water reflector
2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	4.84873	5.50000	1.36463	1.733E-03	66.070	7.096E-03	1208.091	5857.702	6644.499	96.688	9.173E-03	35601.047	56.984	1.407E-02	276.302
0.5	1.64	4.84873	5.50000	1.32203	2.567E-03	54.150	8.000E-03	665.103	3224.902	3658.066	79.284	1.031E-02	23938.289	46.422	1.585E-02	225.089
0.928	3.00	4.84873	5.50000	1.27787	3.271E-03	47.997	8.044E-03	463.157	2245.722	2547.363	70.209	1.044E-02	18771.575	41.068	1.606E-02	199.126
1.5	4.76	4.84873	5.50000	1.23903	4.172E-03	42.564	8.111E-03	323.019	1566.231	1776.605	62.309	1.040E-02	14784.832	36.477	1.620E-02	176.866
1.916	6.00	4.84873	5.50000	1.22253	4.904E-03	39.299	8.223E-03	254.241	1232.747	1398.328	57.497	1.070E-02	12589.311	33.647	1.623E-02	163.146
2.73	8.34	4.84873	5.50000	1.20757	6.683E-03	33.662	9.036E-03	159.771	774.684	878.738	49.216	1.181E-02	9224.233	28.759	1.807E-02	139.445
5	14.29	3.42610	3.88629	1.21569	7.435E-03	31.538	9.960E-03	131.400	450.189	510.658	45.931	1.225E-02	5676.726	26.539	2.011E-02	90.926
10	25.00	2.07930	2.35859	1.27507	9.879E-03	26.731	1.410E-02	80.005	166.355	188.700	38.605	1.745E-02	2433.877	21.818	2.869E-02	45.367
20	40.00	1.16409	1.32045	1.35781	1.301E-02	22.797	2.000E-02	49.626	57.769	65.529	32.662	2.497E-02	975.329	18.081	4.103E-02	21.048
30	50.00	0.80831	0.91688	1.39788	1.444E-02	21.509	2.291E-02	41.684	33.693	38.219	30.742	2.869E-02	599.981	16.934	4.710E-02	13.688
40	57.14	0.61910	0.70226	1.41521	1.498E-02	21.098	2.415E-02	39.337	24.354	27.625	**30.146**	3.028E-02	441.892	**16.627**	4.966E-02	10.294
50	62.50	0.50167	0.56905	1.41957	1.504E-02	**21.091**	2.443E-02	**39.296**	19.714	22.362	30.158	3.063E-02	358.359	16.672	5.022E-02	8.364
60	66.67	0.42168	0.47832	1.41595	1.482E-02	21.313	2.414E-02	40.552	17.100	19.397	30.515	3.260E-02	308.394	16.933	4.955E-02	7.140
70	70.00	0.36369	0.41254	1.40723	1.443E-02	21.686	2.320E-02	42.717	15.536	17.623	31.097	3.167E-02	276.229	17.335	4.594E-02	6.305
80	72.73	0.31973	0.36268	1.39515	1.392E-02	22.169	2.242E-02	45.637	14.592	16.552	31.846	3.041E-02	254.667	17.806	4.730E-02	5.693
90	75.00	0.28524	0.32355	1.38082	1.335E-02	22.743	2.133E-02	49.278	14.056	15.944	32.730	2.894E-02	239.995	18.395	4.498E-02	5.247
100	76.92	0.25747	0.29205	1.36499	1.274E-02	23.397	2.016E-02	53.651	**13.813**	**15.669**	33.735	2.733E-02	230.127	19.060	4.245E-02	4.907
125	80.65	0.20708	0.23489	1.32185	1.112E-02	25.355	1.695E-02	68.275	14.138	16.038	36.733	2.303E-02	**219.457**	21.007	3.573E-02	4.350
150	83.33	0.17318	0.19644	1.27692	9.488E-03	27.806	1.378E-02	90.054	15.596	17.690	40.481	1.877E-02	222.888	23.437	2.905E-02	4.059
175	85.37	0.14882	0.16881	1.23240	7.904E-03	30.869	1.081E-02	123.209	18.336	20.799	45.161	1.475E-02	238.383	26.463	2.280E-02	**3.938**
200	86.96	0.13046	0.14798	1.18927	6.394E-03	34.791	8.108E-03	176.392	23.012	26.103	51.151	1.109E-02	268.089	30.351	1.710E-02	3.960
225	88.24	0.11614	0.13174	1.14802	4.971E-03	40.028	5.699E-03	268.652	31.201	35.392	59.153	7.835E-03	319.172	35.540	1.207E-02	4.128
250	89.29	0.10465	0.11871	1.10880	3.631E-03	47.549	3.650E-03	450.323	47.126	53.456	70.647	5.044E-03	410.224	43.010	7.739E-03	4.501
275	90.16	0.09523	0.10802	1.07169	2.382E-03	59.768	1.951E-03	894.301	85.164	96.603	89.332	2.679E-03	596.862	55.169	4.134E-03	5.254
300	90.91	0.08737	0.09911	1.03661	1.212E-03	85.676	6.734E-04	2634.306	230.159	261.074	128.967	1.023E-03	1141.329	81.008	1.560E-03	7.078
325	91.55	0.08056	0.09138	1.00348												
326	91.57	0.08032	0.09111	1.00219												
327	91.60	0.08007	0.09082	1.00093												
328	**91.62**	**0.07983**	**0.09055**	**0.99964**												
329	91.64	0.07959	0.09028	0.99836												
330	91.67	0.07935	0.09001	0.99708												
335	91.78	0.07818	0.08868	0.99075												
350	92.105	0.07498	0.08505	0.97222												

* means the data are the same as the data of Table A.3.b.2.

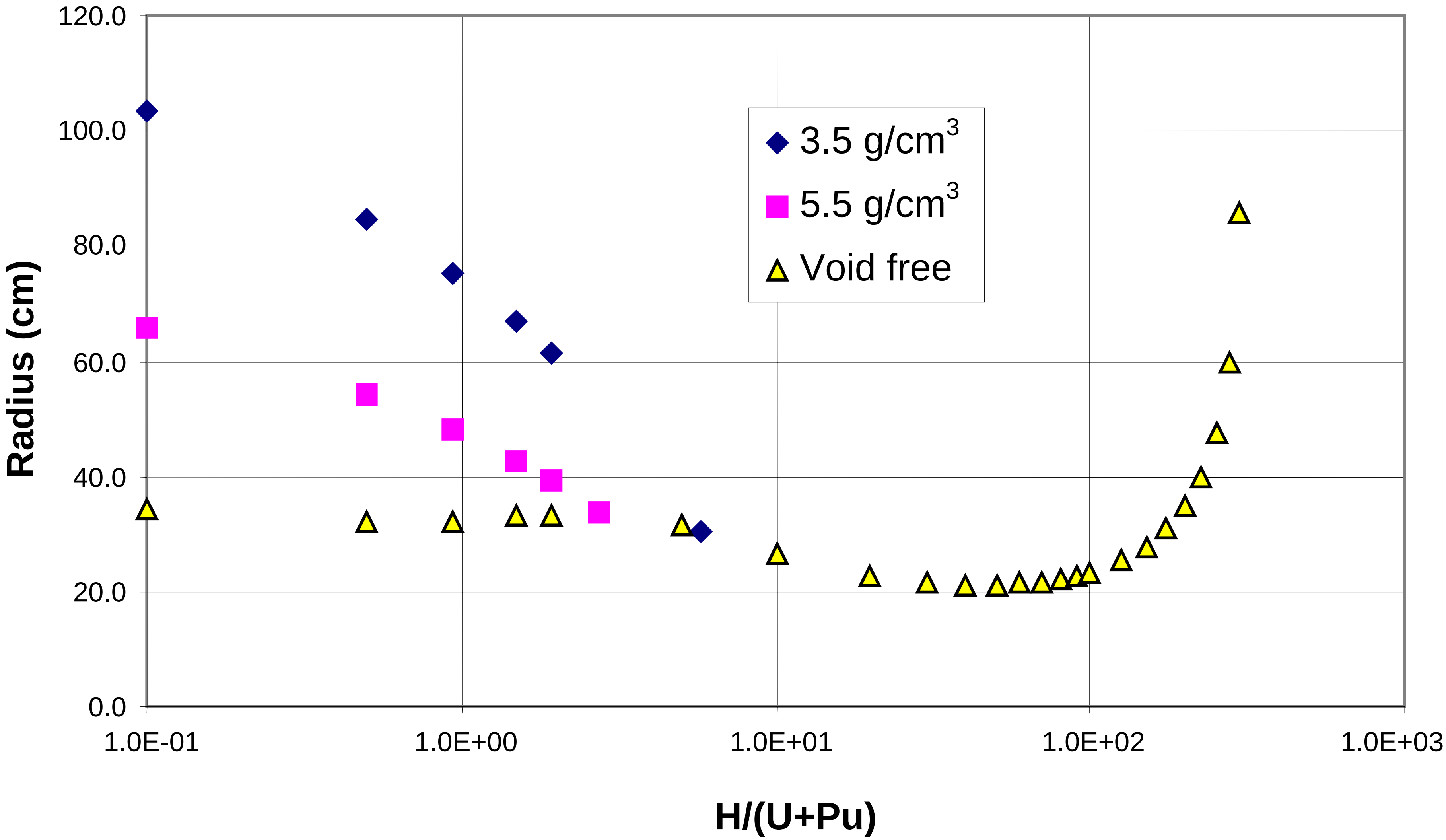

Fig. A.3.d.1. Sphere radius [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

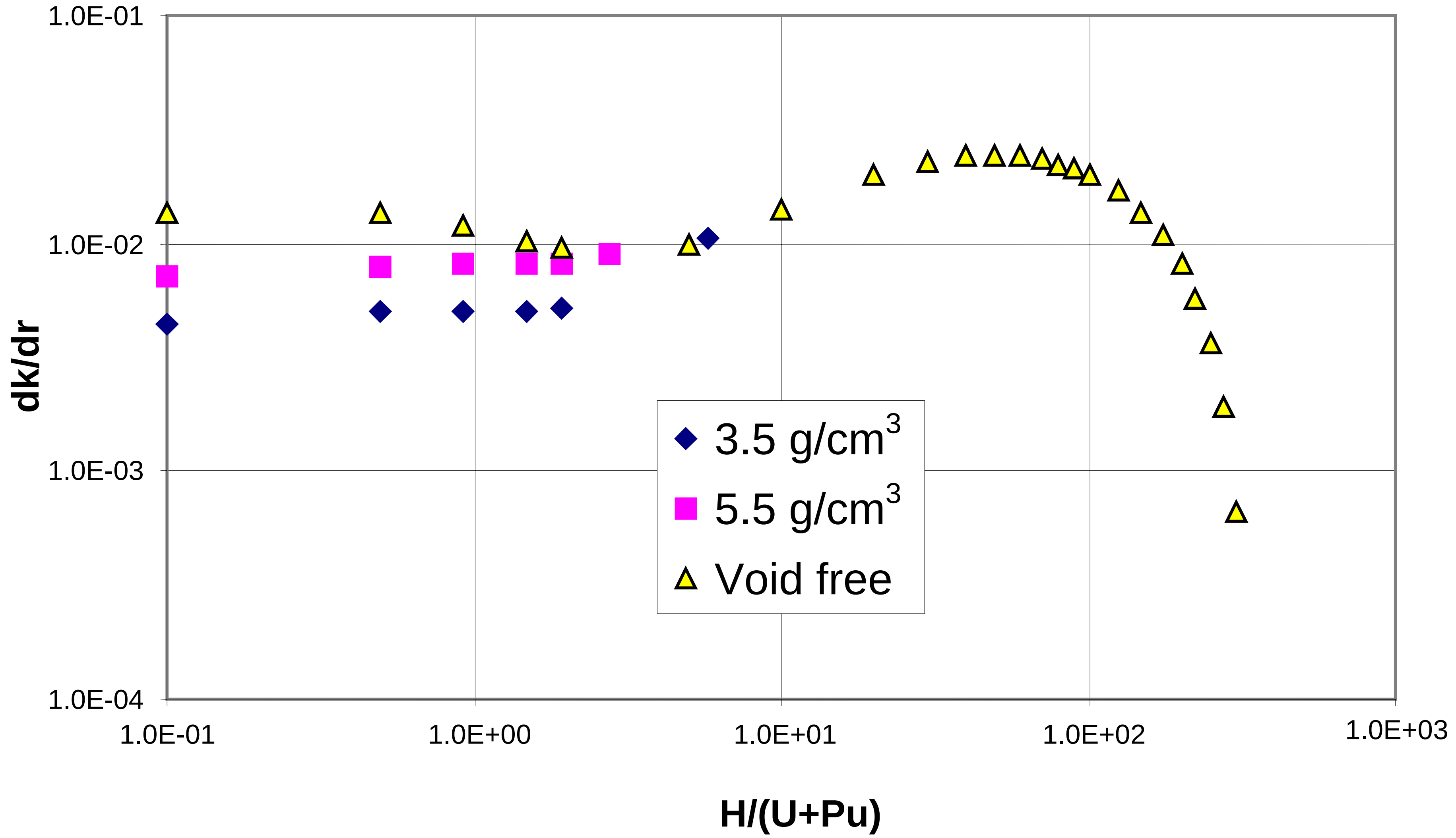

Fig. A.3.d.2. Delta lambda divided by delta dimension [sphere, ^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

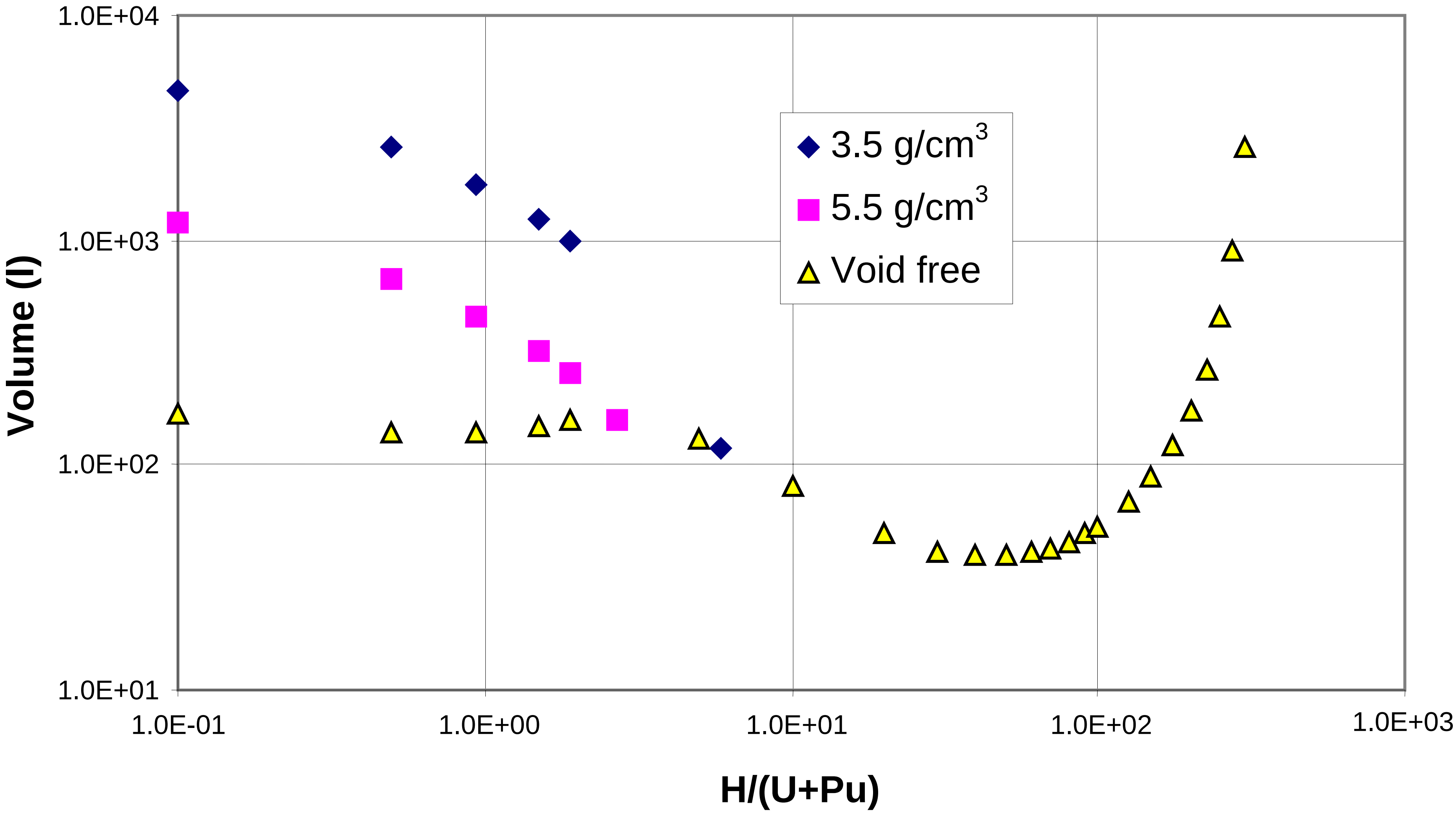

Fig. A.3.d.3. Sphere volume [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

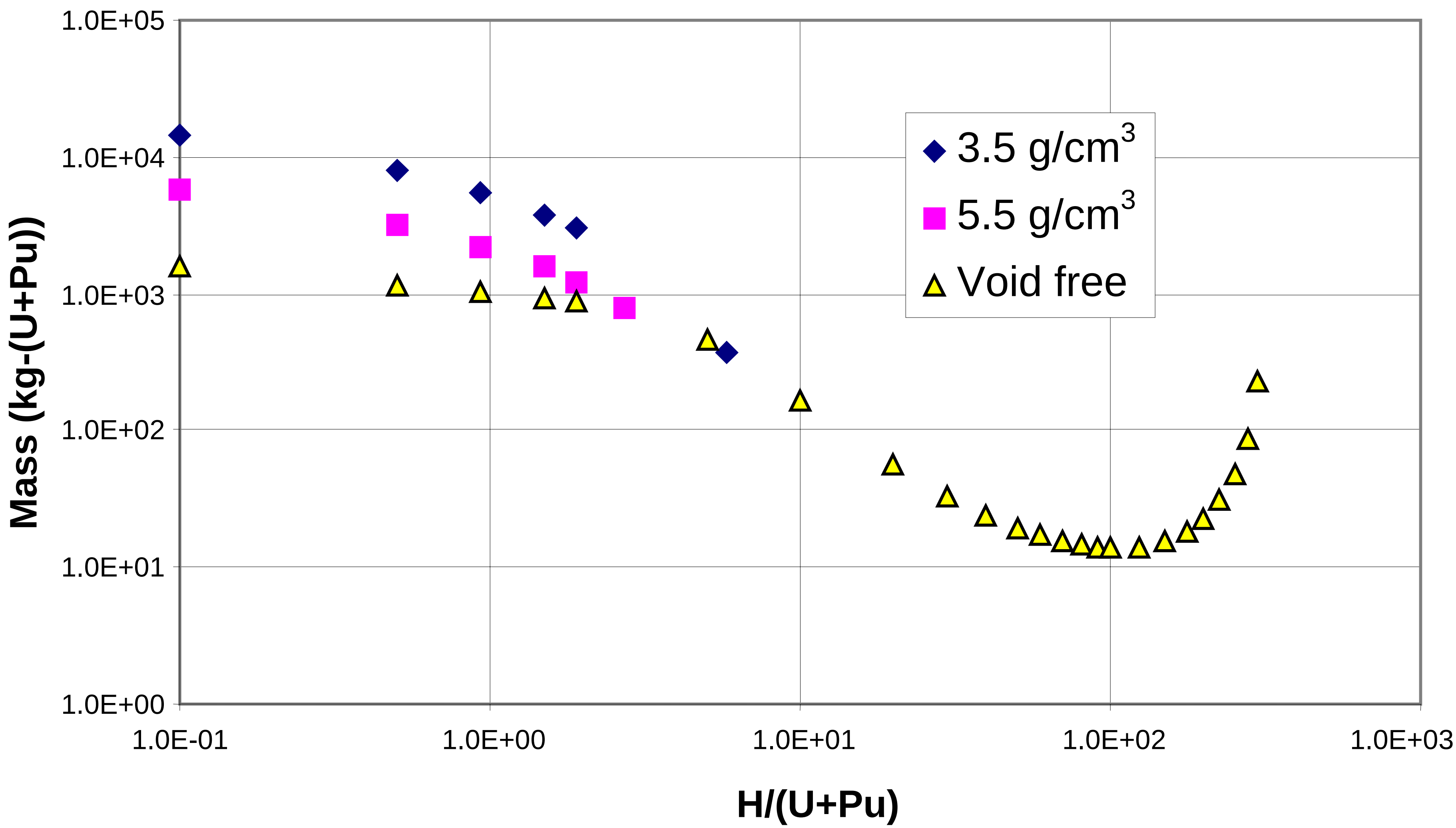

Fig. A.3.d.4. U + Pu mass [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

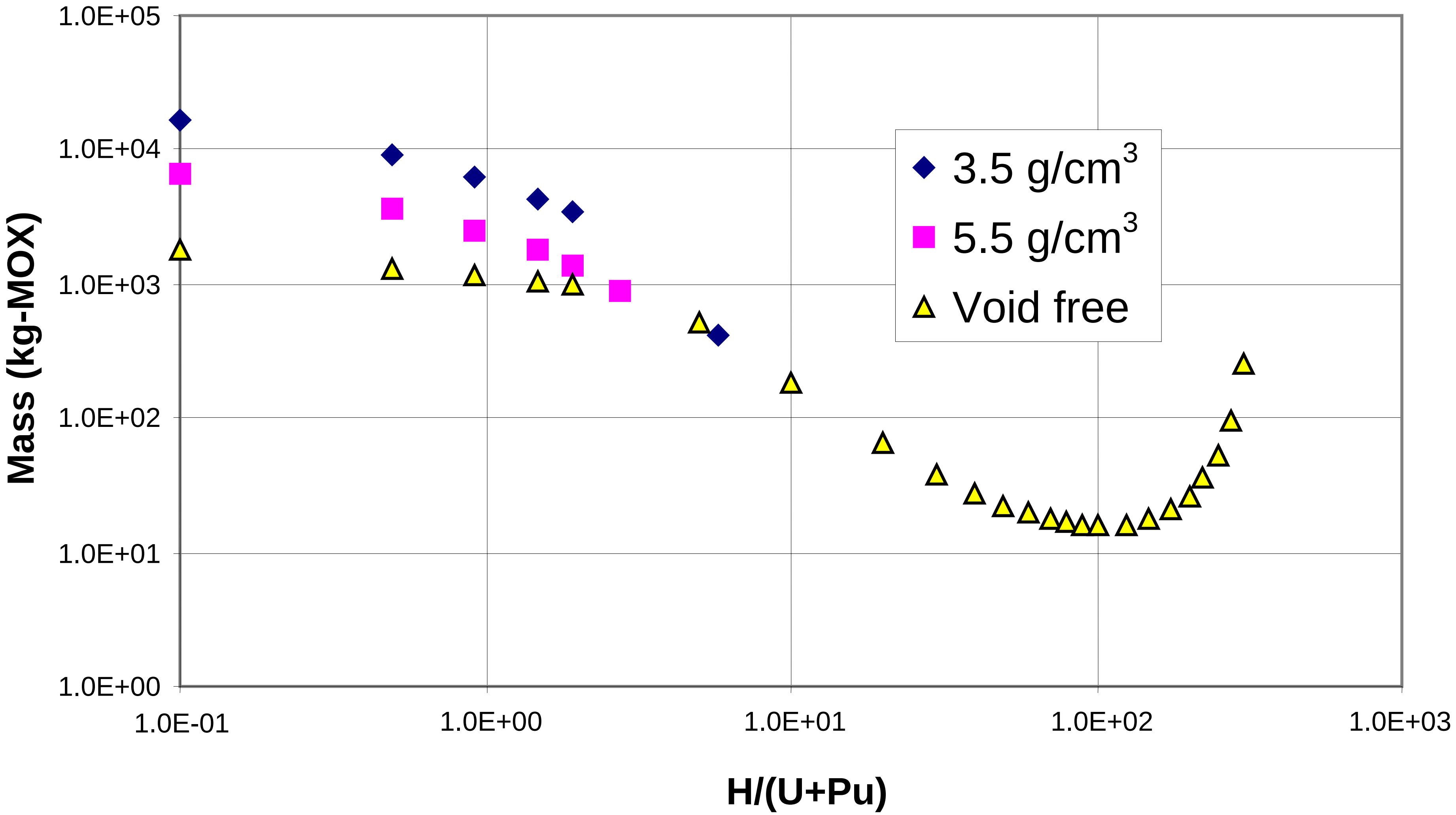

Fig. A.3.d.5. MOX mass [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

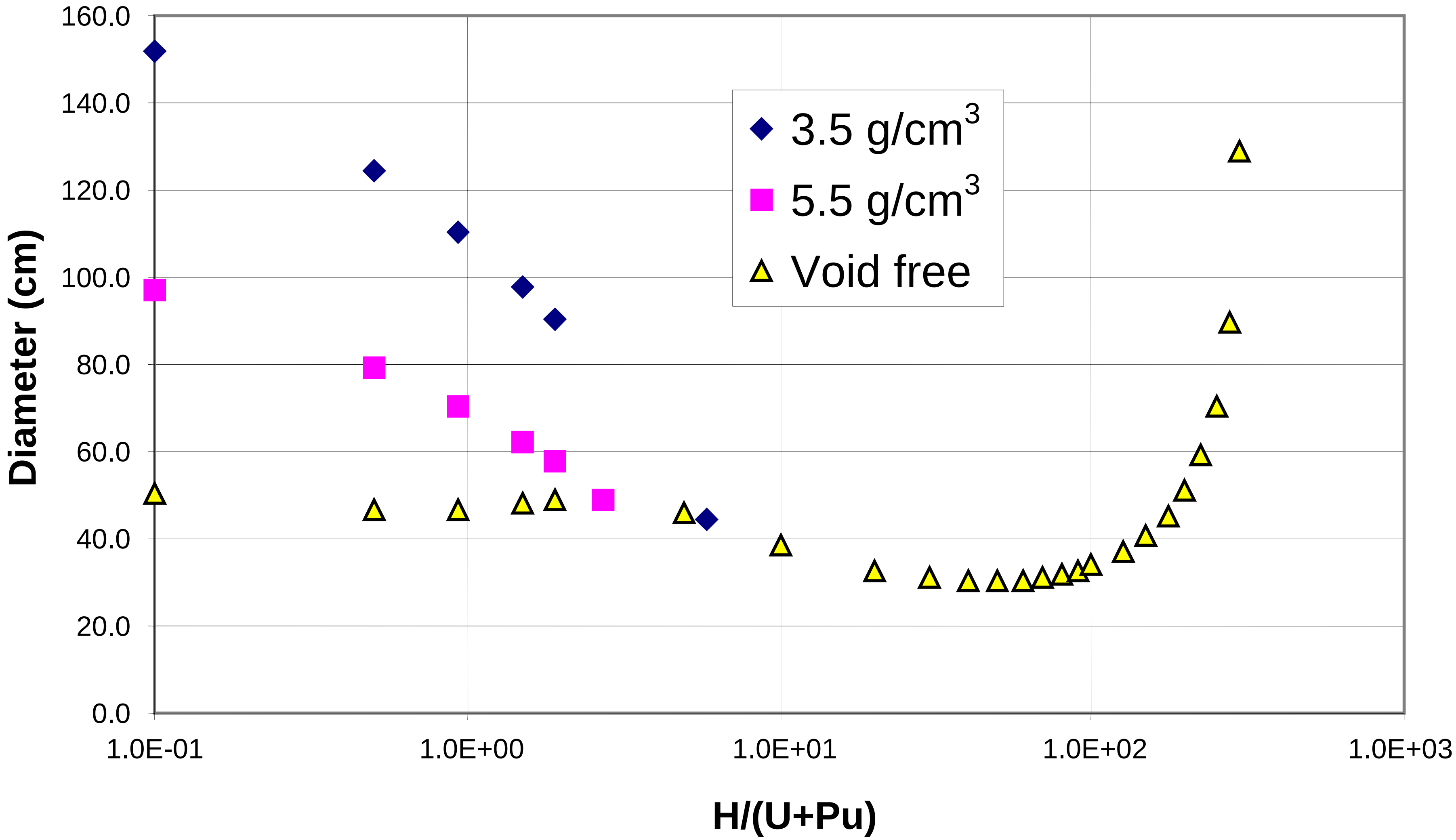

Fig. A.3.d.6. Cylinder diameter [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

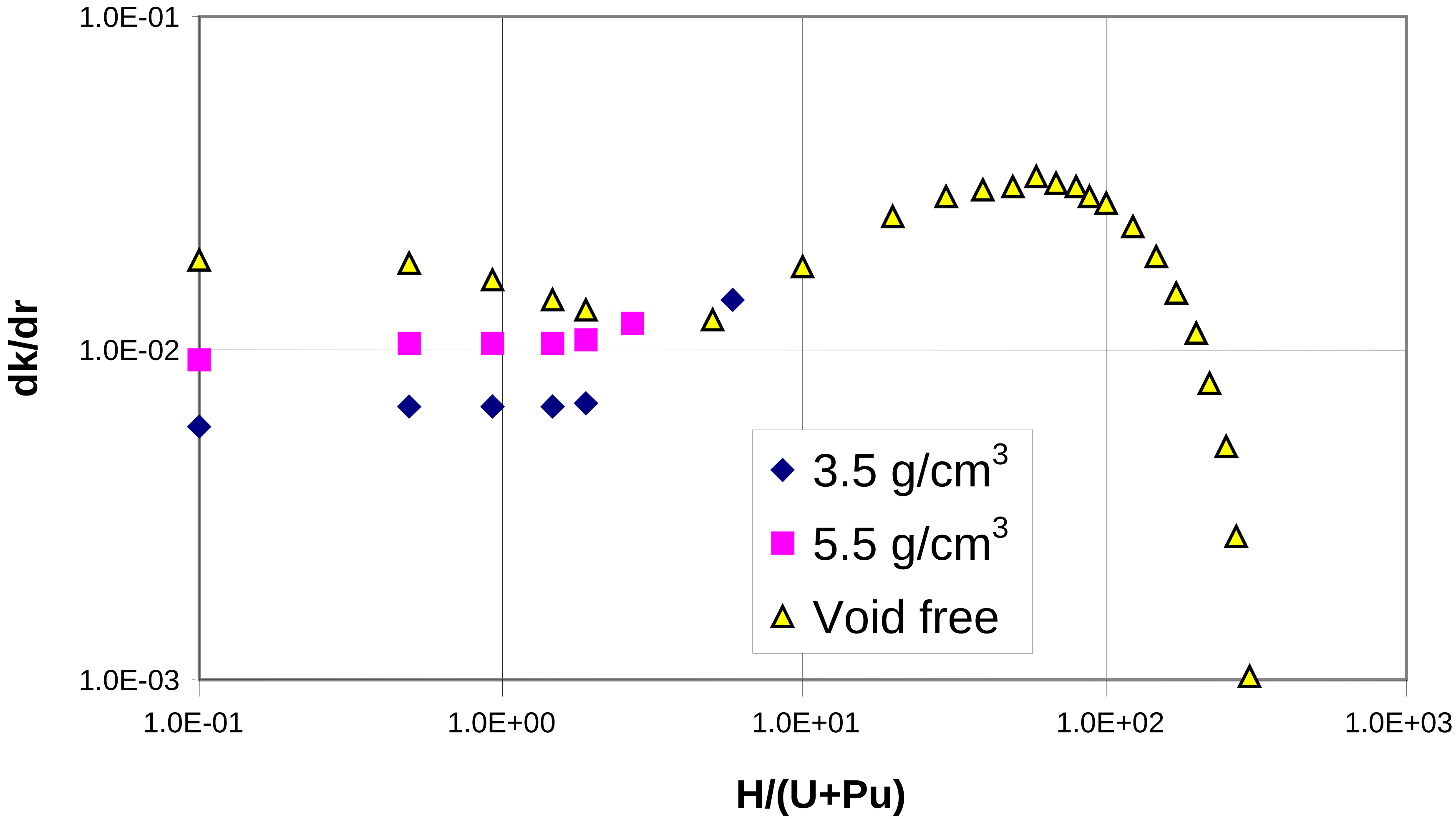

Fig. A.3.d.7. Delta lambda divided by delta dimension [cylinder, ^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

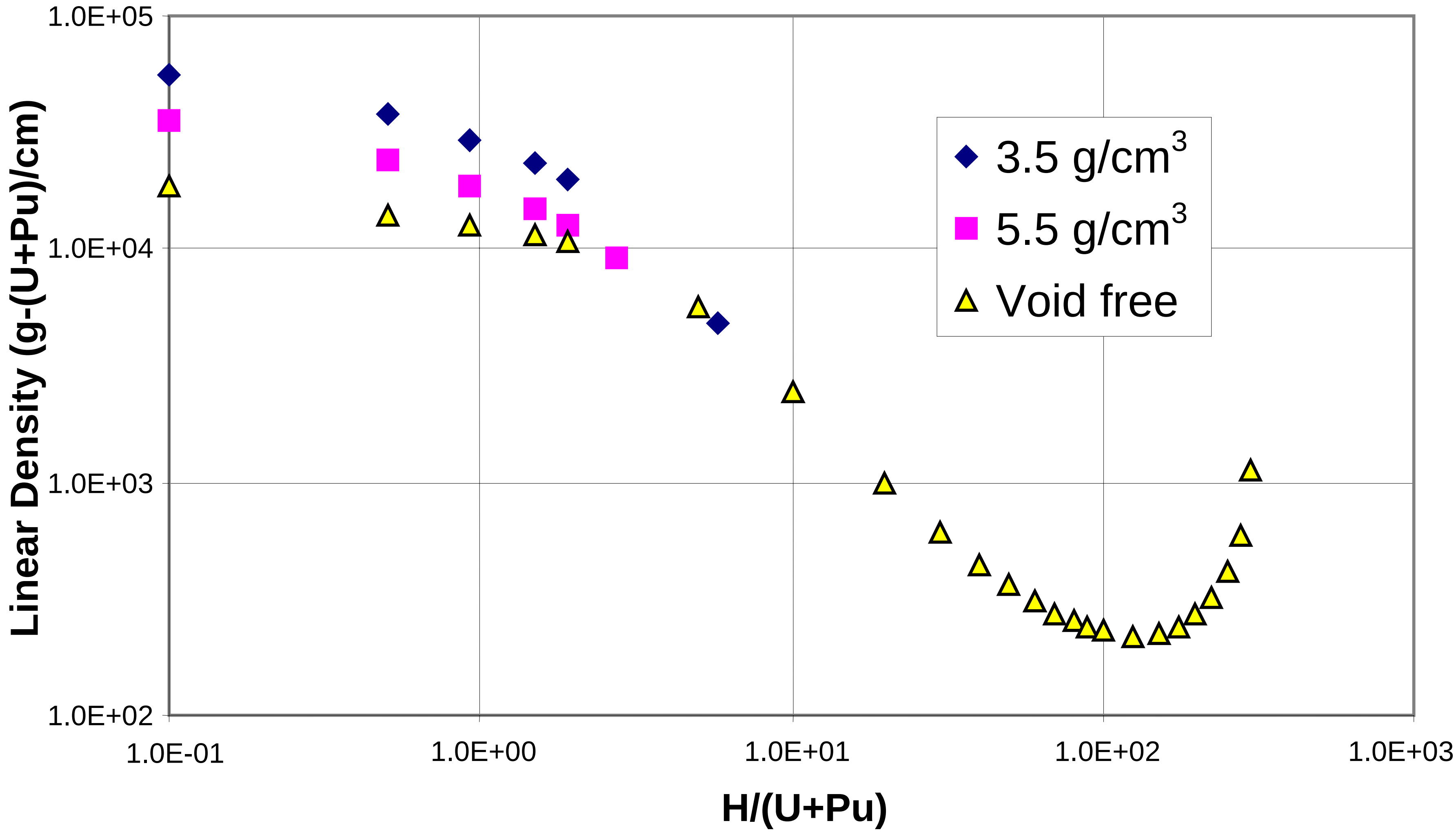

Fig. A.3.d.8. Linear density [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

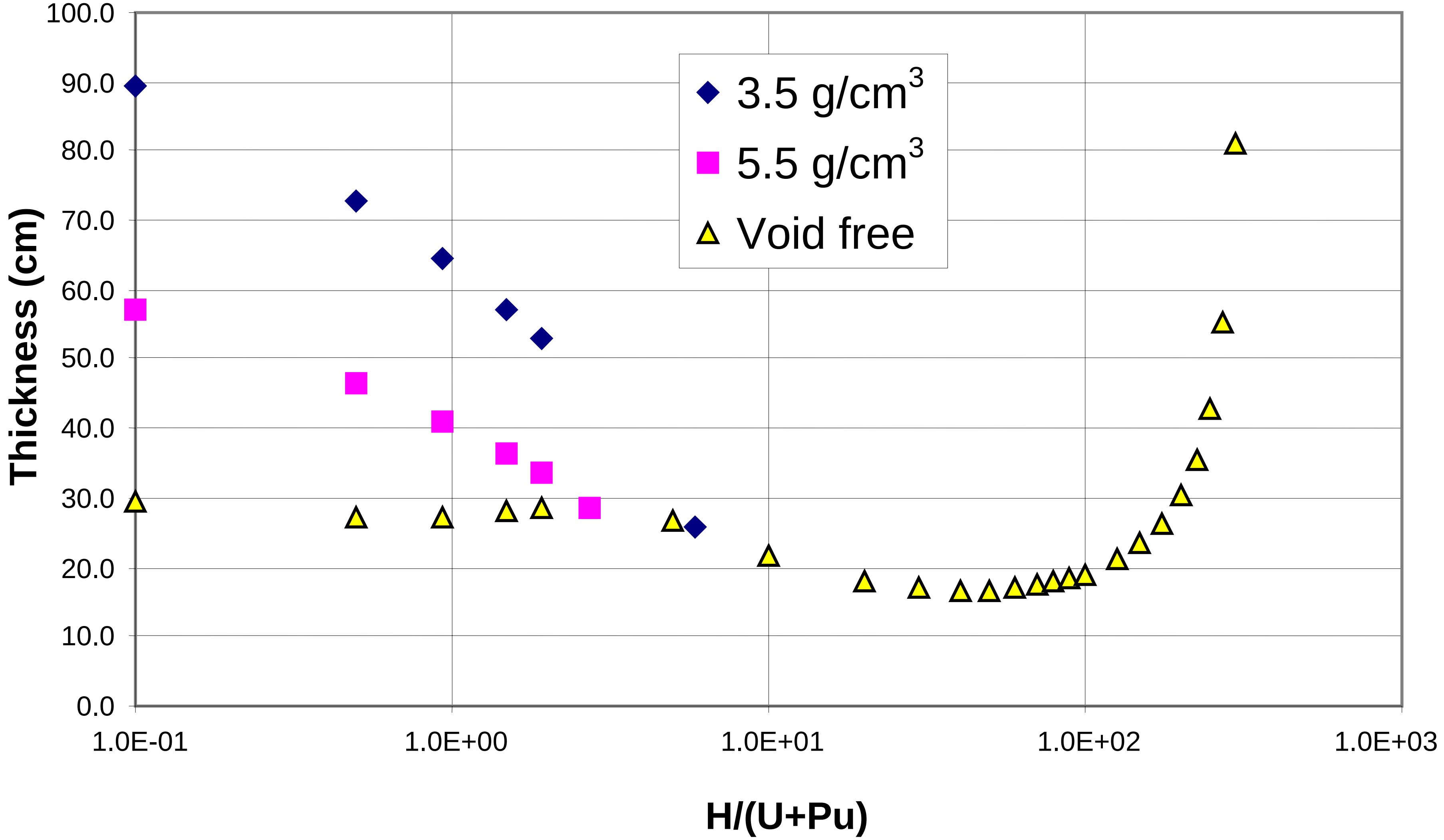

Fig. A.3.d.9. Slab thickness [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

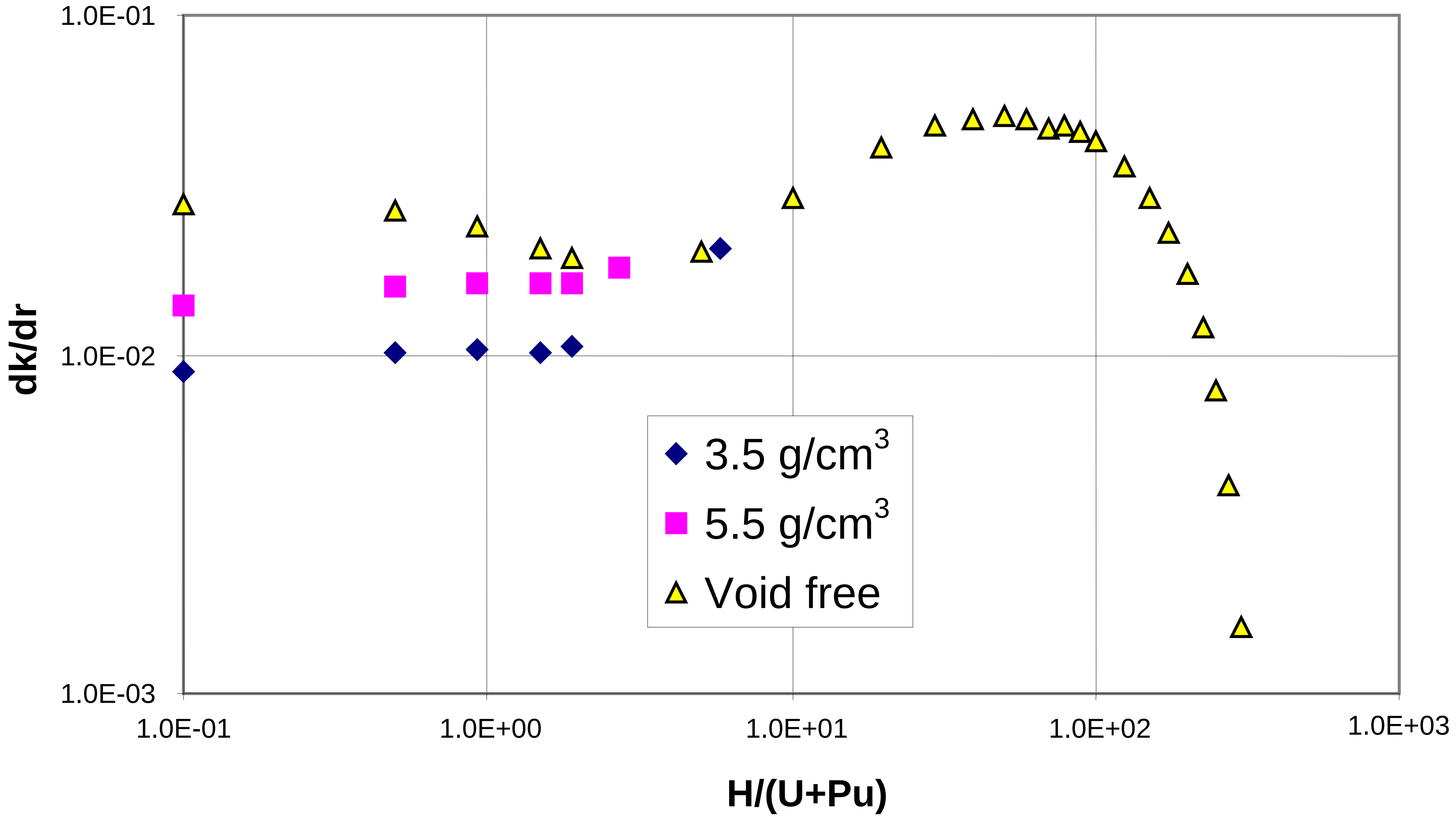

Fig. A.3.d.10. Delta lambda divided by delta dimension [slab, $^{235}U/U$ = 0.3%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

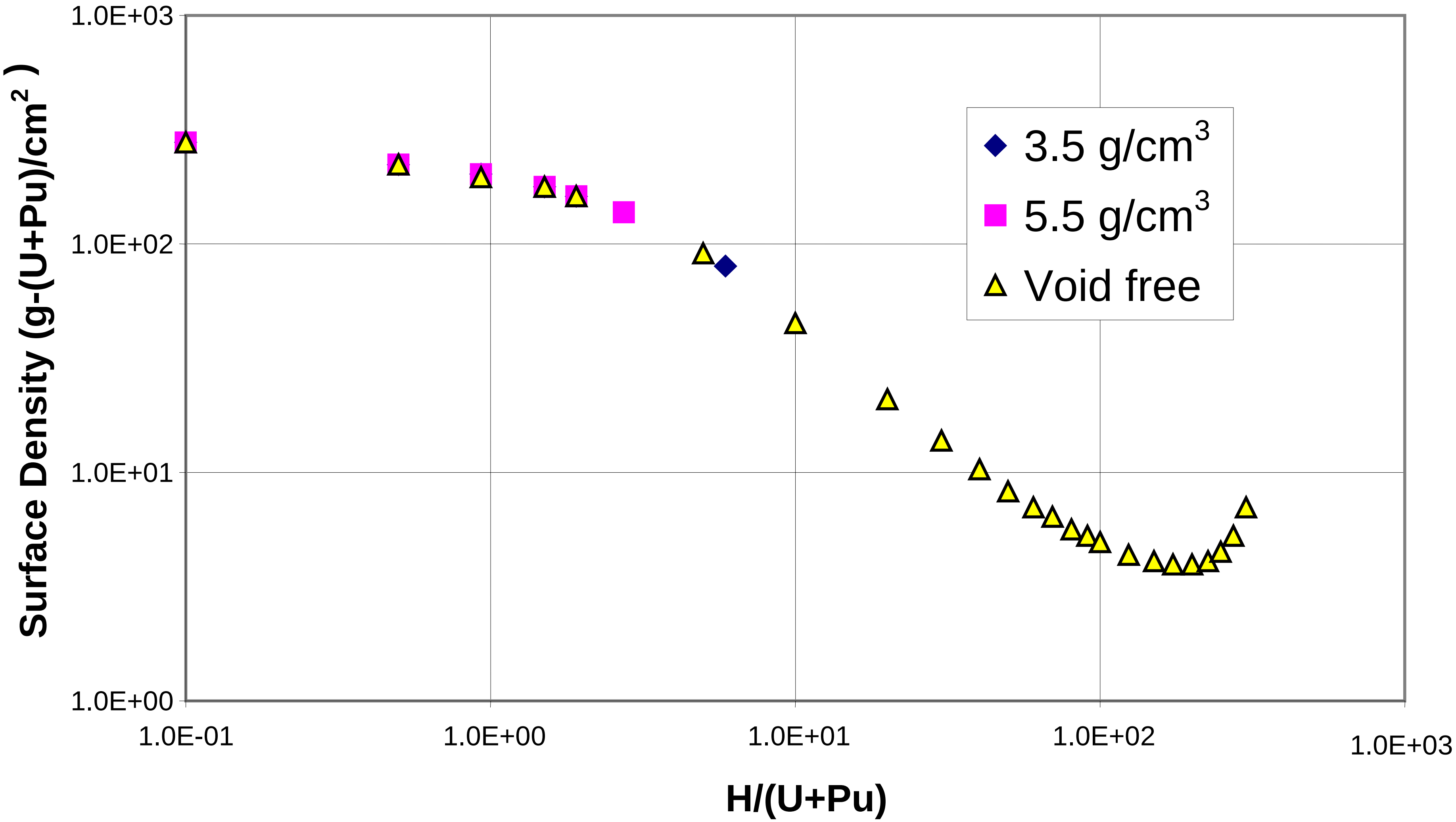

Fig. A.3.d.11. Surface density [^{235}U/U = 0.3%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

APPENDIX A.4

DATA PLOTS

(^{235}U/U = <u>0.718%</u>, ^{239}Pu/Pu = <u>100%</u>)

APPENDIX A.4

DATA PLOTS (^{235}U/U = <u>0.718%</u>, ^{239}Pu/Pu = <u>100%</u>)

(a) Plutonium weight percentages: <u>35%</u> and density: <u>3.5 g/cm^3</u>

(b) Plutonium weight percentages: 12.5% and density: void-free

Table A.4.b.1. MOX data [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Table A.4.b.2. MOX data [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Figure A.4.b.1. *k*-infinity [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.4.b.2. B_m^2 [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.4.b.3. Sphere radius [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.4.b.4. Sphere volume [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.4.b.5. U + Pu mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.4.b.6. MOX mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.4.b.7. Cylinder diameter [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.4.b.8. Linear density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.4.b.9. Slab thickness [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.4.b.10. Surface density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.4.b.11. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 30.0 cm]

Figure A.4.b.12. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 2.5 cm]

(c) Plutonium weight percentages: <u>12.5%</u>, density: <u>3.5 and 5.5 g/cm^3</u> and water reflector: <u>30 cm</u>

Table A.4.c.1.	MOX data [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]
Table A.4.c.2.	MOX data [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]
Figure A.4.c.1.	*k*-infinity [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%]
Figure A.4.c.2.	B_m^2 [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%]
Figure A.4.c.3.	Sphere radius [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]
Figure A.4.c.4.	Delta lambda divided by delta dimension [sphere, ^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]
Figure A.4.c.5.	Sphere volume [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]
Figure A.4.c.6.	U + Pu mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]
Figure A.4.c.7.	MOX mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]
Figure A.4.c.8.	Cylinder diameter [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]
Figure A.4.c.9.	Delta lambda divided by delta dimension [cylinder, ^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]
Figure A.4.c.10.	Linear density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]
Figure A.4.c.11.	Slab thickness [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]
Figure A.4.c.12.	Delta lambda divided by delta dimension [slab, ^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]
Figure A.4.c.13.	Surface density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

(d) Plutonium weight percentages: <u>12.5%</u>, density: <u>3.5 and 5.5 g/cm^3</u> and water reflector: <u>2.5 cm</u>

Table A.4.a.1. MOX data [$^{235}U/U$ = 0.718%, $^{239}Pu/Pu$ = 100%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	99.282	100.000	0.000	0.000	0.000

Maximum fissile material oxide density = 3.5 g (UO_2 + PuO_2)/cm^3

Water reflector 30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 35 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08579	3.49999	2.13643	2.908E-03	33.193	1.632E-02	153.189	472.710	536.161	42.427	2.185E-02	4362.637	16.463	3.531E-02	50.801
0.5	1.64	3.08579	3.49999	1.93073	3.601E-03	30.553	1.754E-02	119.465	368.645	418.128	39.127	2.340E-02	3710.341	15.146	3.747E-02	46.736
0.928	3.00	3.08579	3.49999	1.84243	4.548E-03	27.802	1.941E-02	90.016	277.772	315.057	35.668	2.583E-02	3083.251	13.788	4.094E-02	42.547
1.5	4.76	3.08579	3.49999	1.78055	6.018E-03	24.721	2.212E-02	63.284	195.280	221.493	31.750	2.939E-02	2443.175	12.219	4.624E-02	37.705
1.916	6.00	3.08579	3.49999	1.75286	7.223E-03	22.868	2.416E-02	50.092	154.573	175.321	29.380	3.207E-02	2092.020	11.255	5.031E-02	34.729
5.88	16.38	3.08579	3.49999	1.67351	2.449E-02	13.447	4.250E-02	10.186	31.430	35.649	17.275	5.659E-02	723.282	6.290	9.226E-02	19.410
10	24.99	2.08461	2.36443	1.66631	2.465E-02	13.370	4.274E-02	10.012	20.871	23.673	17.189	5.710E-02	483.732	6.305	9.465E-02	13.143
20	39.99	1.16610	1.32263	1.68221	2.534E-02	13.169	4.448E-02	9.565	11.154	12.652	16.955	5.962E-02	263.273	6.320	9.976E-02	7.369
30	49.99	0.80944	0.91809	1.70027	2.591E-02	13.047	4.598E-02	9.303	7.530	8.541	16.831	6.171E-02	180.087	6.362	1.036E-01	5.149
40	57.13	0.61986	0.70306	1.71424	2.629E-02	12.991	4.708E-02	9.183	5.692	6.456	16.796	6.648E-02	137.337	6.432	1.060E-01	3.987
50	62.49	0.50223	0.56964	1.72422	2.655E-02	12.974	4.784E-02	9.147	4.594	5.211	16.814	6.757E-02	111.513	6.519	1.078E-01	3.274
60	66.65	0.42212	0.47878	1.73087	2.664E-02	13.004	4.827E-02	9.210	3.888	4.410	16.893	6.819E-02	94.616	6.630	1.089E-01	2.799
70	69.99	0.36405	0.41292	1.73486	2.666E-02	13.051	4.851E-02	9.311	3.390	3.845	16.996	6.853E-02	82.595	6.748	1.095E-01	2.457
80	72.72	0.32003	0.36299	1.73667	2.662E-02	13.116	4.859E-02	9.452	3.025	3.431	17.123	6.862E-02	73.697	6.875	1.096E-01	2.200
90	74.99	0.28551	0.32383	1.73671	2.651E-02	13.197	4.850E-02	9.626	2.748	3.117	17.269	6.851E-02	66.872	7.009	1.094E-01	2.001
100	76.91	0.25770	0.29229	1.73532	2.637E-02	13.289	4.831E-02	9.830	2.533	2.873	17.431	6.825E-02	61.493	7.149	1.089E-01	1.842
150	83.33	0.17332	0.19658	1.71392	2.521E-02	13.865	4.907E-02	11.166	1.935	2.195	18.387	6.536E-02	46.021	7.897	1.041E-01	1.369
200	86.95	0.13057	0.14810	1.67947	2.372E-02	14.564	4.598E-02	12.939	1.689	1.916	19.501	6.116E-02	38.999	8.701	9.708E-02	1.136
250	89.28	0.10473	0.11879	1.63959	2.212E-02	15.342	4.254E-02	15.126	1.584	1.797	20.722	5.649E-02	35.320	9.551	8.936E-02	1.000
275	90.16	0.09530	0.10809	1.61877	2.131E-02	15.756	4.076E-02	16.385	1.562	1.771	21.367	5.410E-02	34.173	9.993	8.546E-02	0.952
300	90.90	0.08743	0.09917	1.59771	2.051E-02	16.187	3.900E-02	17.765	1.553	1.762	22.035	5.172E-02	33.340	10.446	8.155E-02	0.913
350	92.10	0.07504	0.08511	1.55558	1.894E-02	17.096	3.551E-02	20.928	1.570	1.781	23.439	4.702E-02	32.379	11.390	7.388E-02	0.855
400	93.02	0.06572	0.07454	1.51410	1.743E-02	18.074	3.213E-02	24.733	1.625	1.844	24.945	4.251E-02	32.119	12.395	6.656E-02	0.815
500	94.34	0.05265	0.05972	1.43477	1.461E-02	20.269	2.586E-02	34.878	1.836	2.083	28.310	3.413E-02	33.141	14.578	5.334E-02	0.768
550	94.82	0.04788	0.05431	1.39728	1.330E-02	21.513	2.299E-02	41.706	1.997	2.265	30.214	3.030E-02	34.328	15.825	4.719E-02	0.758
600	95.24	0.04391	0.04980	1.36132	1.205E-02	22.872	2.029E-02	50.118	2.201	2.496	32.291	2.671E-02	35.959	17.158	4.159E-02	0.753
650	95.59	0.04055	0.04599	1.32688	1.087E-02	24.371	1.776E-02	60.634	2.459	2.789	34.581	2.336E-02	38.086	18.652	3.628E-02	0.756
700	95.89	0.03766	0.04272	1.29391	9.744E-03	26.047	1.541E-02	74.019	2.788	3.162	37.140	2.025E-02	40.799	20.299	3.140E-02	0.764
800	96.38	0.03297	0.03740	1.23221	7.659E-03	30.075	1.118E-02	113.950	3.757	4.261	43.292	1.468E-02	48.531	24.276	2.270E-02	0.800
900	96.772	0.02932	0.03326	1.17569	5.767E-03	35.492	7.600E-03	187.269	5.491	6.228	51.5636	9.974E-03	61.227	29.638	1.537E-02	0.869
1000	97.086	0.02639	0.02993	1.12384	4.045E-03	43.460	4.624E-03	343.836	9.074	10.292	63.7374	6.078E-03	84.201	37.541	9.339E-03	0.991
1250	97.655	0.02109	0.02392	1.01161												
1275	97.700	0.02068	0.02346	1.00158												
1277	97.703	0.02065	0.02342	1.00078												
1278	97.705	0.02063	0.02340	1.00040												
1279	97.707	0.02062	0.02339	0.99999												
1280	97.709	0.02060	0.02337	0.99958												
1285	97.717	0.02052	0.02327	0.99762												
1290	97.726	0.02044	0.02318	0.99564												
1300	97.743	0.02028	0.02300	0.99173												
1325	97.785	0.01990	0.02257	0.98207												
1350	97.825	0.01954	0.02216	0.97261												
1500	98.038	0.01758	0.01994	0.91927												

Table A.4.a.2. MOX data [$^{235}U/U$ = 0.718%, $^{239}Pu/Pu$ = 100%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	99.282	100.000	0.000	0.000	0.000

Maximum fissile material oxide density = 3.5 g (UO_2 + PuO_2)/cm^3

Water reflector 2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 35 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08579	3.49999	2.13643	2.908E-03	44.368	1.779E-02	365.853	1128.946	1280.485	62.055	2.336E-02	9332.814	32.377	3.650E-02	99.907
0.5	1.64	3.08579	3.49999	1.93073	3.601E-03	40.106	1.881E-02	270.217	833.834	945.760	56.163	2.471E-02	7644.637	29.372	3.859E-02	90.637
0.928	3.00	3.08579	3.49999	1.84243	4.548E-03	35.831	2.048E-02	192.699	594.629	674.446	50.198	2.694E-02	6106.968	26.257	4.211E-02	81.024
1.5	4.76	3.08579	3.49999	1.78055	6.018E-03	31.253	2.184E-02	127.871	394.583	447.548	43.781	2.884E-02	4645.533	22.867	4.723E-02	70.562
1.916	6.00	3.08579	3.49999	1.75286	7.223E-03	28.575	2.354E-02	97.737	301.597	342.081	40.029	3.112E-02	3883.382	20.874	5.110E-02	64.412
5.88	16.38	3.08579	3.49999	1.67351	2.449E-02	15.717	4.148E-02	16.263	50.185	56.921	21.961	5.494E-02	1168.833	11.253	8.657E-02	34.726
10	24.99	2.08461	2.36443	1.66631	2.465E-02	15.603	4.154E-02	15.912	33.171	37.623	21.778	5.511E-02	776.531	11.137	8.719E-02	23.216
20	39.99	1.16610	1.32263	1.68221	2.534E-02	15.307	4.311E-02	15.022	17.517	19.868	21.331	5.729E-02	416.731	10.882	9.090E-02	12.689
30	49.99	0.80944	0.91809	1.70027	2.591E-02	15.104	4.455E-02	14.434	11.684	13.252	21.036	5.925E-02	281.309	10.728	9.403E-02	8.684
40	57.13	0.61986	0.70306	1.71424	2.629E-02	14.982	4.562E-02	14.087	8.732	9.904	20.862	6.070E-02	211.891	10.669	9.609E-02	6.613
50	62.49	0.50223	0.56964	1.72422	2.655E-02	14.909	4.637E-02	13.881	6.972	7.907	20.764	6.173E-02	170.058	**10.627**	9.776E-02	5.337
60	66.65	0.42212	0.47878	1.73087	2.664E-02	**14.894**	4.683E-02	**13.841**	5.842	6.627	**20.751**	6.234E-02	142.759	10.635	9.876E-02	4.489
70	69.99	0.36405	0.41292	1.73486	2.666E-02	14.902	4.709E-02	13.863	5.047	5.724	20.772	6.269E-02	123.374	10.664	9.932E-02	3.882
80	72.72	0.32003	0.36299	1.73667	2.662E-02	14.934	4.719E-02	13.951	4.465	5.064	20.829	6.281E-02	109.050	10.715	9.954E-02	3.429
90	74.99	0.28551	0.32383	1.73671	2.651E-02	14.984	4.714E-02	14.093	4.024	4.564	20.913	6.276E-02	98.075	10.783	9.944E-02	3.079
100	76.91	0.25770	0.29229	1.73532	2.637E-02	15.050	4.698E-02	14.280	3.680	4.174	21.021	6.254E-02	89.436	10.864	9.910E-02	2.800
150	83.33	0.17332	0.19658	1.71392	2.521E-02	15.531	4.726E-02	15.691	2.720	3.085	21.778	6.260E-02	64.564	11.400	9.797E-02	1.976
200	86.95	0.13057	0.14810	1.67947	2.372E-02	16.168	4.430E-02	17.702	2.311	2.622	22.766	5.864E-02	53.149	12.072	9.179E-02	1.576
250	89.28	0.10473	0.11879	1.63959	2.212E-02	16.904	4.142E-02	20.231	2.119	2.403	23.898	5.481E-02	46.978	12.831	8.557E-02	1.344
275	90.16	0.09530	0.10809	1.61877	2.131E-02	17.302	3.973E-02	21.695	2.068	2.345	24.509	5.253E-02	44.960	13.237	8.194E-02	1.261
300	90.90	0.08743	0.09917	1.59771	2.051E-02	17.718	3.759E-02	23.298	2.037	2.310	25.146	4.974E-02	43.421	13.659	7.752E-02	1.194
350	92.10	0.07504	0.08511	1.55558	1.894E-02	18.603	3.288E-02	26.969	**2.024**	**2.295**	26.501	4.527E-02	41.391	14.498	7.082E-02	1.088
400	93.02	0.06572	0.07454	1.51410	1.743E-02	19.565	3.106E-02	31.369	2.062	2.338	27.968	4.096E-02	40.374	15.459	6.393E-02	1.016
450	93.75	0.05846	0.06631	1.47375	1.598E-02	20.605	2.793E-02	36.645	2.142	2.430	29.556	3.683E-02	**40.109**	16.465	5.753E-02	0.963
500	94.34	0.05265	0.05972	1.43477	1.461E-02	21.733	2.498E-02	43.000	2.264	2.568	31.277	3.293E-02	40.452	17.584	5.132E-02	0.926
600	95.24	0.04391	0.04980	1.36132	1.205E-02	24.322	2.017E-02	60.266	2.646	3.001	35.223	2.653E-02	42.787	20.126	4.121E-02	0.884
650	95.59	0.04055	0.04599	1.32688	1.087E-02	25.816	1.767E-02	72.066	2.922	3.315	37.501	2.323E-02	44.788	21.604	3.602E-02	0.876
700	95.89	0.03766	0.04272	1.29391	9.744E-03	27.487	1.534E-02	86.993	3.276	3.716	40.050	2.015E-02	47.443	23.241	3.121E-02	**0.875**
750	96.15	0.03516	0.03988	1.26238	8.676E-03	29.366	1.317E-02	106.072	3.729	4.230	42.914	1.729E-02	50.856	25.087	2.675E-02	0.882
800	96.38	0.03297	0.03740	1.23221	7.659E-03	31.510	1.116E-02	131.047	4.321	4.901	46.187	1.464E-02	55.239	27.201	2.262E-02	0.897
900	96.772	0.02932	0.03326	1.17569	5.767E-03	36.924	7.600E-03	210.872	6.183	7.013	54.451	9.956E-03	68.276	32.552	1.534E-02	0.954
1000	97.086	0.02639	0.02993	1.12384	4.045E-03	44.893	4.644E-03	378.990	10.002	11.344	66.623	6.078E-03	91.998	40.446	9.335E-03	1.067
1250	97.655	0.02109	0.02392	1.01161												
1275	97.700	0.02068	0.02346	1.00158												
1277	97.703	0.02065	0.02342	1.00078												
1278	97.705	0.02063	0.02340	1.00040												
1279	**97.707**	**0.02062**	**0.02339**	**0.99999**												
1280	97.709	0.02060	0.02337	0.99958												
1285	97.717	0.02052	0.02327	0.99762												
1290	97.726	0.02044	0.02318	0.99564												
1300	97.743	0.02028	0.02300	0.99173												
1325	97.785	0.01990	0.02257	0.98207												
1350	97.825	0.01954	0.02216	0.97261												
1500	98.038	0.01758	0.01994	0.91927												

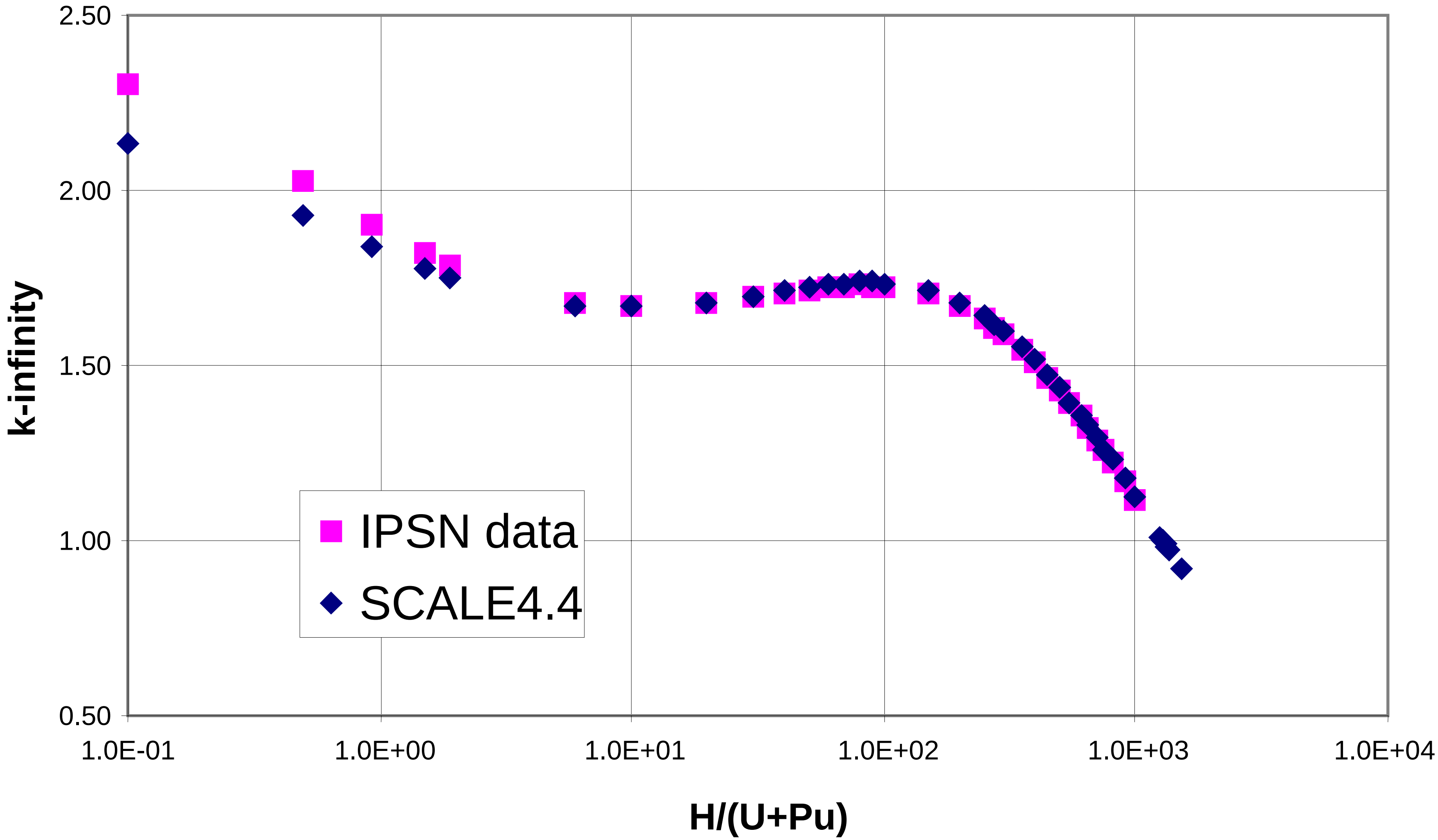

Fig. A.4.a.1. ***k*-infinity [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].**

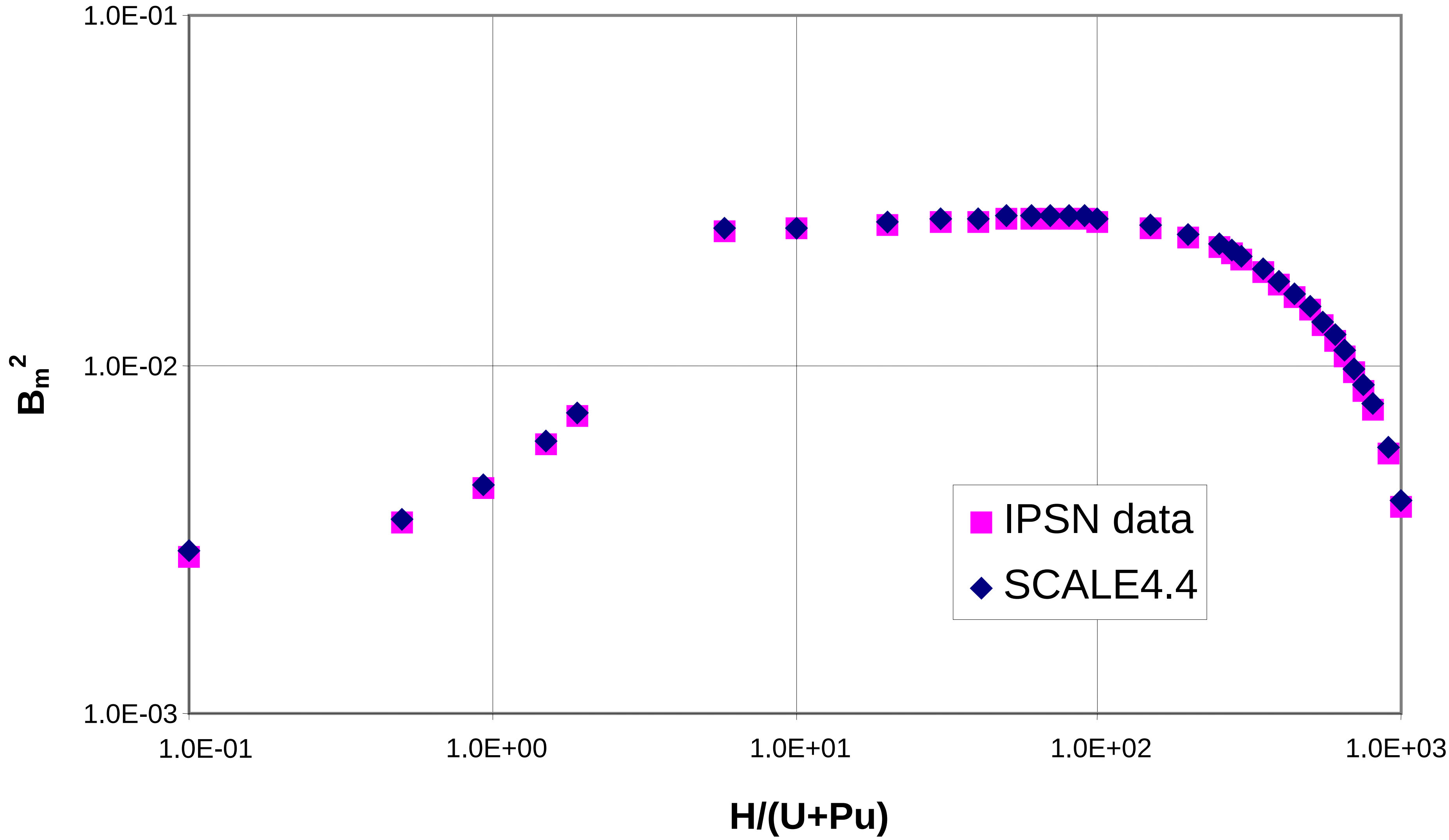

Fig. A.4.a.2. B_m^2 [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

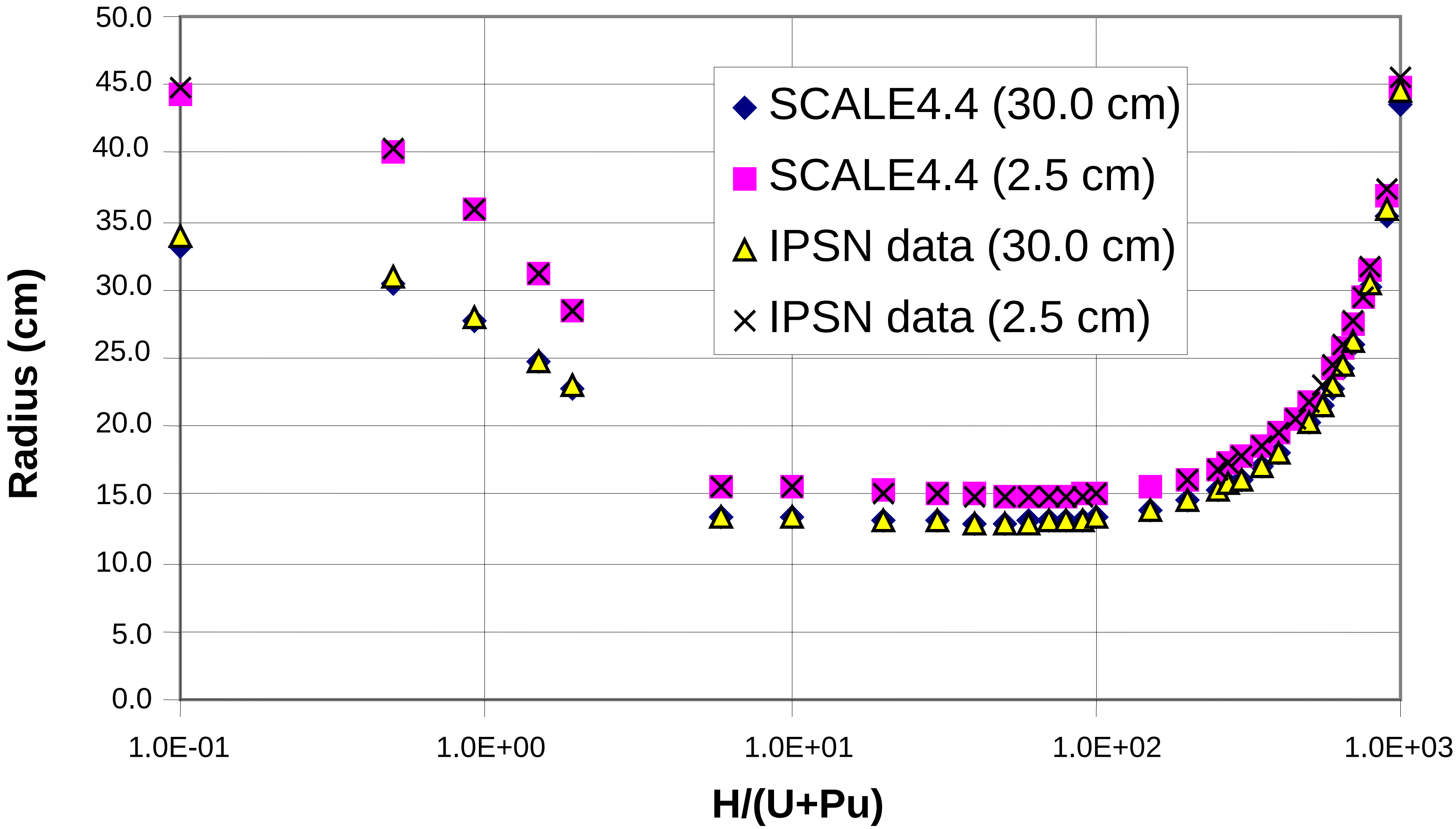

Fig. A.4.a.3. Sphere radius [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

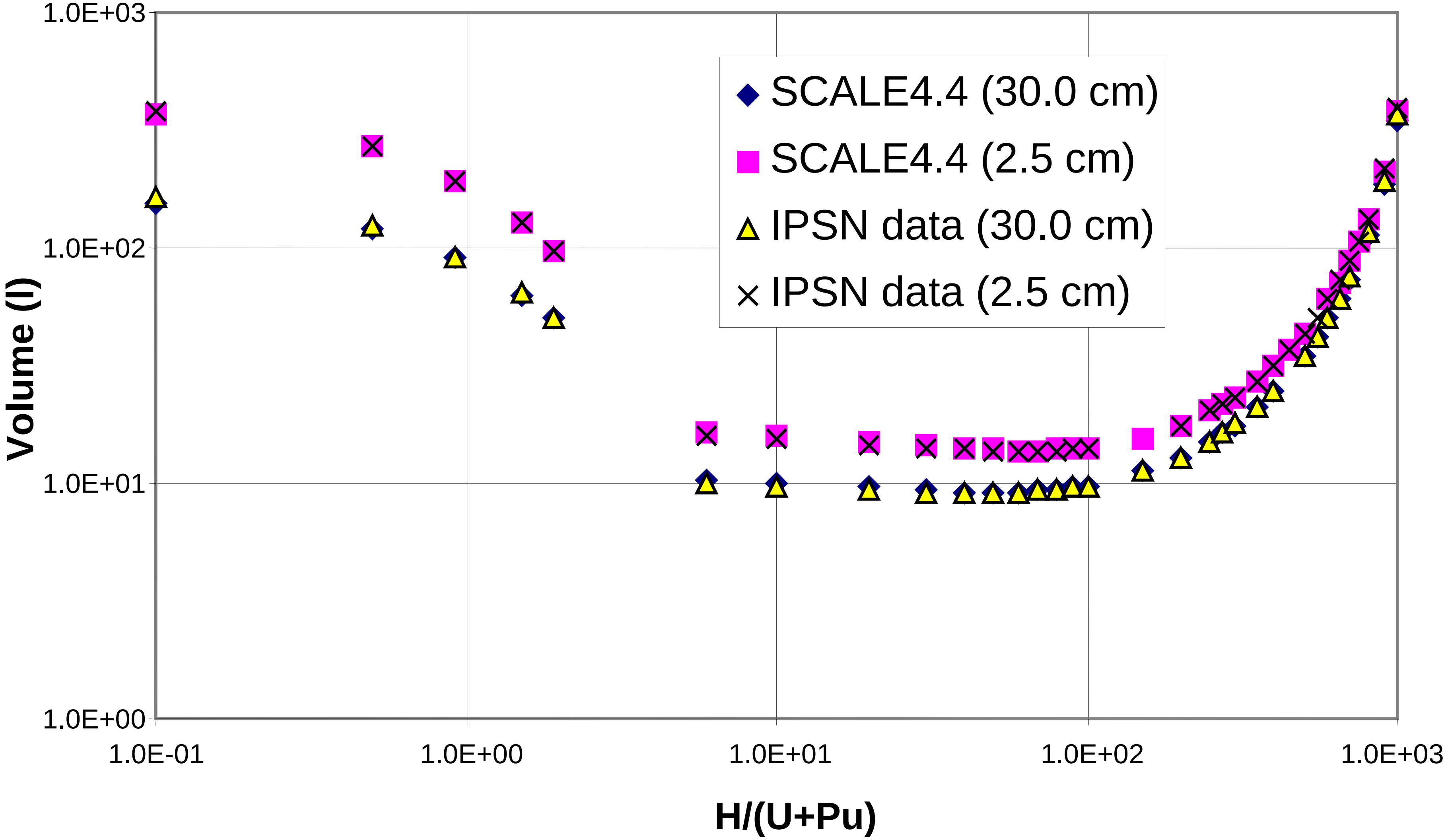

Fig. A.4.a.4. Sphere volume [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

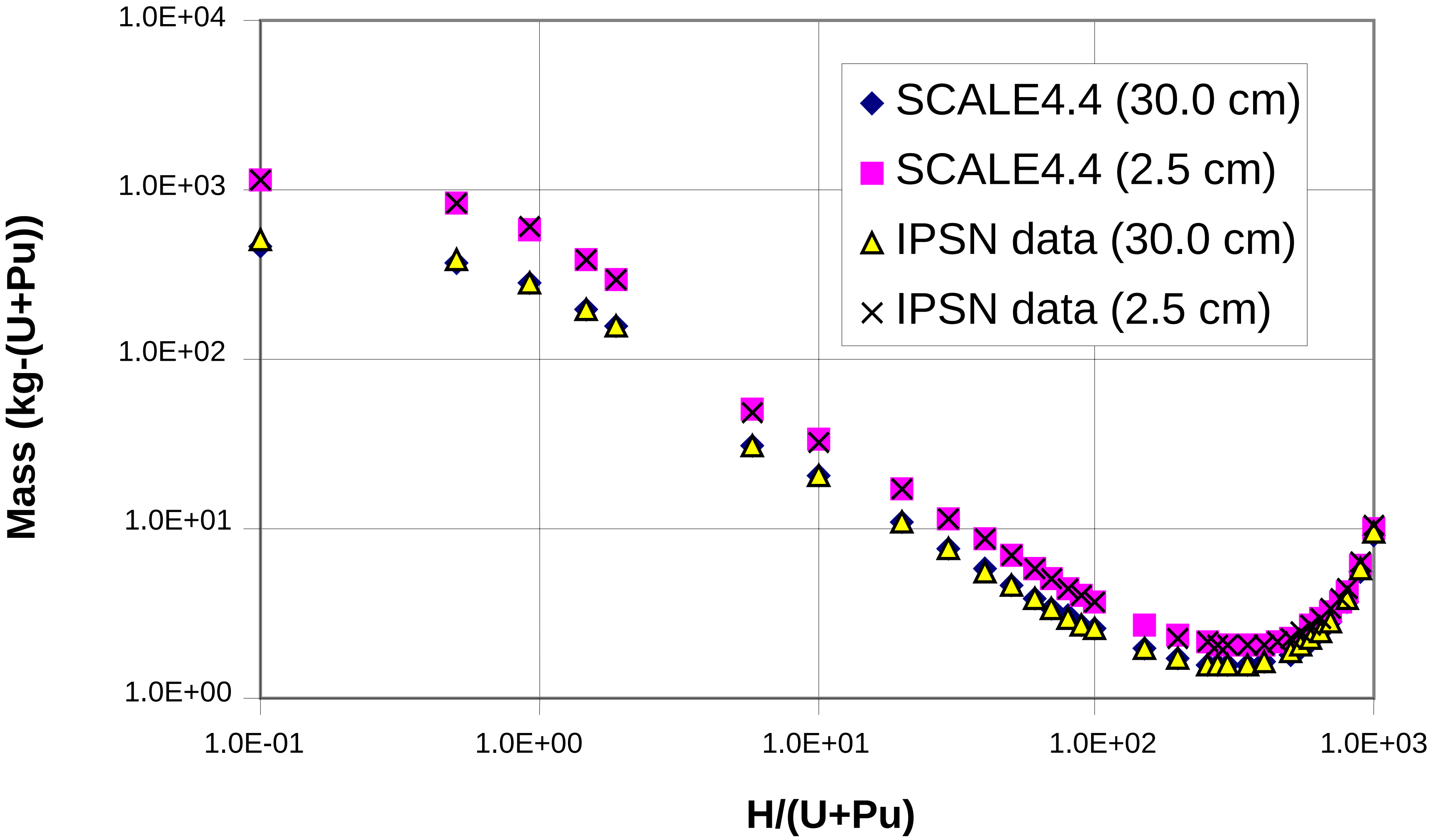

Fig. A.4.a.5. U + Pu mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

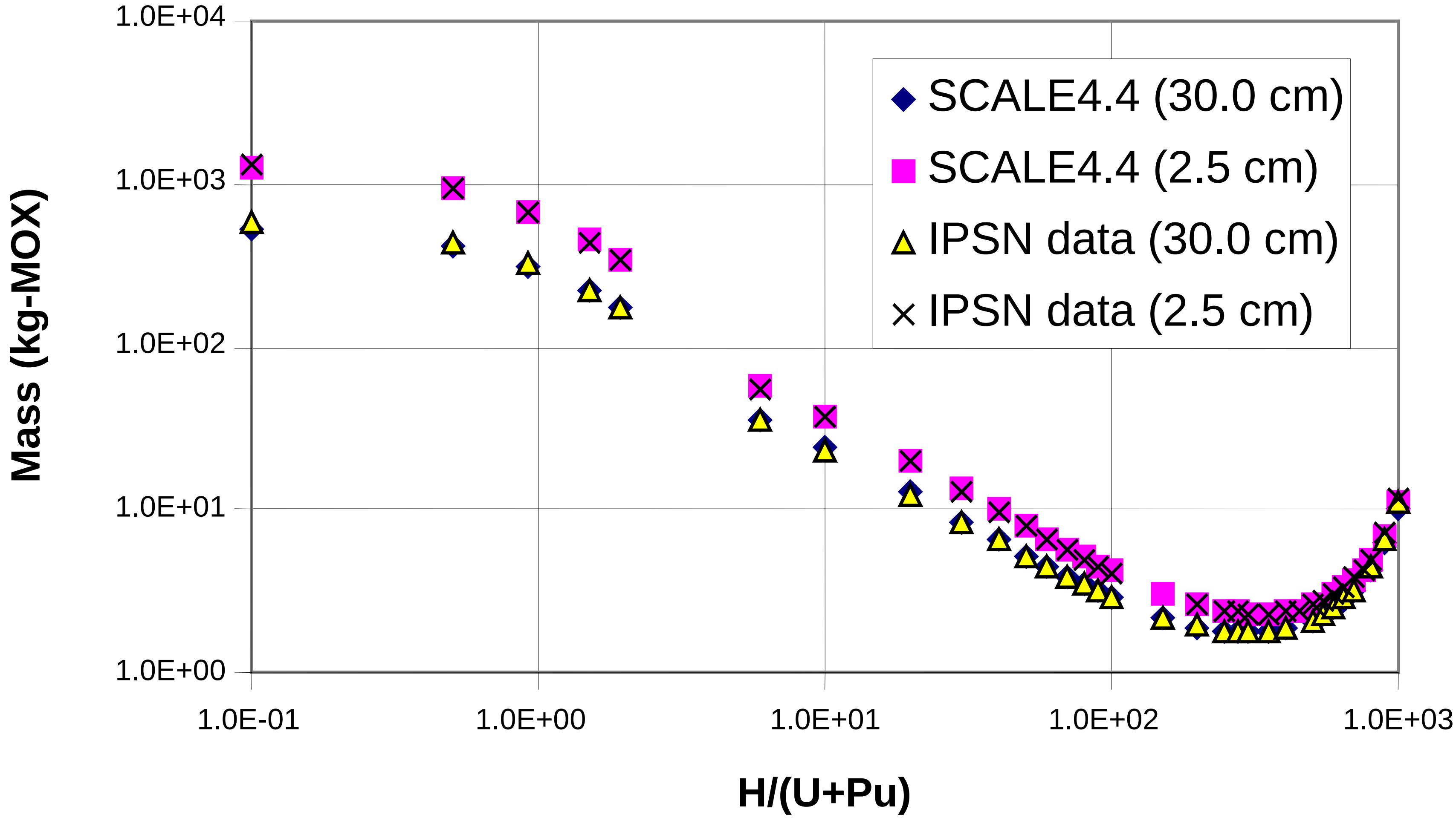

Fig. A.4.a.6. MOX mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

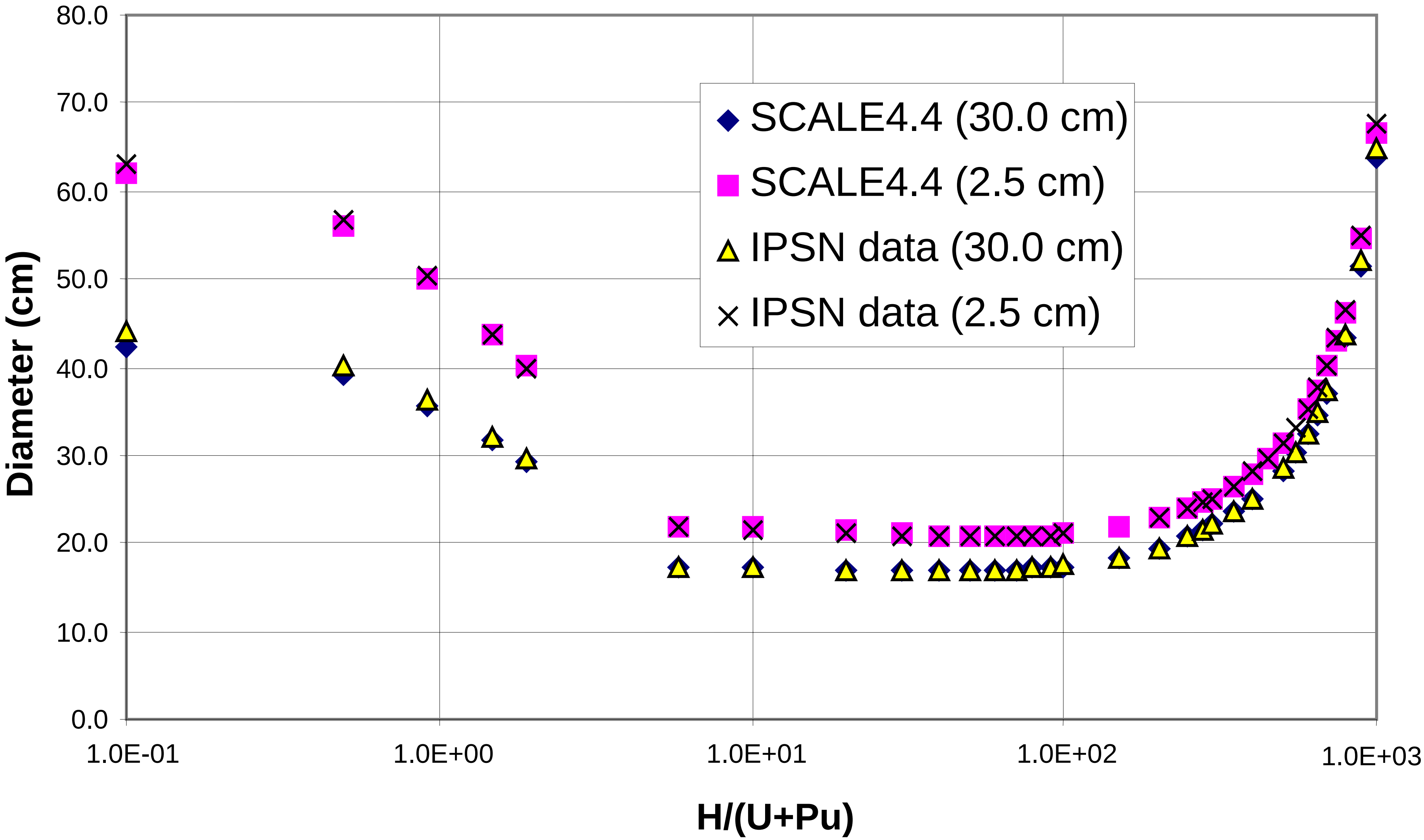

Fig. A.4.a.7. Cylinder diameter [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

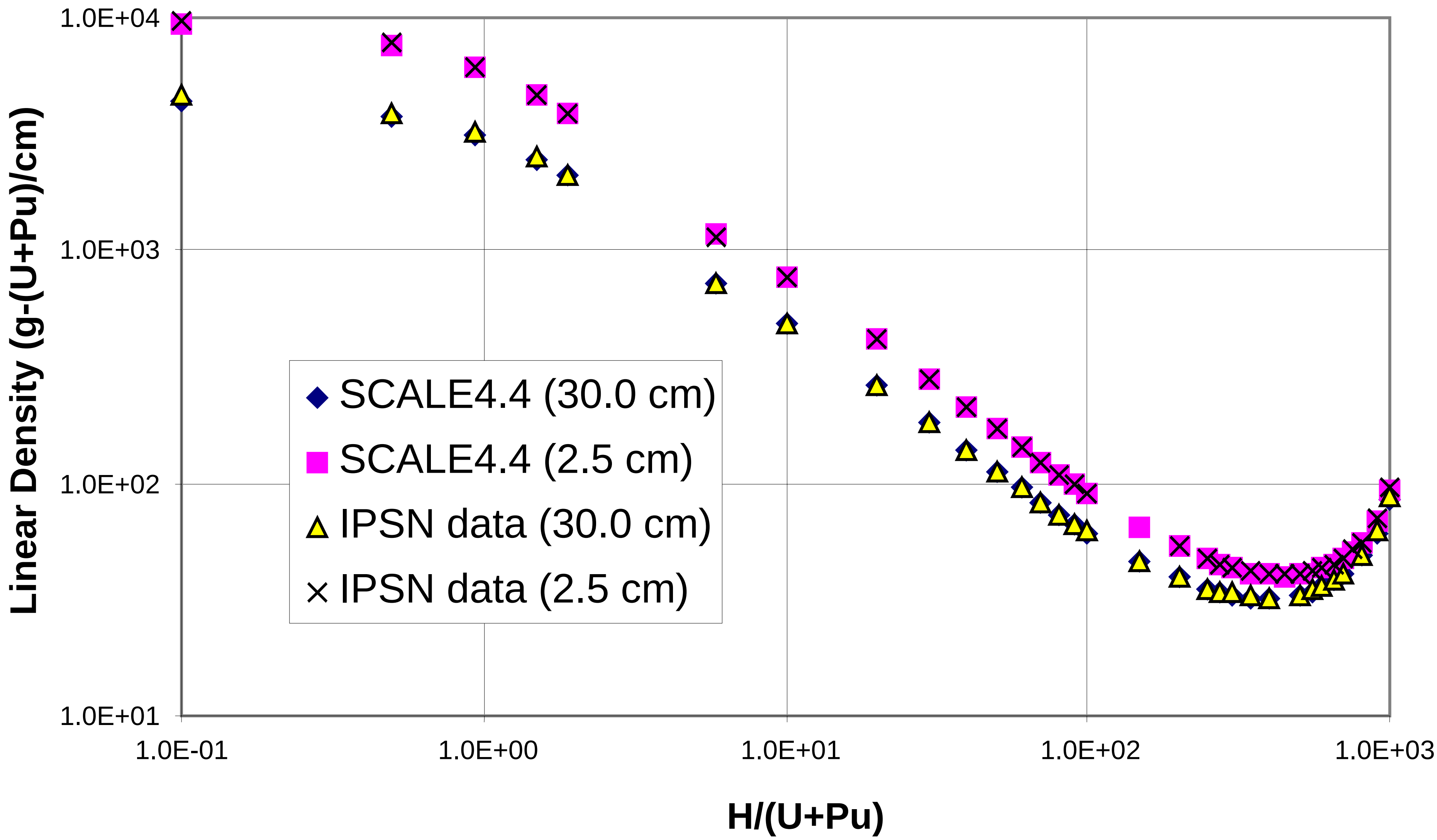

Fig. A.4.a.8. Linear density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

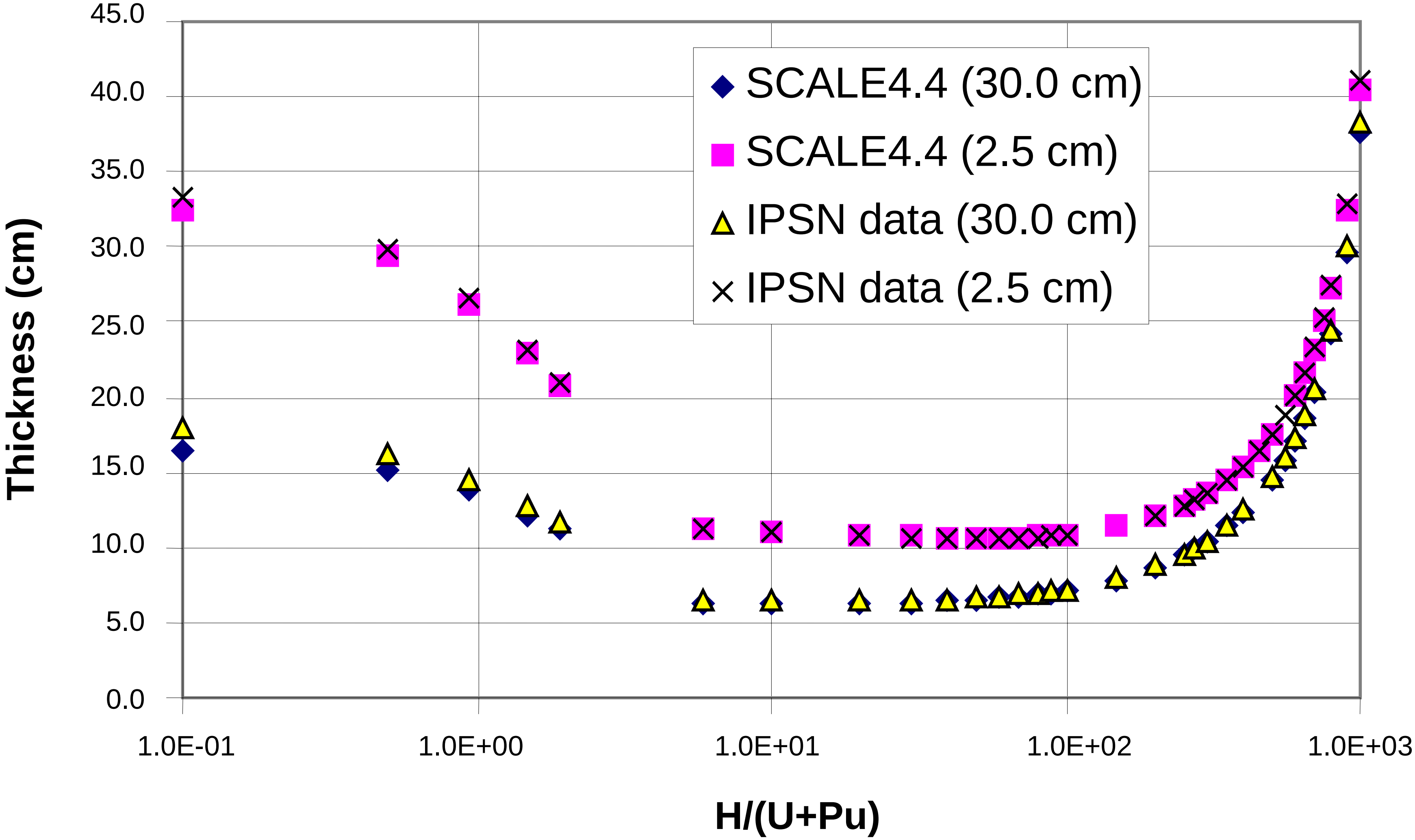

Fig. A.4.a.9. Slab thickness [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

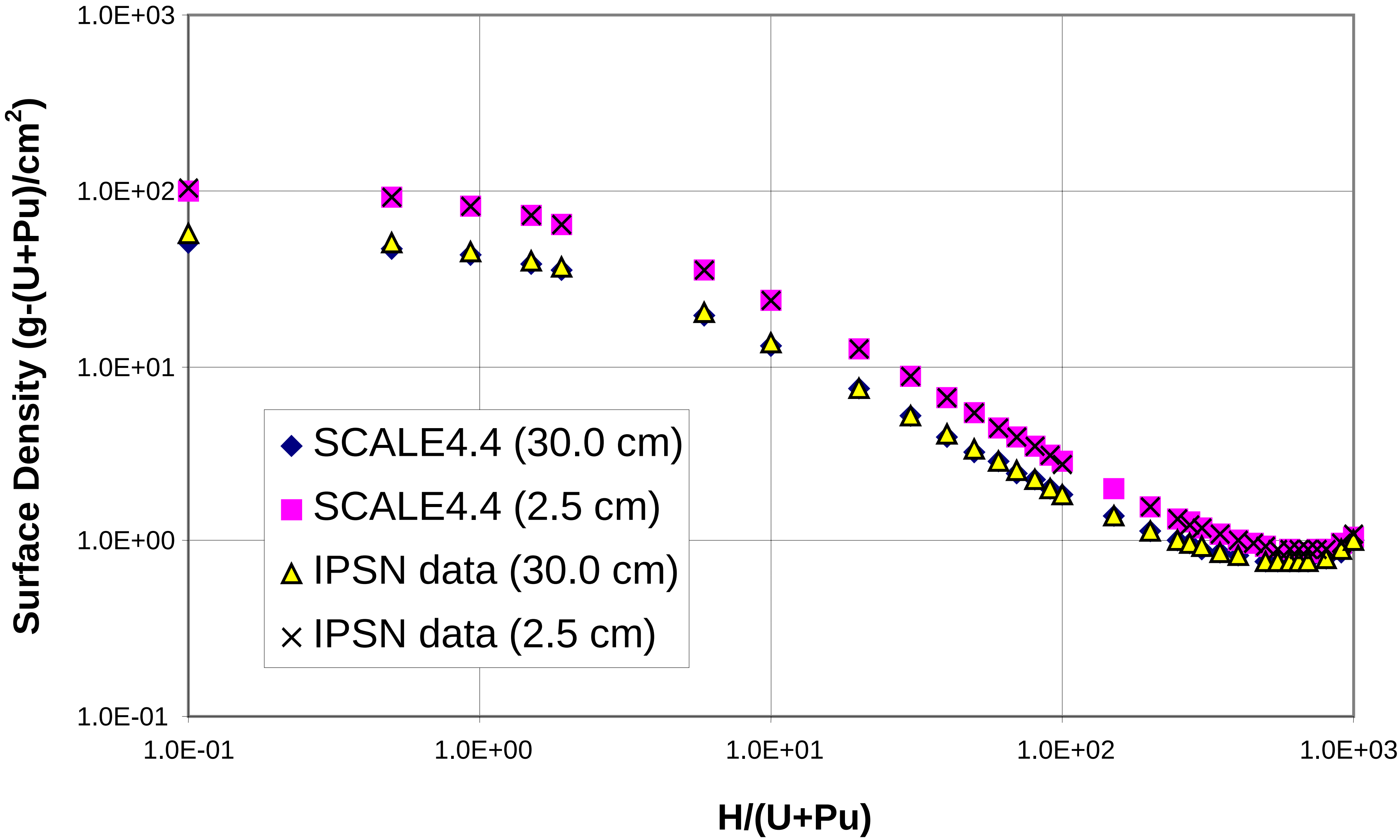

Fig. A.4.a.10. Surface density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

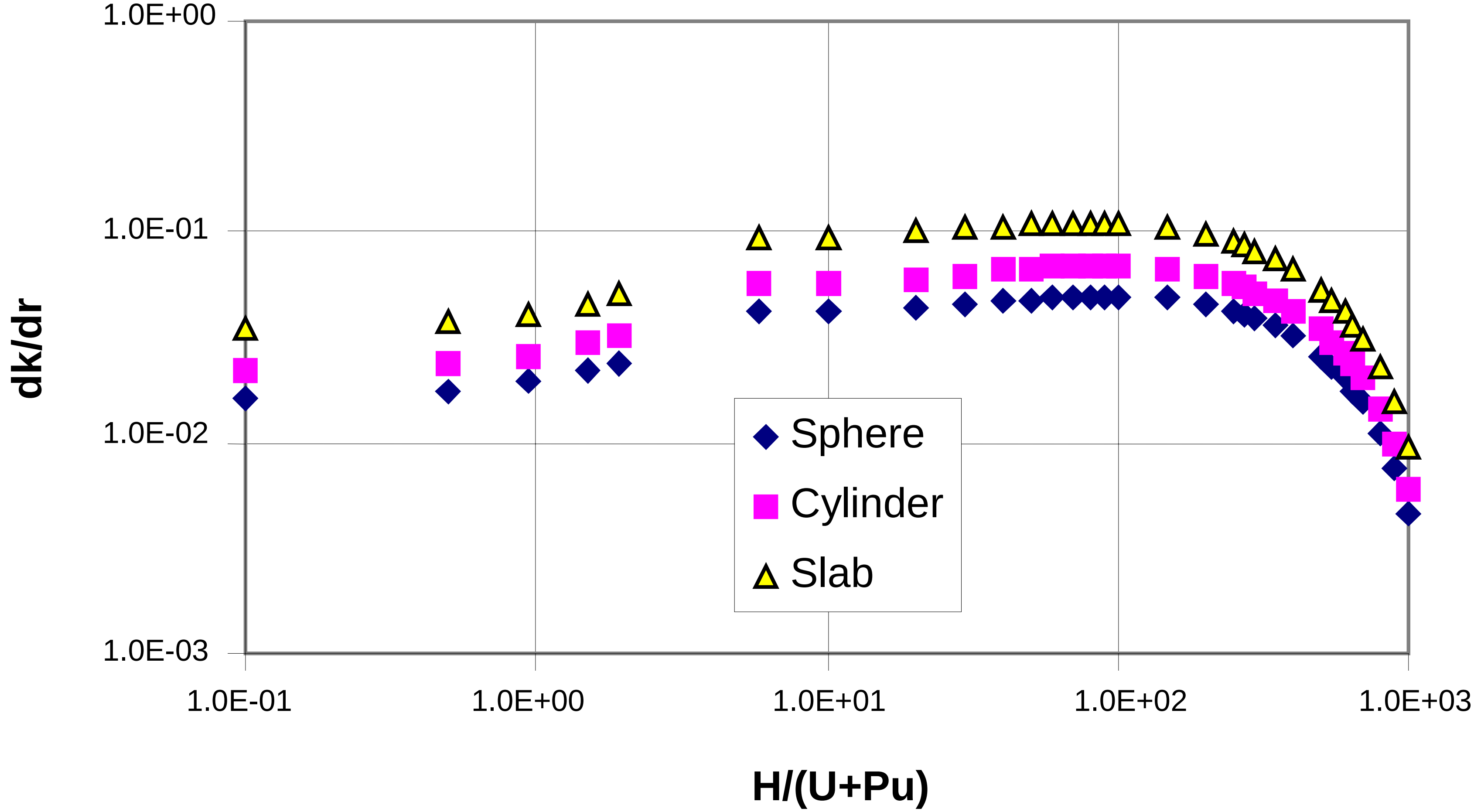

Fig. A.4.a.11. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 30.0 cm].

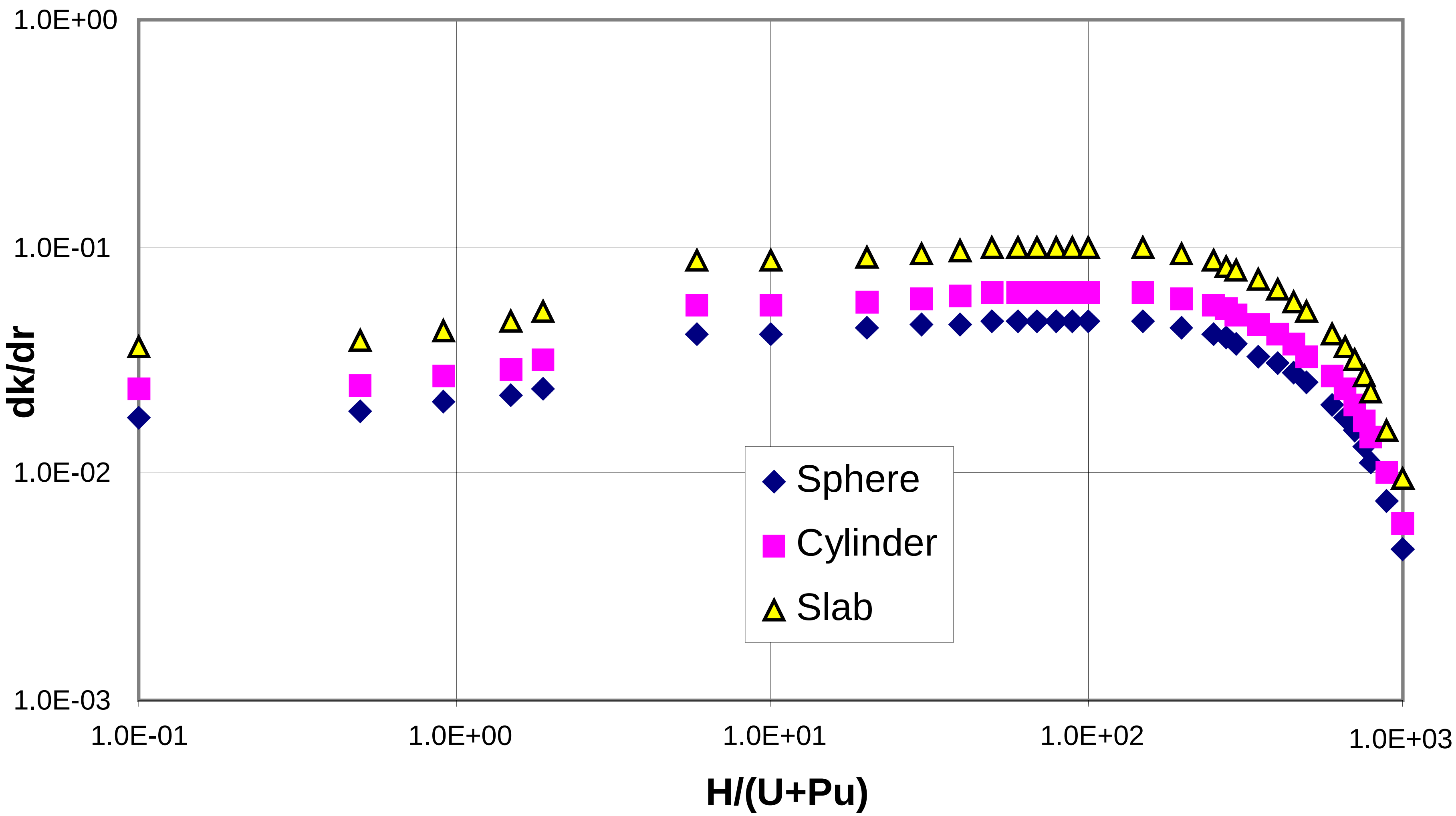

Fig. A.4.a.12. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 2.5 cm].

Table A.4.b.1. MOX data [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	99.282	100.000	0.000	0.000	0.000

Fissile material oxide density void-free

Water reflector 30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	9.37772	10.63771	1.45567	8.204E-03	25.063	1.776E-02	65.946	618.422	701.513	33.668	2.281E-02	8348.756	14.717	3.351E-02	138.015
0.5	1.64	8.21257	9.31601	1.42377	9.537E-03	23.423	1.901E-02	53.830	442.080	501.478	31.524	2.452E-02	6409.742	13.891	3.583E-02	114.077
0.928	3.00	7.24887	8.22282	1.42438	1.077E-02	21.954	2.066E-02	44.322	321.283	364.451	29.481	2.674E-02	4948.036	12.905	3.939E-02	93.549
1.5	4.76	6.26618	7.10810	1.43491	1.210E-02	20.565	2.119E-02	36.430	228.278	258.950	27.517	2.939E-02	3726.555	11.905	4.372E-02	74.597
1.916	6.00	5.70383	6.47019	1.44412	1.291E-02	19.816	2.236E-02	32.591	185.896	210.873	26.452	2.935E-02	3134.490	11.351	4.650E-02	64.744
5	14.29	3.42507	3.88526	1.50475	1.671E-02	17.010	2.854E-02	20.616	70.610	80.097	22.461	3.779E-02	1357.118	9.286	6.133E-02	31.805
10	25.01	2.07868	2.35797	1.56575	1.968E-02	15.468	3.404E-02	15.502	32.224	36.554	20.311	4.533E-02	673.530	8.258	7.478E-02	17.166
20	40.01	1.16374	1.32010	1.62420	2.213E-02	14.569	3.903E-02	12.953	15.074	17.099	19.138	5.506E-02	334.757	7.852	8.669E-02	9.137
30	50.01	0.80807	0.91664	1.64574	2.289E-02	14.423	4.078E-02	12.566	10.155	11.519	19.024	5.758E-02	229.692	7.963	9.107E-02	6.435
40	57.15	0.61891	0.70207	1.64985	2.295E-02	14.534	4.105E-02	12.859	7.958	9.028	19.266	5.801E-02	180.429	8.241	9.182E-02	5.101
50	62.51	0.50151	0.56889	1.64426	2.265E-02	14.770	4.312E-02	13.496	6.768	7.678	19.679	5.730E-02	152.539	8.597	9.069E-02	4.311
60	66.67	0.42155	0.47819	1.63283	2.214E-02	15.080	3.956E-02	14.366	6.056	6.870	20.193	5.594E-02	135.002	8.997	8.845E-02	3.793
70	70.01	0.36358	0.41243	1.61775	2.151E-02	15.441	3.830E-02	15.421	5.607	6.360	20.774	5.418E-02	123.239	9.427	8.556E-02	3.428
80	72.73	0.31963	0.36258	1.60033	2.082E-02	15.839	3.933E-02	16.645	5.320	6.035	21.408	5.217E-02	115.046	9.881	8.229E-02	3.158
90	75.01	0.28516	0.32347	1.58142	2.008E-02	16.269	3.775E-02	18.037	5.143	5.834	22.084	5.004E-02	109.224	10.356	7.882E-02	2.953
100	76.93	0.25740	0.29198	1.56157	1.932E-02	16.726	3.610E-02	19.600	5.045	5.723	22.798	4.782E-02	105.075	10.850	7.520E-02	2.793
125	80.65	0.20701	0.23482	1.51016	1.741E-02	17.978	3.190E-02	24.341	5.039	5.716	24.742	4.219E-02	99.526	12.171	6.607E-02	2.520
150	83.34	0.17312	0.19638	1.45862	1.554E-02	19.389	2.779E-02	30.530	5.285	5.996	26.915	3.670E-02	98.498	13.627	5.721E-02	2.359
175	85.37	0.14877	0.16876	1.40847	1.376E-02	20.974	2.390E-02	38.649	5.750	6.522	29.349	3.151E-02	100.648	15.197	4.913E-02	2.261
200	86.96	0.13042	0.14794	1.36042	1.208E-02	22.772	2.026E-02	49.462	6.451	7.318	32.102	2.668E-02	105.562	17.008	4.145E-02	2.218
225	88.24	0.11611	0.13171	1.31472	1.050E-02	24.831	1.691E-02	64.128	7.446	8.446	35.252	2.225E-02	113.325	19.041	3.452E-02	2.211
250	89.29	0.10462	0.11868	1.27141	9.021E-03	27.234	1.386E-02	84.612	8.852	10.041	38.926	1.821E-02	124.502	21.419	2.819E-02	2.241
275	90.17	0.09520	0.10799	1.23048	7.631E-03	30.094	1.110E-02	114.163	10.868	12.329	43.295	1.456E-02	140.152	24.240	2.251E-02	2.308
300	90.91	0.08734	0.09907	1.19181	6.328E-03	33.592	8.613E-03	158.776	13.867	15.731	48.639	1.129E-02	162.280	27.708	1.741E-02	2.420
350	92.11	0.07496	0.08503	1.12076	3.958E-03	43.965	4.491E-03	355.972	26.684	30.269	64.491	5.867E-03	244.860	37.999	9.024E-03	2.848
400	93.03	0.06565	0.07447	1.05722	1.863E-03	66.732	1.516E-03	1244.781	81.720	92.700	99.308	1.977E-03	508.507	60.667	3.026E-03	3.983
450	93.75	0.05840	0.06625	1.00020												
451	93.76	0.05818	0.06600	0.99912												
452	93.78	0.05805	0.06585	0.99805												
453	93.79	0.05792	0.06570	0.99697												

Table A.4.b.2. MOX data [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**100.000**	**0.000**	**0.000**	**0.000**

Fissile material oxide density void-free

Water reflector 2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	9.37772	10.63771	1.45567	8.204E-03	29.790	1.860E-02	110.739	1038.478	1178.008	43.240	2.418E-02	13770.652	24.724	3.651E-02	231.851
0.5	1.64	8.21257	9.31601	1.42377	9.537E-03	27.443	1.959E-02	86.573	710.988	806.516	39.715	2.553E-02	10173.886	22.522	3.874E-02	184.960
0.928	3.00	7.24887	8.22282	1.42438	1.077E-02	25.600	1.952E-02	70.278	509.435	577.883	36.925	2.750E-02	7762.661	20.750	4.188E-02	150.417
1.5	4.76	6.26618	7.10810	1.43491	1.210E-02	23.924	2.121E-02	57.355	359.394	407.682	34.381	2.784E-02	5817.479	19.128	4.570E-02	119.857
1.916	6.00	5.70383	6.47019	1.44412	1.291E-02	23.034	2.230E-02	51.190	291.979	331.209	33.029	2.930E-02	4887.174	18.264	4.534E-02	104.176
5	14.29	3.42507	3.88526	1.50475	1.671E-02	19.726	2.808E-02	32.151	110.119	124.914	28.004	3.705E-02	2109.597	15.067	5.790E-02	51.605
10	25.01	2.07868	2.35797	1.56575	1.968E-02	17.863	3.327E-02	23.875	49.628	56.296	25.192	4.403E-02	1036.070	13.312	6.929E-02	27.670
20	40.01	1.16374	1.32010	1.62420	2.213E-02	16.673	3.805E-02	19.414	22.592	25.628	23.421	5.048E-02	501.368	12.273	7.964E-02	14.283
30	50.01	0.80807	0.91664	1.64574	2.289E-02	**16.374**	3.976E-02	**18.389**	14.859	16.856	**22.996**	5.280E-02	335.605	**12.085**	8.313E-02	9.766
40	57.15	0.61891	0.70207	1.64985	2.295E-02	16.387	4.006E-02	18.433	11.408	12.941	23.037	5.322E-02	257.974	12.148	8.386E-02	7.519
50	62.51	0.50151	0.56889	1.64426	2.265E-02	16.554	3.961E-02	19.001	9.529	10.809	23.308	5.260E-02	213.976	12.352	8.288E-02	6.194
60	66.67	0.42155	0.47819	1.63283	2.214E-02	16.812	3.870E-02	19.904	8.391	9.518	23.714	5.138E-02	186.180	12.638	8.092E-02	5.328
70	70.01	0.36358	0.41243	1.61775	2.151E-02	17.131	3.751E-02	21.060	7.657	8.686	24.210	4.979E-02	167.376	12.979	7.835E-02	4.719
80	72.73	0.31963	0.36258	1.60033	2.082E-02	17.497	3.614E-02	22.436	7.171	8.135	24.775	5.120E-02	154.089	13.362	7.539E-02	4.271
90	75.01	0.28516	0.32347	1.58142	2.008E-02	17.899	3.719E-02	24.019	6.849	7.769	25.395	4.916E-02	144.434	13.778	7.225E-02	3.929
100	76.93	0.25740	0.29198	1.56157	1.932E-02	18.333	3.315E-02	25.810	6.643	7.536	26.062	4.704E-02	137.312	14.224	6.897E-02	3.661
125	80.65	0.20701	0.23482	1.51016	1.741E-02	19.542	3.153E-02	31.262	**6.472**	**7.341**	27.915	4.163E-02	126.690	15.391	6.095E-02	3.186
150	83.34	0.17312	0.19638	1.45862	1.554E-02	20.922	2.753E-02	38.362	6.641	7.534	30.023	3.629E-02	**122.557**	16.774	5.282E-02	2.904
175	85.37	0.14877	0.16876	1.40847	1.376E-02	22.486	2.371E-02	47.622	7.085	8.037	32.410	3.123E-02	122.732	18.298	4.857E-02	2.722
200	86.96	0.13042	0.14794	1.36042	1.208E-02	24.267	2.014E-02	59.862	7.807	8.856	35.128	2.649E-02	126.395	20.044	4.114E-02	2.614
225	88.24	0.11611	0.13171	1.31472	1.050E-02	26.314	1.684E-02	76.324	8.862	10.053	38.250	2.212E-02	133.422	22.057	3.431E-02	2.561
250	89.29	0.10462	0.11868	1.27141	9.021E-03	28.709	1.381E-02	99.118	10.370	11.763	41.904	1.813E-02	144.280	24.417	2.807E-02	**2.554**
275	90.17	0.09520	0.10799	1.23048	7.631E-03	31.562	1.107E-02	131.699	12.538	14.222	46.257	1.452E-02	159.989	27.233	2.243E-02	2.593
300	90.91	0.08734	0.09907	1.19181	6.328E-03	35.055	8.596E-03	180.449	15.760	17.878	51.590	1.127E-02	182.571	30.687	1.738E-02	2.680
350	92.11	0.07496	0.08503	1.12076	3.958E-03	45.425	4.476E-03	392.621	29.431	33.385	67.439	5.592E-03	267.754	40.960	9.020E-03	3.070
400	93.03	0.06565	0.07447	1.05722	1.863E-03	68.194	1.514E-03	1328.400	87.209	98.927	102.244	1.980E-03	539.019	63.619	3.027E-03	4.177
450	93.75	0.05840	0.06625	1.00020												
451	**93.76**	**0.05818**	**0.06600**	**0.99912**												
452	93.78	0.05805	0.06585	0.99805												
453	93.79	0.05792	0.06570	0.99697												

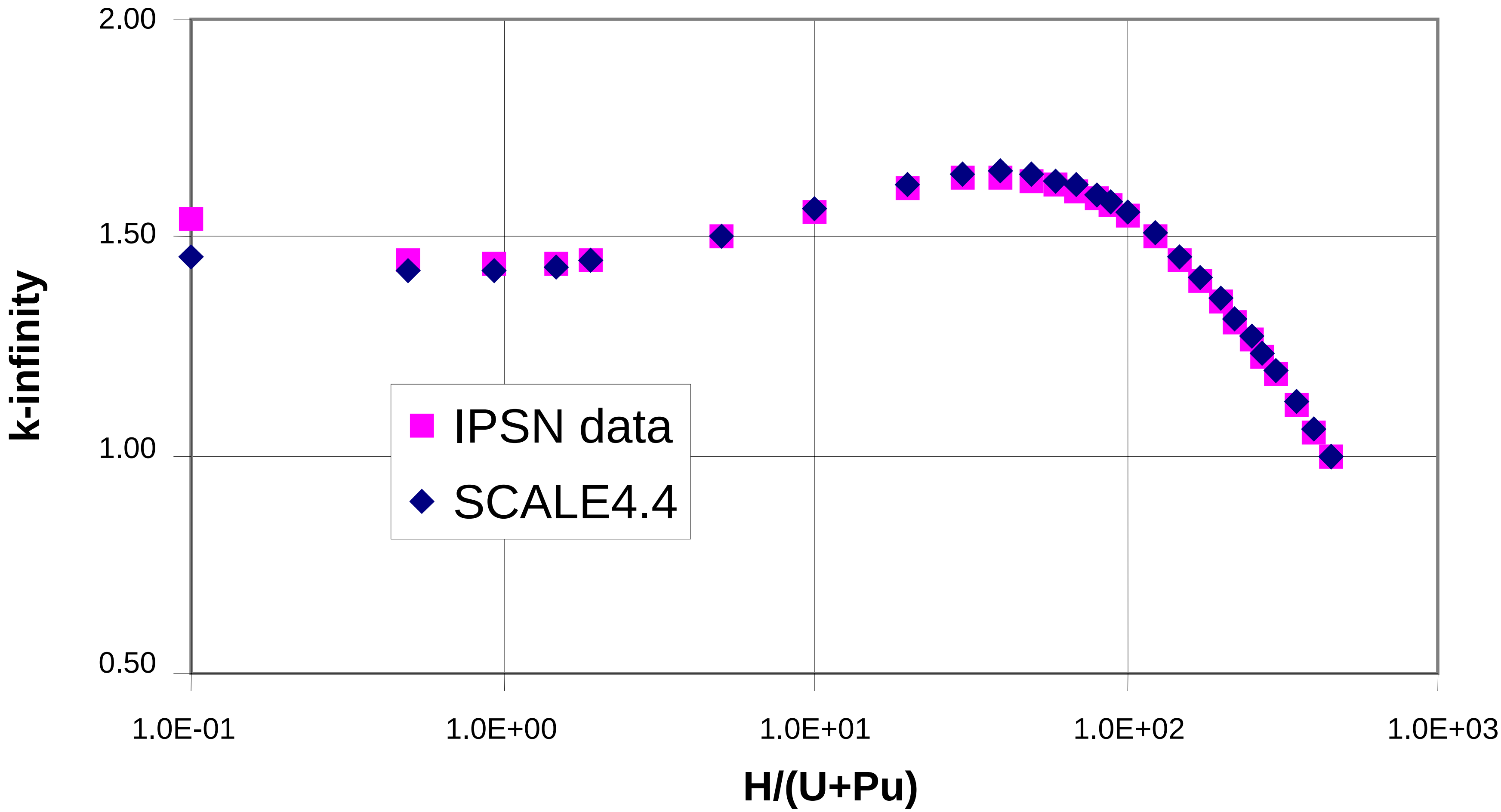

Fig. A.4.b.1. *k*-infinity [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

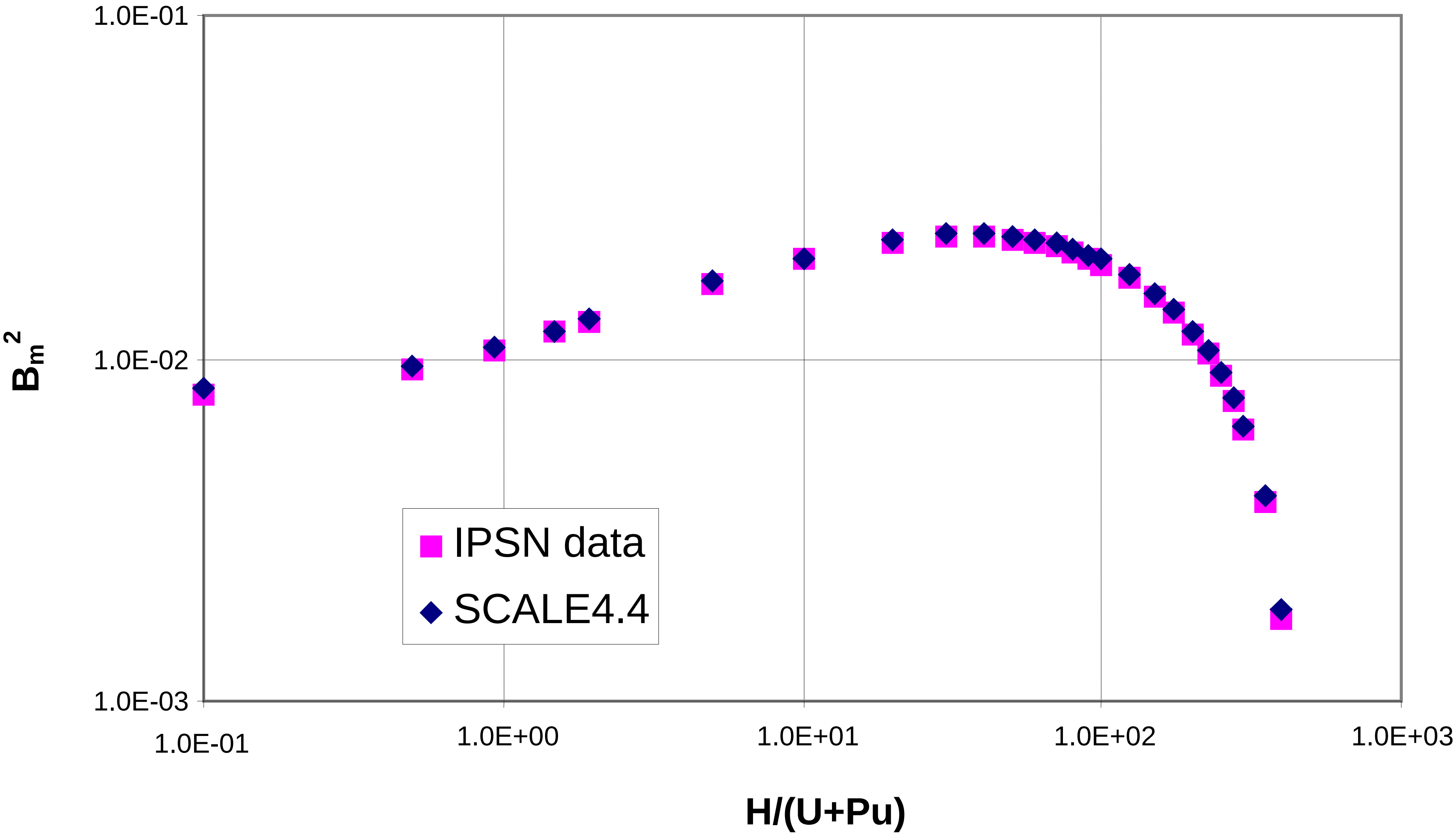

Fig. A.4.b.2. B_m^2 [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

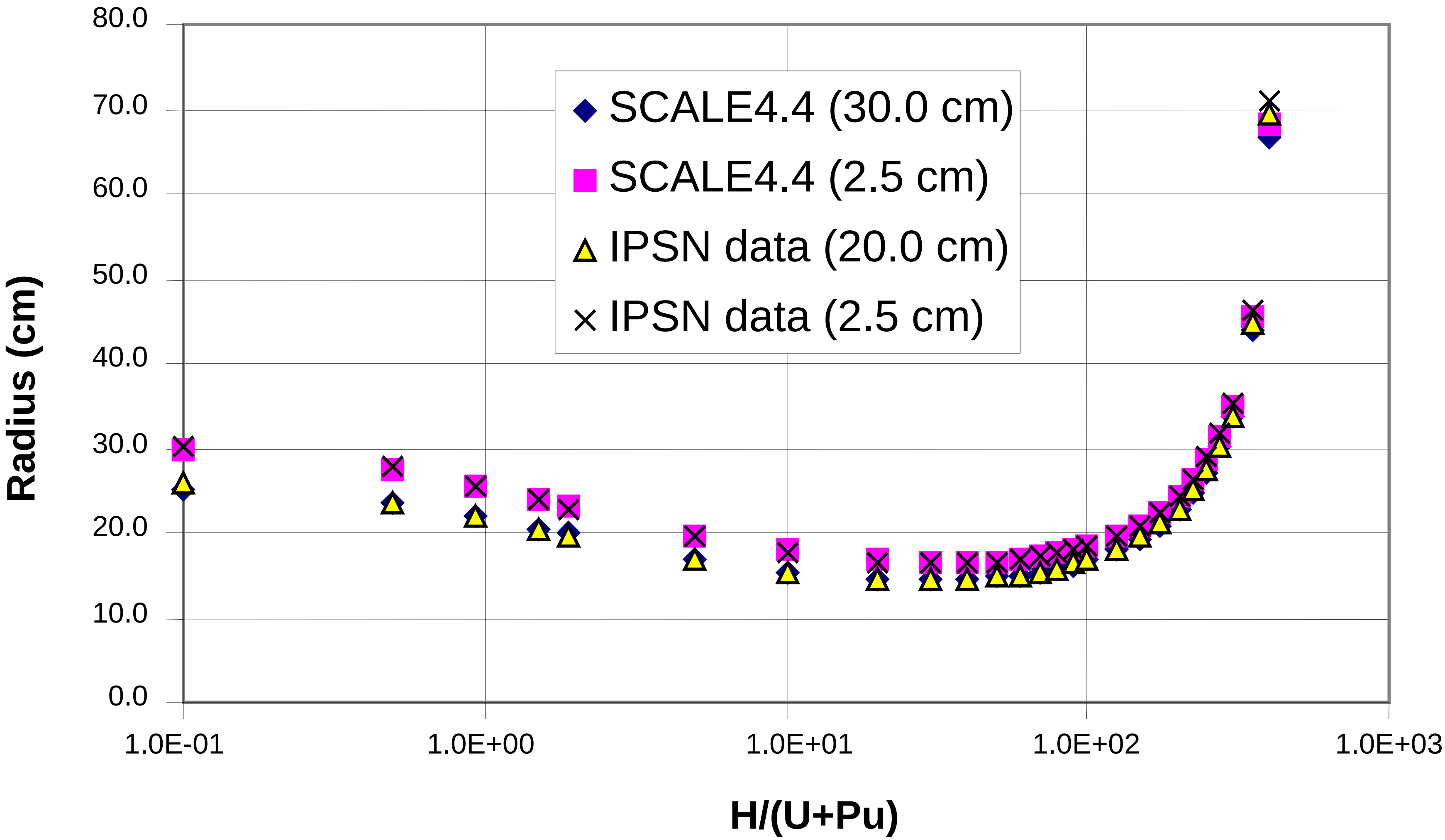

Fig. A.4.b.3. Sphere radius [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

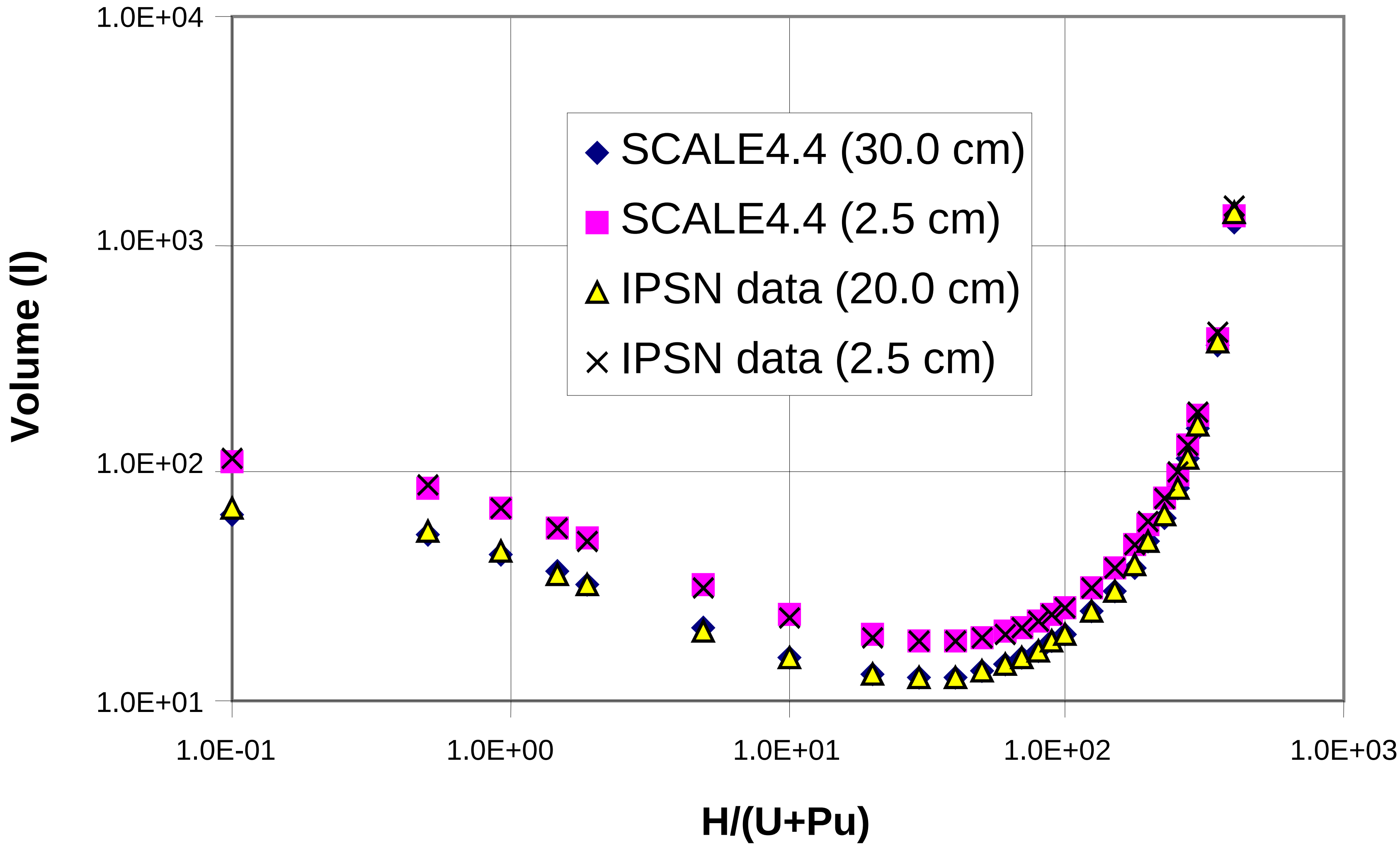

Fig. A.4.b.4. Sphere volume [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

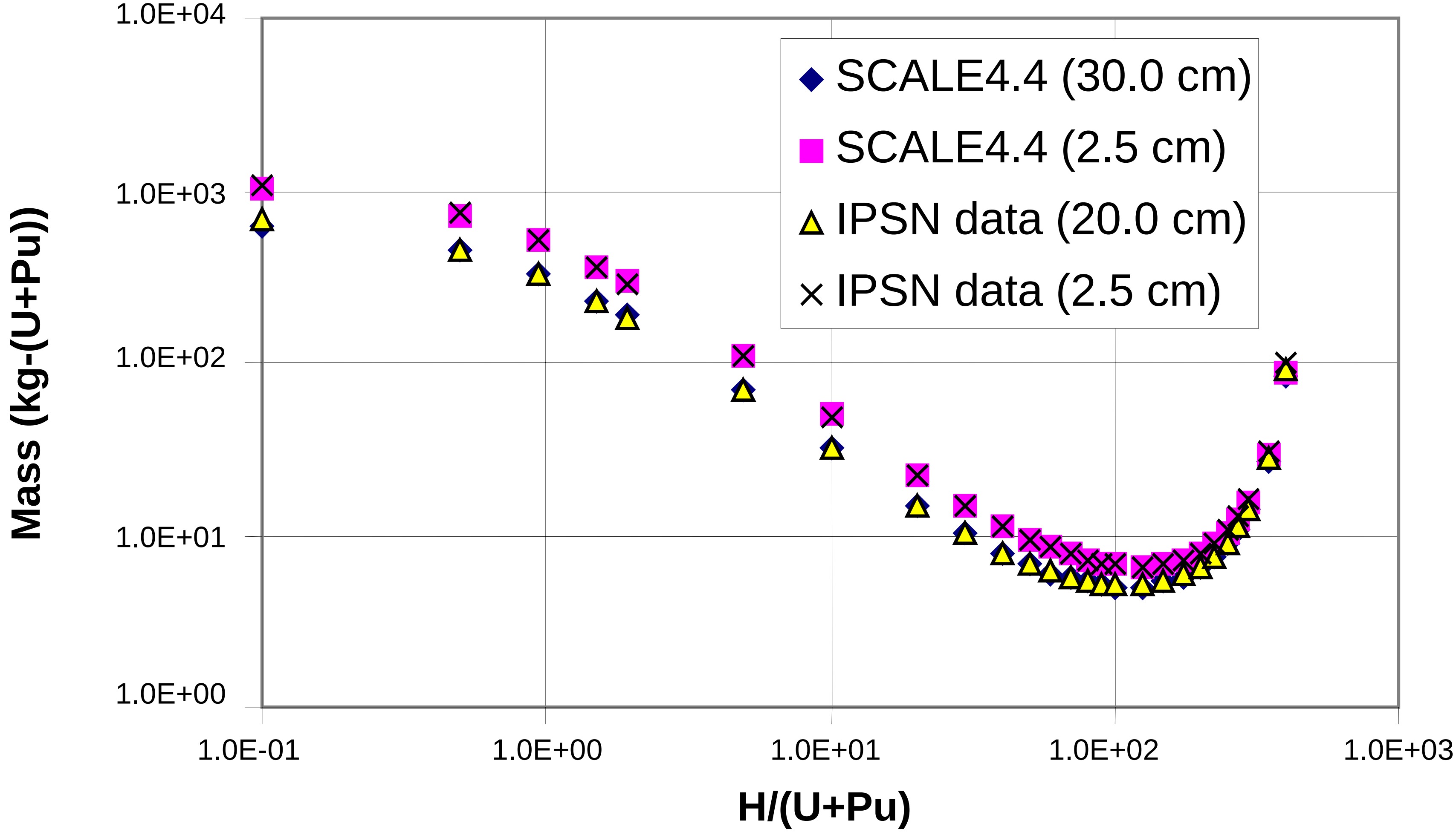

Fig. A.4.b.5. U + Pu mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

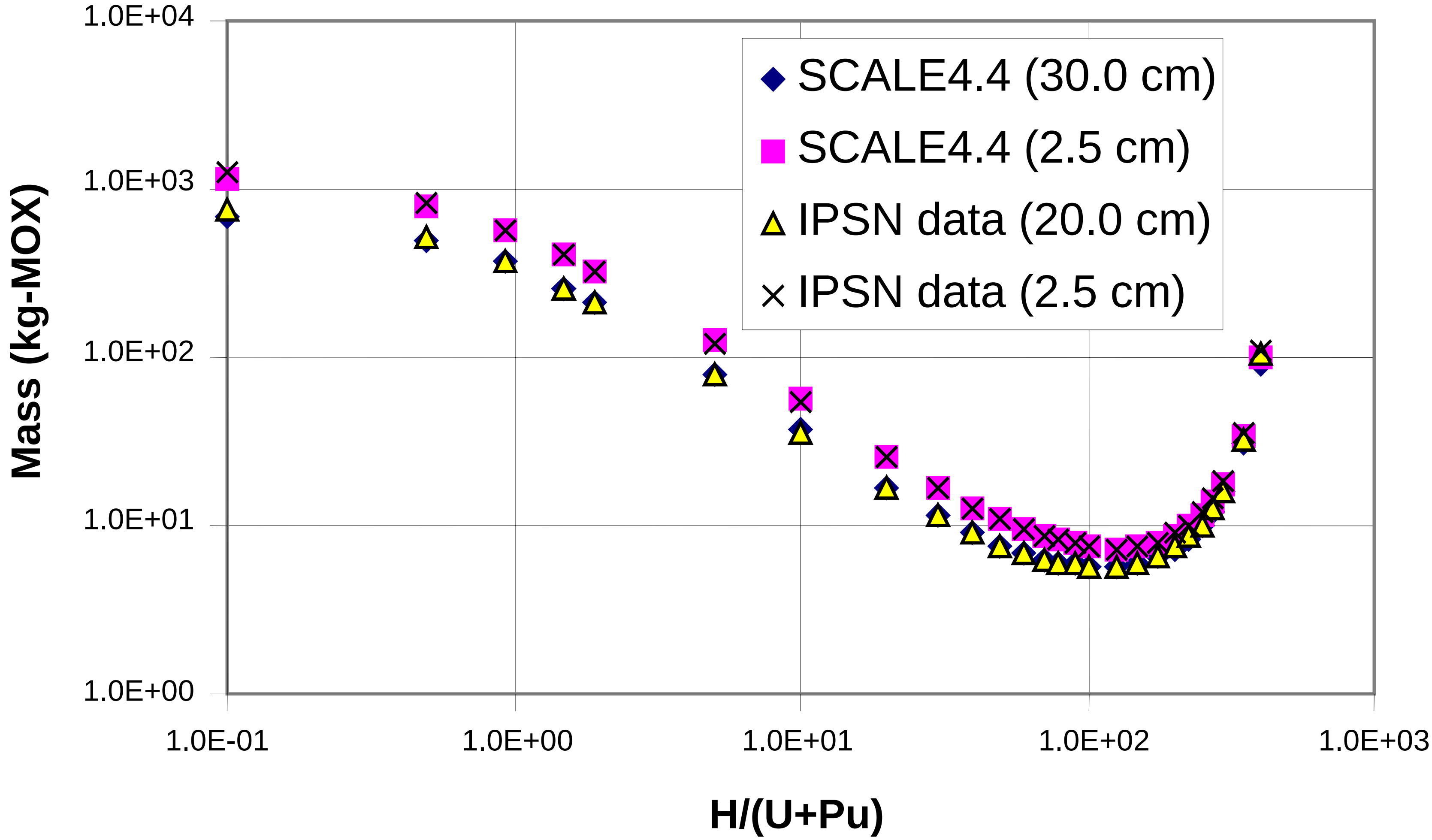

Fig. A.4.b.6. MOX mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

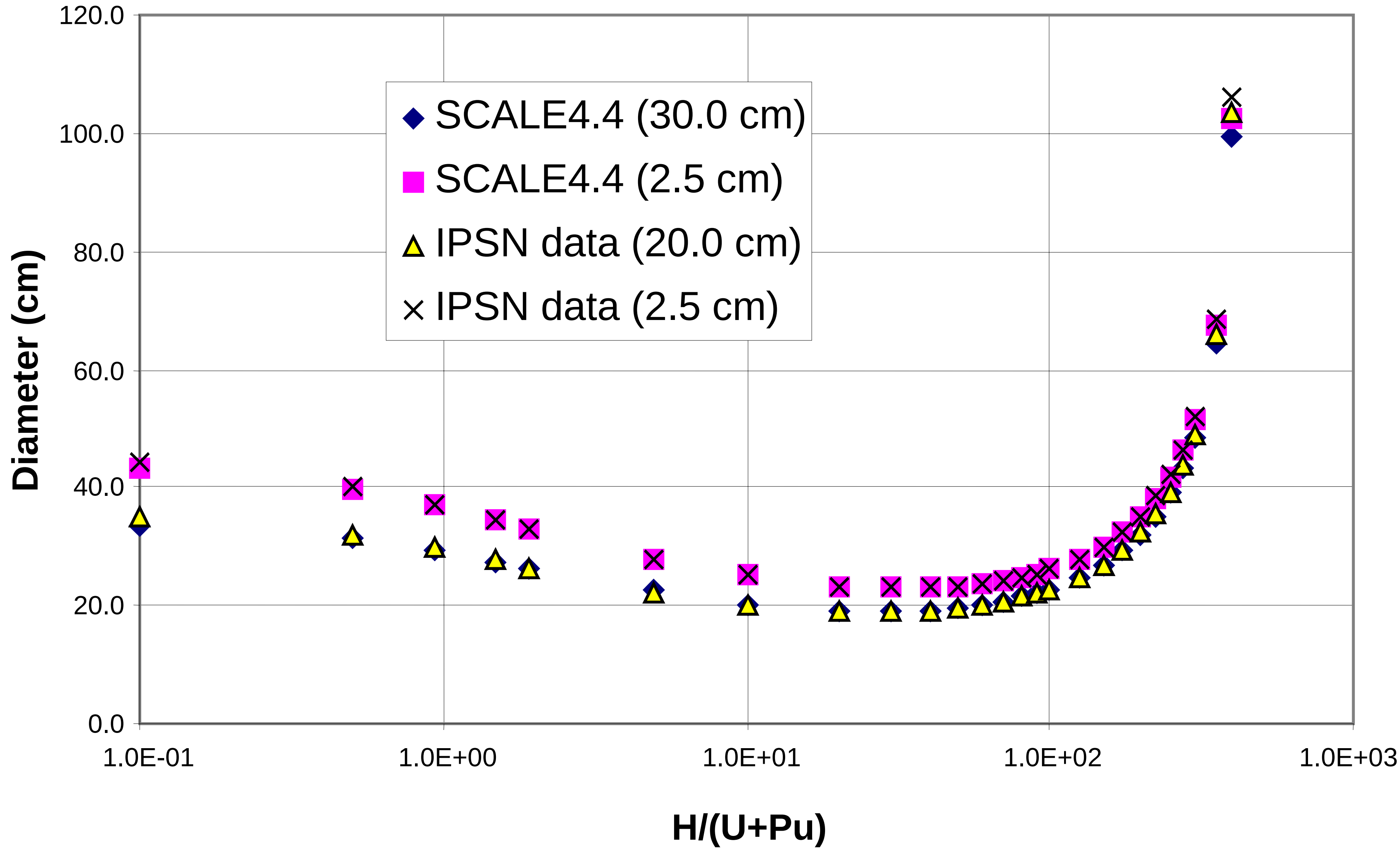

Fig. A.4.b.7. Cylinder diameter [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

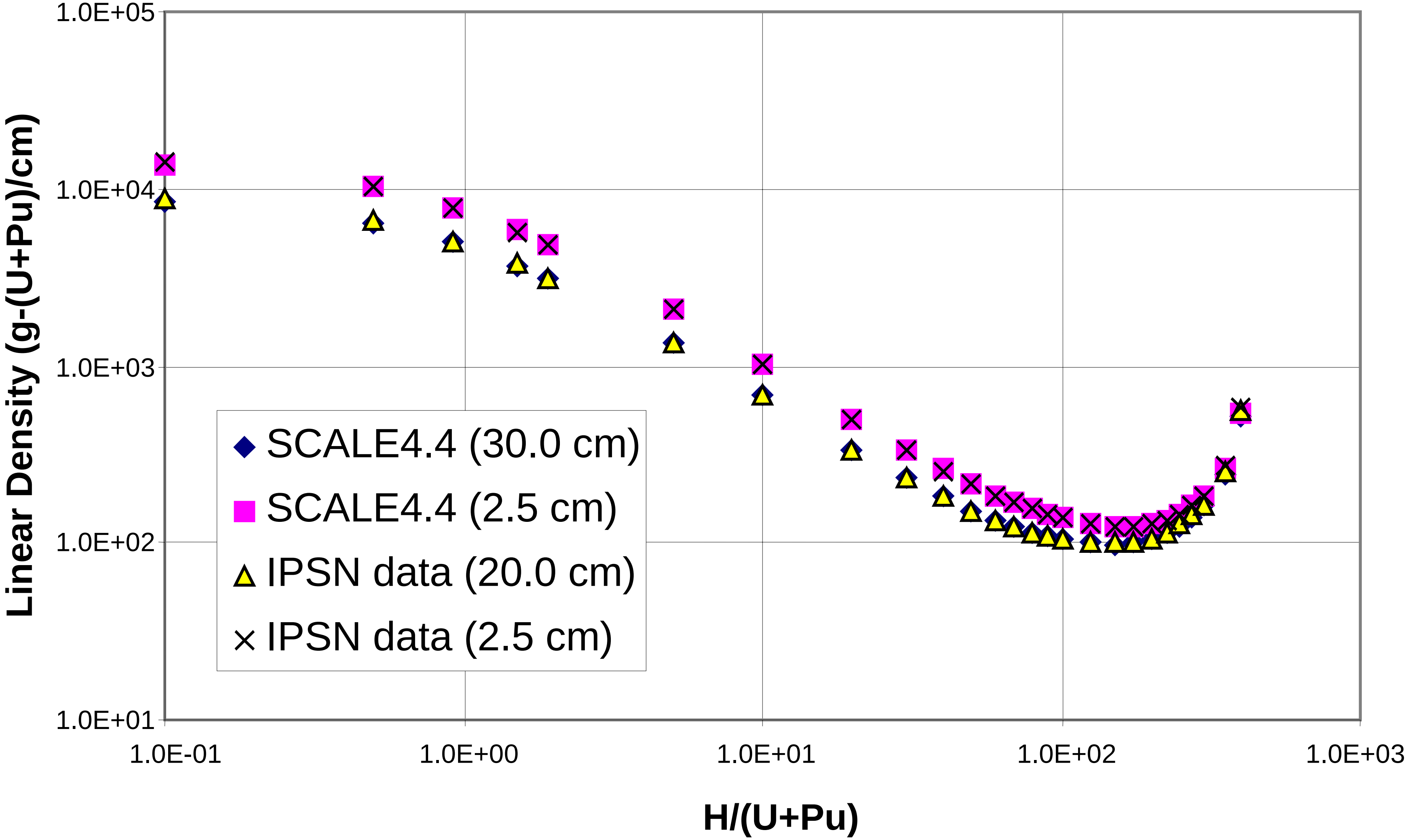

Fig. A.4.b.8. Linear density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

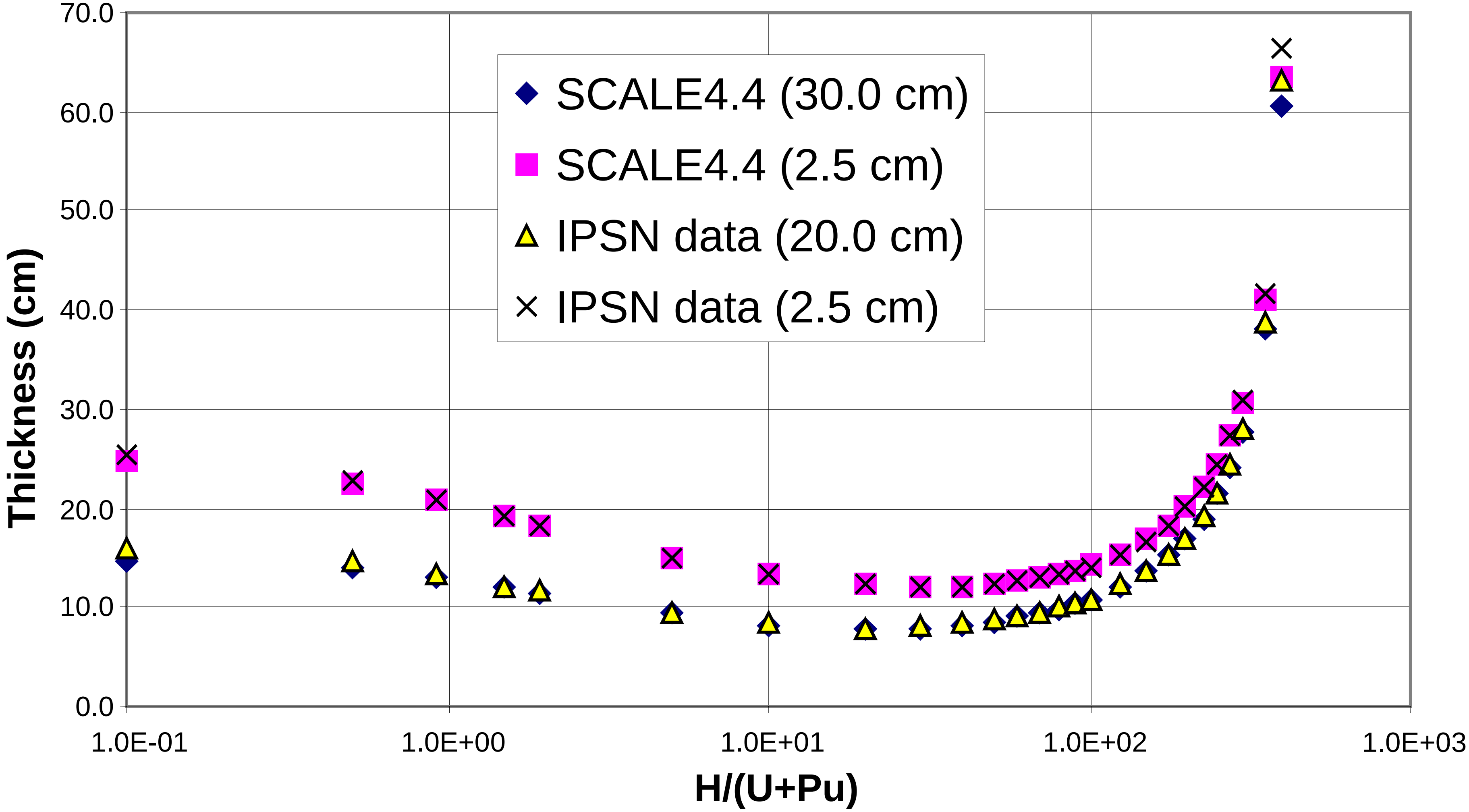

Fig. A.4.b.9. Slab thickness [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

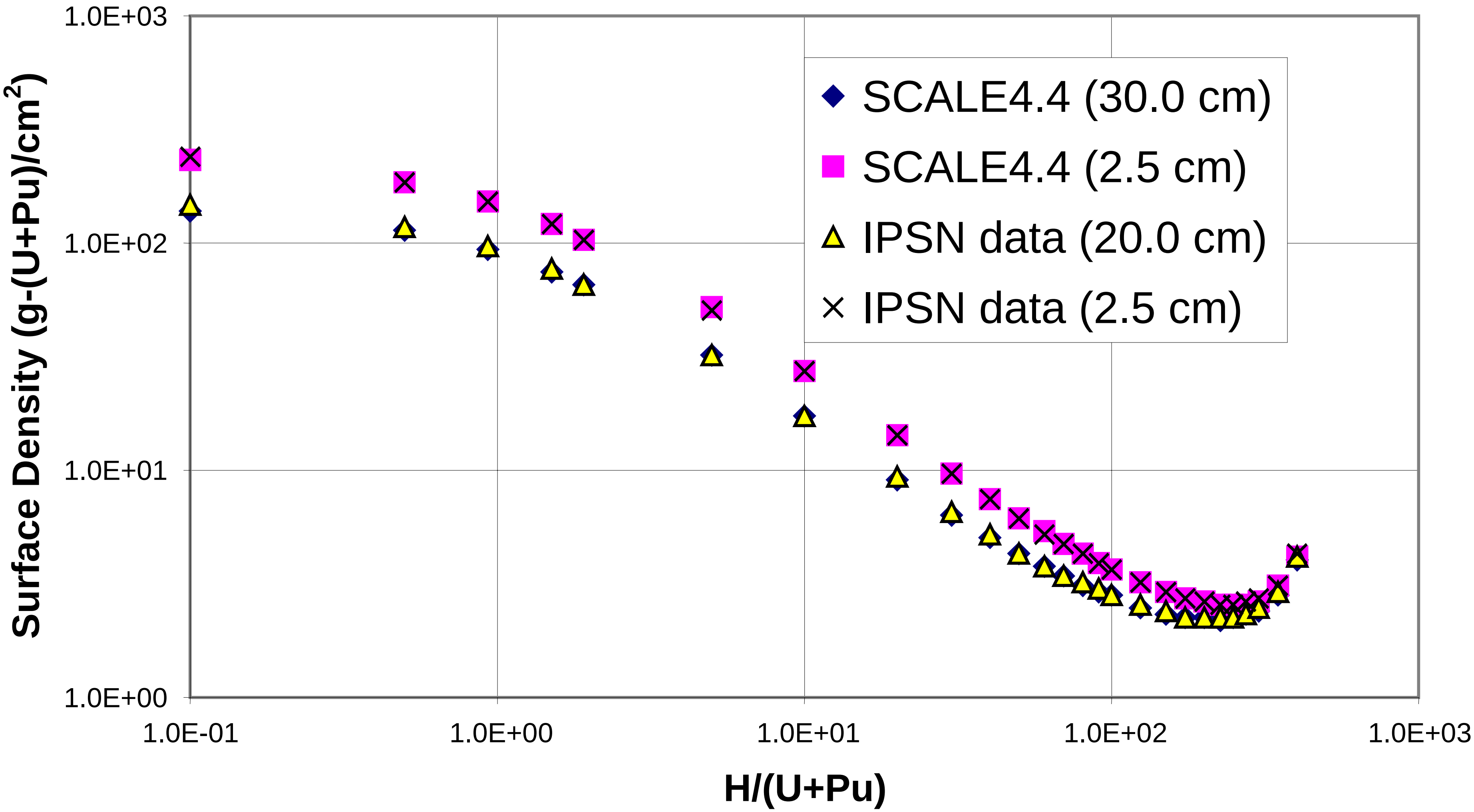

Fig. A.4.b.10. Surface density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

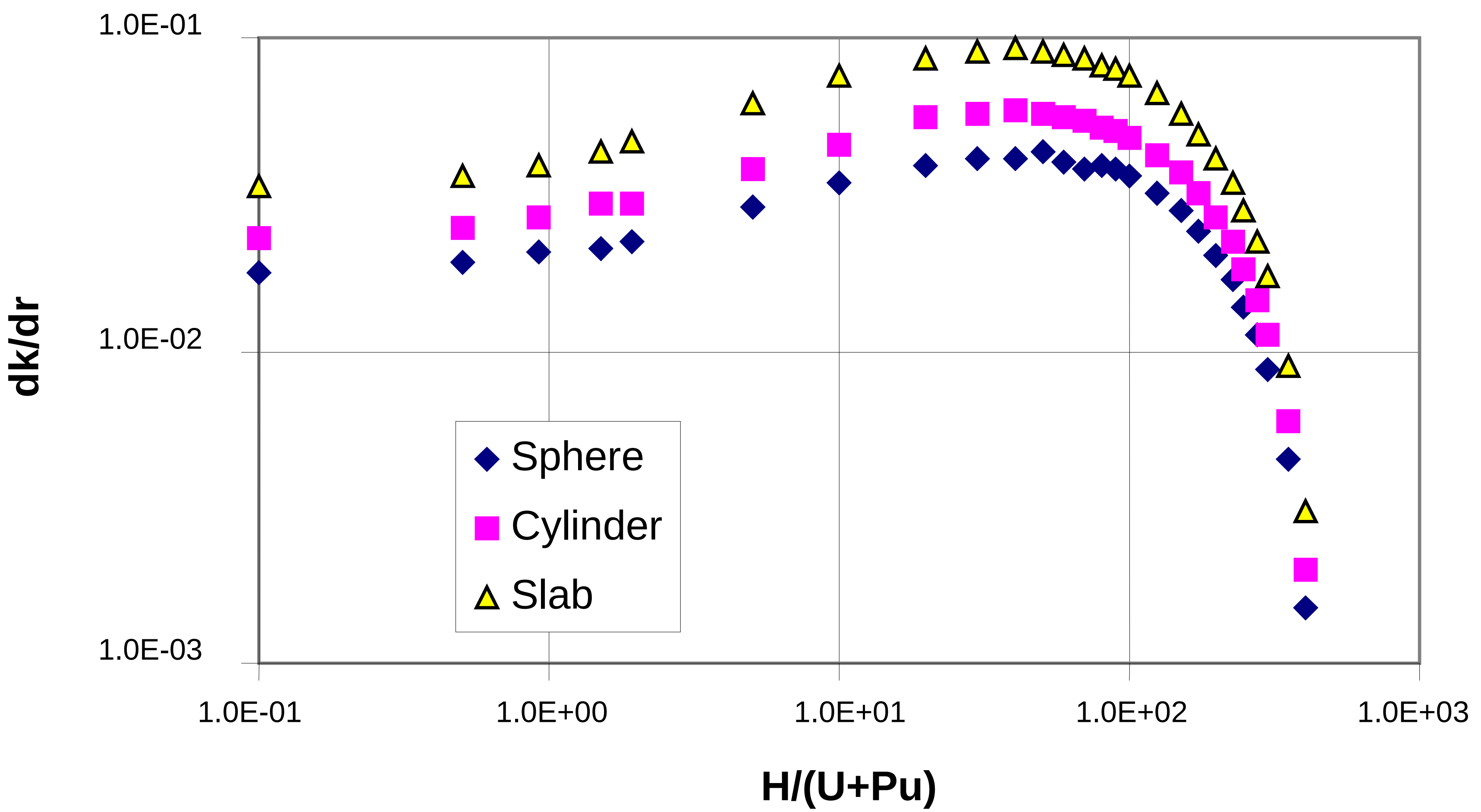

Fig. A.4.b.11. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 30.0 cm].

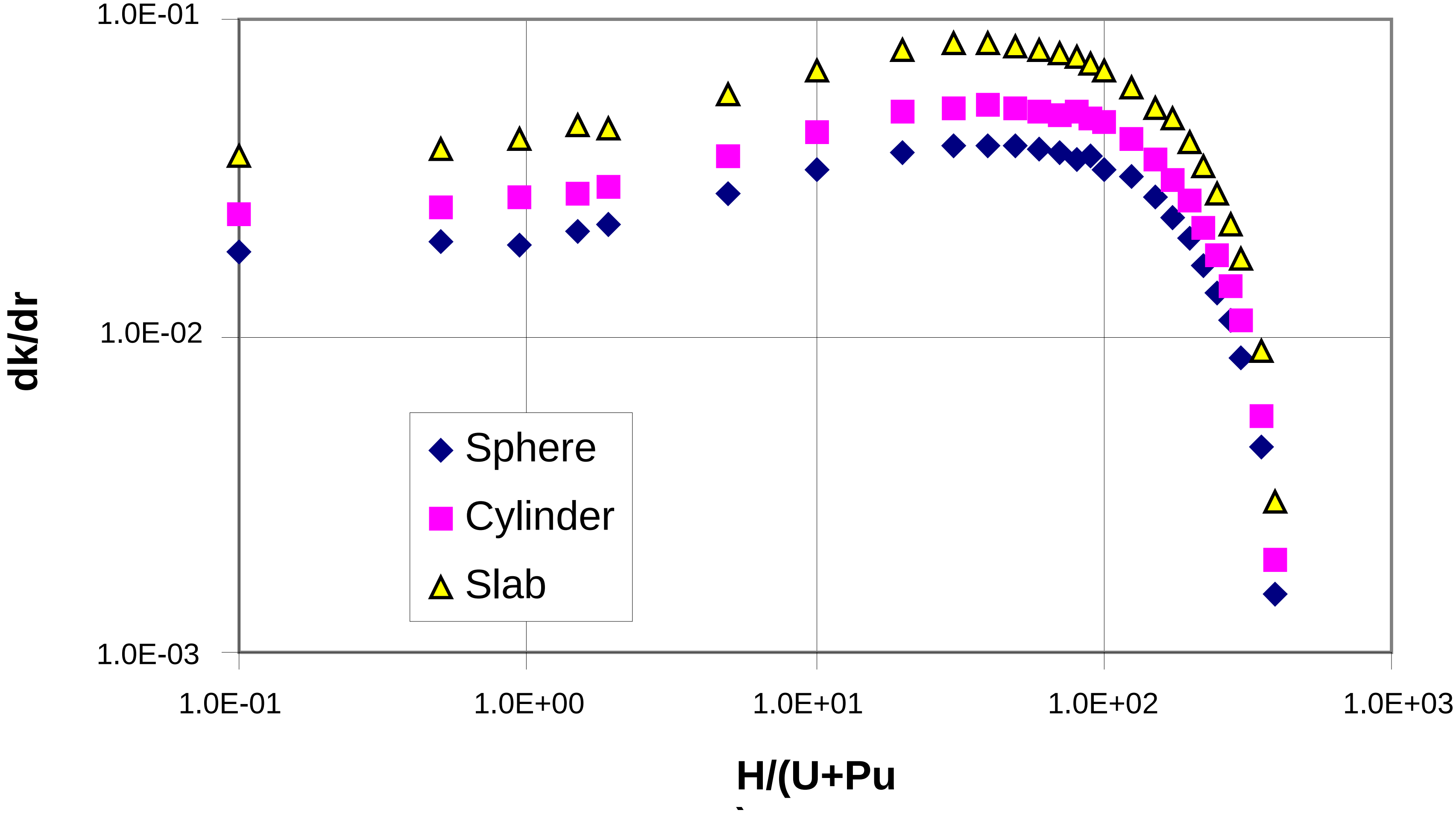

Fig. A.4.b.12. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 2.5 cm].

Table A.4.c.1. MOX data [$^{235}U/U$ = 0.718%, $^{239}Pu/Pu$ = 100%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**100.000**	**0.000**	**0.000**	**0.000**

Fissile material oxide density
3.5 g (UO_2 + PuO_2)/cm^3

Water reflector
30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

						Sphere					Cylinder			Slab		
H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Radius (cm)	dk/dr	Volume (l)	Mass U + Pu (kg)	Mass MOX (kg)	Diameter (cm)	dk/dr	Linear den. Pu + U (g/cm)	Thickness (cm)	dk/dr	Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08544	3.50000	1.45567	8.881E-04	69.711	5.407E-03	1419.045	4378.382	4966.659	94.327	7.017E-03	21561.698	44.830	1.102E-02	138.320
0.5	1.64	3.08544	3.50000	1.42377	1.346E-03	57.649	6.584E-03	802.535	2476.175	2808.872	78.099	8.559E-03	14780.808	37.029	1.358E-02	114.251
0.928	3.00	3.08544	3.50000	1.42440	1.952E-03	48.038	8.228E-03	464.345	1432.709	1625.207	64.870	1.065E-02	10197.405	30.361	1.684E-02	93.678
1.5	4.76	3.08544	3.50000	1.43492	2.935E-03	39.229	1.041E-02	252.885	780.263	885.099	52.725	1.382E-02	6736.646	24.175	2.147E-02	74.589
1.916	6.00	3.08544	3.50000	1.44413	3.777E-03	34.614	1.230E-02	173.715	535.986	608.001	46.399	1.611E-02	5217.134	20.991	2.464E-02	64.767
5.84	16.30	3.08544	3.50000	1.51764	1.734E-02	16.622	3.113E-02	19.238	59.359	67.335	21.916	4.102E-02	1163.980	9.002	6.378E-02	27.774
10	25.01	2.07868	2.35797	1.56575	1.968E-02	15.468	3.404E-02	15.502	32.224	36.554	20.311	4.533E-02	673.530	8.258	7.478E-02	17.166
20	40.01	1.16374	1.32010	1.62420	2.213E-02	14.569	3.903E-02	12.953	15.074	17.099	19.138	5.506E-02	334.757	**7.852**	8.669E-02	9.137
30	50.01	0.80807	0.91664	1.64574	2.289E-02	**14.423**	4.078E-02	**12.566**	10.155	11.519	**19.024**	5.758E-02	229.692	7.963	9.107E-02	6.435
40	57.15	0.61891	0.70207	1.64985	2.295E-02	14.534	4.105E-02	12.859	7.958	9.028	19.266	5.801E-02	180.429	8.241	9.182E-02	5.101
50	62.51	0.50151	0.56889	1.64426	2.265E-02	14.770	4.312E-02	13.496	6.768	7.678	19.679	5.730E-02	152.539	8.597	9.069E-02	4.311
60	66.67	0.42155	0.47819	1.63283	2.214E-02	15.080	3.956E-02	14.366	6.056	6.870	20.193	5.594E-02	135.002	8.997	8.845E-02	3.793
70	70.01	0.36358	0.41243	1.61775	2.151E-02	15.441	3.830E-02	15.421	5.607	6.360	20.774	5.418E-02	123.239	9.427	8.556E-02	3.428
80	72.73	0.31963	0.36258	1.60033	2.082E-02	15.839	3.933E-02	16.645	5.320	6.035	21.408	5.217E-02	115.046	9.881	8.229E-02	3.158
90	75.01	0.28516	0.32347	1.58142	2.008E-02	16.269	3.775E-02	18.037	5.143	5.834	22.084	5.004E-02	109.224	10.356	7.882E-02	2.953
100	76.93	0.25740	0.29198	1.56157	1.932E-02	16.726	3.610E-02	19.600	5.045	5.723	22.798	4.782E-02	105.075	10.850	7.520E-02	2.793
125	80.65	0.20701	0.23482	1.51016	1.741E-02	17.978	3.190E-02	24.341	**5.039**	**5.716**	24.742	4.219E-02	99.526	12.171	6.607E-02	2.520
150	83.34	0.17312	0.19638	1.45862	1.554E-02	19.389	2.779E-02	30.530	5.285	5.996	26.915	3.670E-02	**98.498**	13.627	5.721E-02	2.359
175	85.37	0.14877	0.16876	1.40847	1.376E-02	20.974	2.390E-02	38.649	5.750	6.522	29.349	3.151E-02	100.648	15.197	4.913E-02	2.261
200	86.96	0.13042	0.14794	1.36042	1.208E-02	22.772	2.026E-02	49.462	6.451	7.318	32.102	2.668E-02	105.562	17.008	4.145E-02	**2.218**
225	88.24	0.11611	0.13171	1.31472	1.050E-02	24.831	1.691E-02	64.128	7.446	8.446	35.252	2.225E-02	113.325	19.041	3.452E-02	2.211
250	89.29	0.10462	0.11868	1.27141	9.021E-03	27.234	1.386E-02	84.612	8.852	10.041	38.926	1.821E-02	124.502	21.419	2.819E-02	2.241
275	90.17	0.09520	0.10799	1.23048	7.631E-03	30.094	1.110E-02	114.163	10.868	12.329	43.295	1.456E-02	140.152	24.240	2.251E-02	2.308
300	90.91	0.08734	0.09907	1.19181	6.328E-03	33.592	8.613E-03	158.776	13.867	15.731	48.639	1.129E-02	162.280	27.708	1.741E-02	2.420
350	92.11	0.07496	0.08503	1.12076	3.958E-03	43.965	4.491E-03	355.972	26.684	30.269	64.491	5.867E-03	244.860	37.999	9.024E-03	2.848
400	93.03	0.06565	0.07447	1.05722	1.863E-03	66.732	1.516E-03	1244.781	81.720	92.700	99.308	1.977E-03	508.507	60.667	3.026E-03	3.983
450	93.75	0.05840	0.06625	1.00020												
451	**93.76**	**0.05818**	**0.06600**	**0.99912**												
452	93.78	0.05805	0.06585	0.99805												
453	93.79	0.05792	0.06570	0.99697												

* [shaded] means the data are the same as the data of Table A.4.b.1.

Table A.4.c.2. MOX data [$^{235}U/U$ = 0.718%, $^{239}Pu/Pu$ = 100%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**100.000**	**0.000**	**0.000**	**0.000**

Fissile material oxide density
5.5 g ($UO_2 + PuO_2$)/cm^3

Water reflector
30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	4.84855	5.50000	1.45568	2.193E-03	45.779	8.672E-03	401.874	1948.509	2210.309	61.743	1.143E-02	14516.827	28.489	1.740E-02	138.131
0.5	1.64	4.84855	5.50000	1.42378	3.324E-03	37.893	1.064E-02	227.913	1105.048	1253.521	51.153	1.353E-02	9964.238	23.526	2.111E-02	114.066
0.928	3.00	4.84855	5.50000	1.42441	4.820E-03	31.634	1.313E-02	132.596	642.898	729.278	42.572	1.705E-02	6901.474	19.272	2.591E-02	93.441
1.5	4.76	4.84855	5.50000	1.43491	7.246E-03	25.923	1.680E-02	72.972	353.807	401.344	34.720	2.205E-02	4590.514	15.355	3.372E-02	74.449
1.916	6.00	4.84855	5.50000	1.44413	9.327E-03	22.923	1.983E-02	50.456	244.639	277.509	30.614	2.609E-02	3569.010	13.321	3.965E-02	64.585
2.73	8.34	4.84855	5.50000	1.46219	1.419E-02	18.721	2.557E-02	27.484	133.256	151.161	24.881	3.355E-02	2357.461	10.519	5.116E-02	51.000
5	14.29	3.42507	3.88526	1.50475	1.671E-02	17.010	2.854E-02	20.616	70.610	80.097	22.461	3.779E-02	1357.118	9.286	6.133E-02	31.805
10	25.01	2.07868	2.35797	1.56575	1.968E-02	15.468	3.404E-02	15.502	32.224	36.554	20.311	4.533E-02	673.530	8.258	7.478E-02	17.166
20	40.01	1.16374	1.32010	1.62420	2.213E-02	14.569	3.903E-02	12.953	15.074	17.099	19.138	5.506E-02	334.757	7.852	8.669E-02	9.137
30	50.01	0.80807	0.91664	1.64574	2.289E-02	14.423	4.078E-02	12.566	10.155	11.519	19.024	5.758E-02	229.692	7.963	9.107E-02	6.435
40	57.15	0.61891	0.70207	1.64985	2.295E-02	14.534	4.105E-02	12.859	7.958	9.028	19.266	5.801E-02	180.429	8.241	9.182E-02	5.101
50	62.51	0.50151	0.56889	1.64426	2.265E-02	14.770	4.312E-02	13.496	6.768	7.678	19.679	5.730E-02	152.539	8.597	9.069E-02	4.311
60	66.67	0.42155	0.47819	1.63283	2.214E-02	15.080	3.956E-02	14.366	6.056	6.870	20.193	5.594E-02	135.002	8.997	8.845E-02	3.793
70	70.01	0.36358	0.41243	1.61775	2.151E-02	15.441	3.830E-02	15.421	5.607	6.360	20.774	5.418E-02	123.239	9.427	8.556E-02	3.428
80	72.73	0.31963	0.36258	1.60033	2.082E-02	15.839	3.933E-02	16.645	5.320	6.035	21.408	5.217E-02	115.046	9.881	8.229E-02	3.158
90	75.01	0.28516	0.32347	1.58142	2.008E-02	16.269	3.775E-02	18.037	5.143	5.834	22.084	5.004E-02	109.224	10.356	7.882E-02	2.953
100	76.93	0.25740	0.29198	1.56157	1.932E-02	16.726	3.610E-02	19.600	5.045	5.723	22.798	4.782E-02	105.075	10.850	7.520E-02	2.793
125	80.65	0.20701	0.23482	1.51016	1.741E-02	17.978	3.190E-02	24.341	5.039	5.716	24.742	4.219E-02	99.526	12.171	6.607E-02	2.520
150	83.34	0.17312	0.19638	1.45862	1.554E-02	19.389	2.779E-02	30.530	5.285	5.996	26.915	3.670E-02	98.498	13.627	5.721E-02	2.359
175	85.37	0.14877	0.16876	1.40847	1.376E-02	20.974	2.390E-02	38.649	5.750	6.522	29.349	3.151E-02	100.648	15.197	4.913E-02	2.261
200	86.96	0.13042	0.14794	1.36042	1.208E-02	22.772	2.026E-02	49.462	6.451	7.318	32.102	2.668E-02	105.562	17.008	4.145E-02	2.218
225	88.24	0.11611	0.13171	1.31472	1.050E-02	24.831	1.691E-02	64.128	7.446	8.446	35.252	2.225E-02	113.325	19.041	3.452E-02	2.211
250	89.29	0.10462	0.11868	1.27141	9.021E-03	27.234	1.386E-02	84.612	8.852	10.041	38.926	1.821E-02	124.502	21.419	2.819E-02	2.241
275	90.17	0.09520	0.10799	1.23048	7.631E-03	30.094	1.110E-02	114.163	10.868	12.329	43.295	1.456E-02	140.152	24.240	2.251E-02	2.308
300	90.91	0.08734	0.09907	1.19181	6.328E-03	33.592	8.613E-03	158.776	13.867	15.731	48.639	1.129E-02	162.280	27.708	1.741E-02	2.420
350	92.11	0.07496	0.08503	1.12076	3.958E-03	43.965	4.491E-03	355.972	26.684	30.269	64.491	5.867E-03	244.860	37.999	9.024E-03	2.848
400	93.03	0.06565	0.07447	1.05722	1.863E-03	66.732	1.516E-03	1244.781	81.720	92.700	99.308	1.977E-03	508.507	60.667	3.026E-03	3.983
450	93.75	0.05840	0.06625	1.00020												
451	93.76	0.05818	0.06600	0.99912												
452	93.78	0.05805	0.06585	0.99805												
453	93.79	0.05792	0.06570	0.99697												

* [grey shading] means the data are the same as the data of Table A.4.b.1.

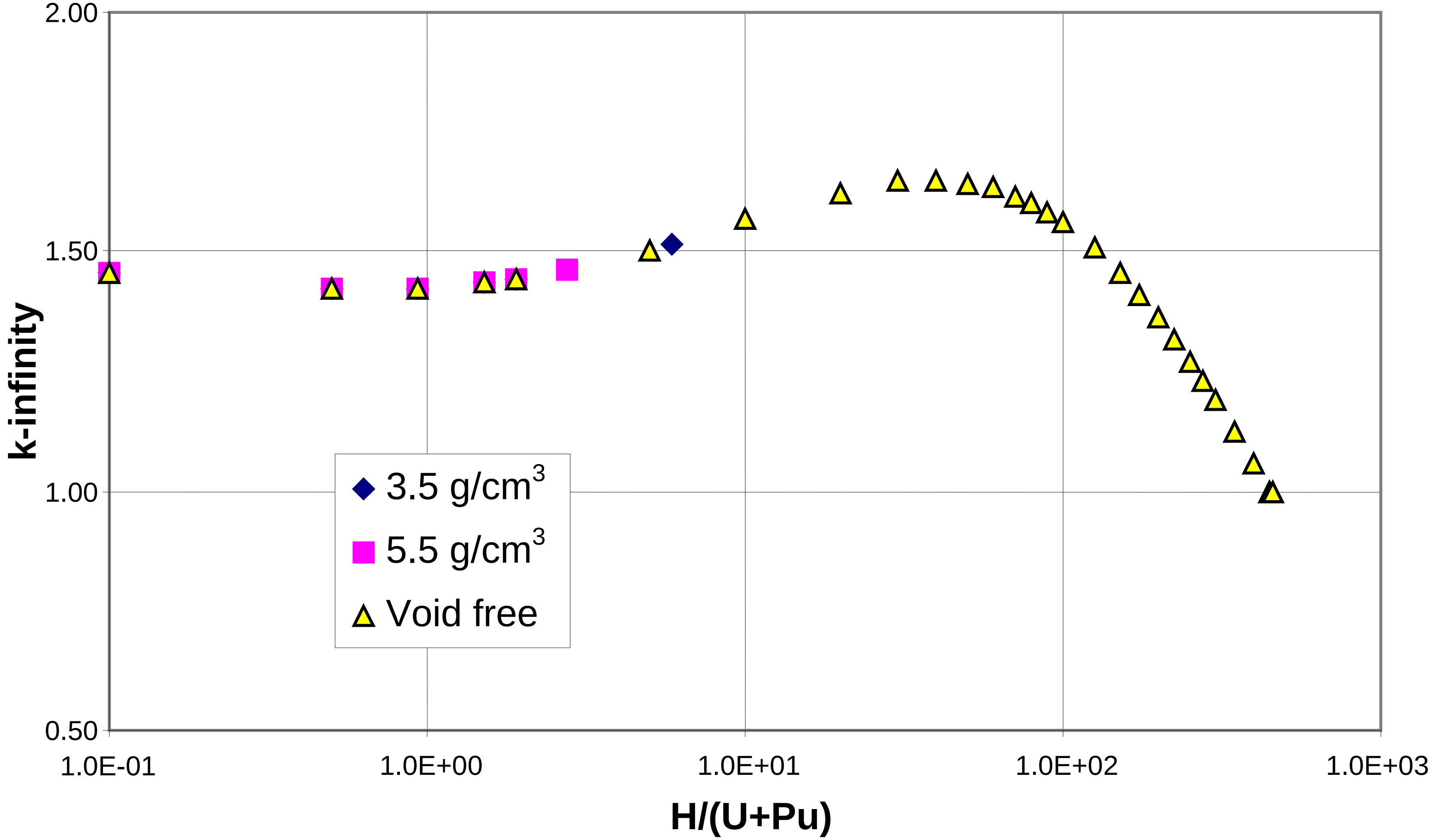

Fig. A.4.c.1. ***k*-infinity [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%].**

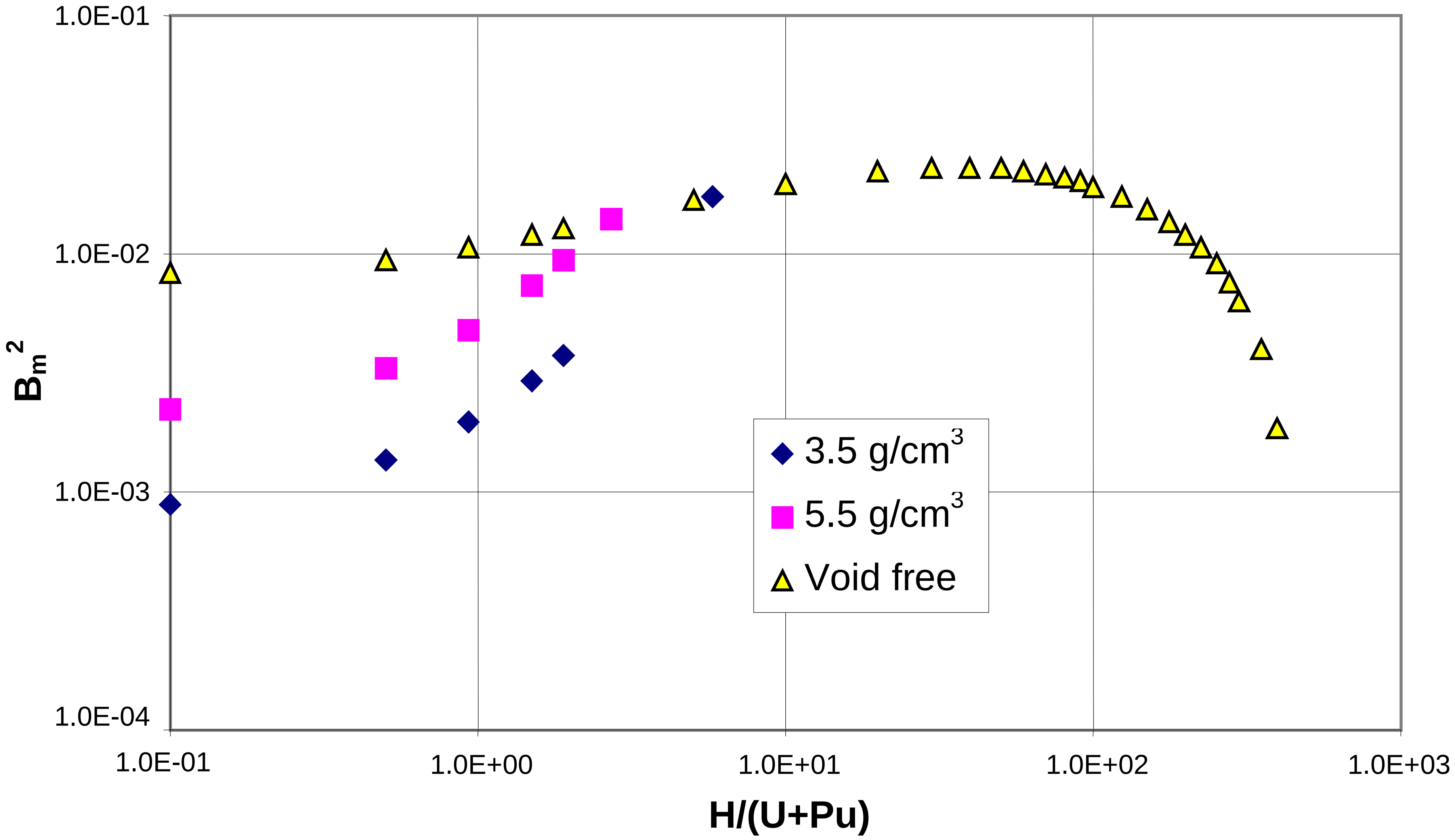

Fig. A.4.c.2. B_m^2 [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%].

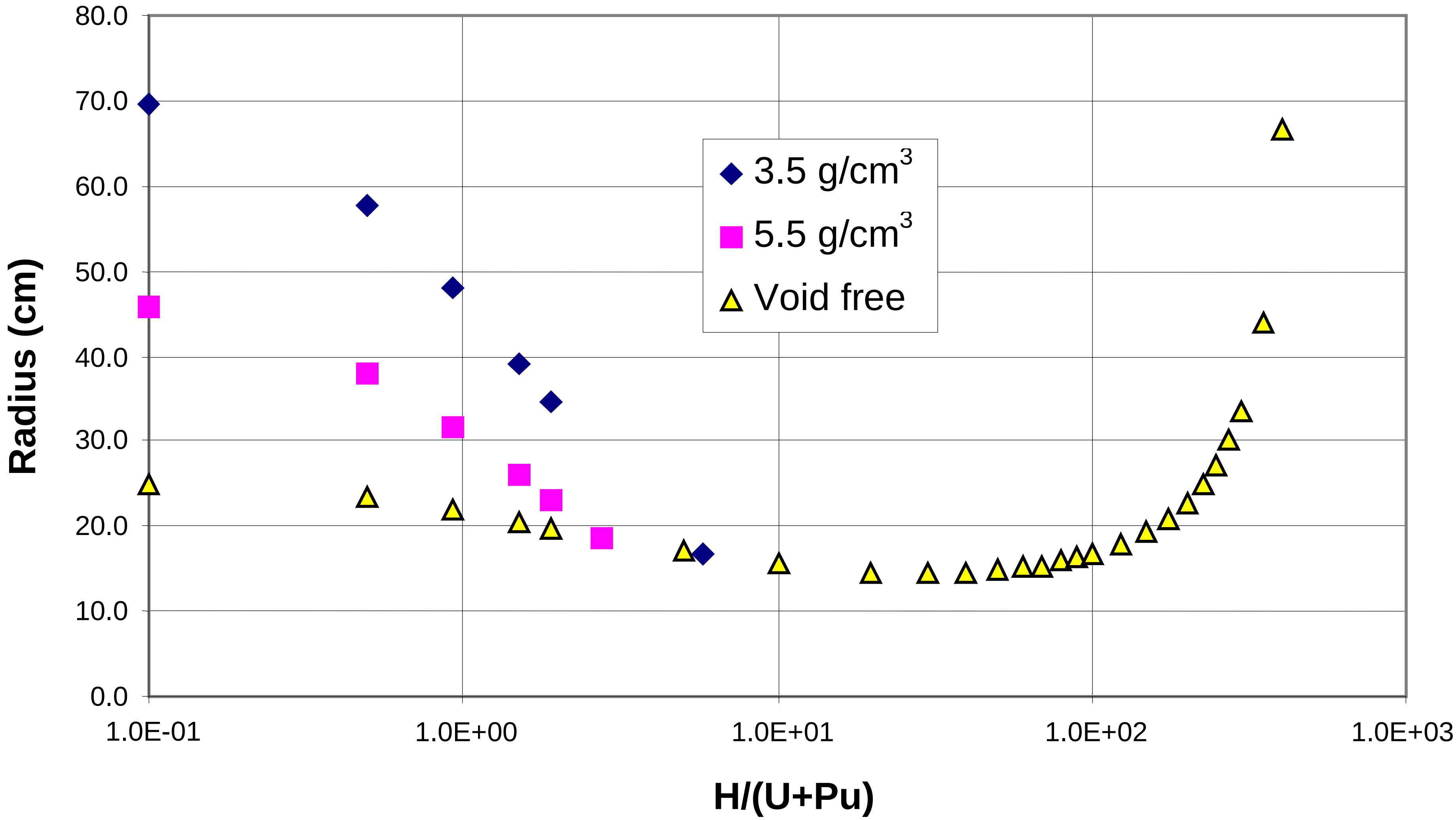

Fig. A.4.c.3. Sphere radius [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

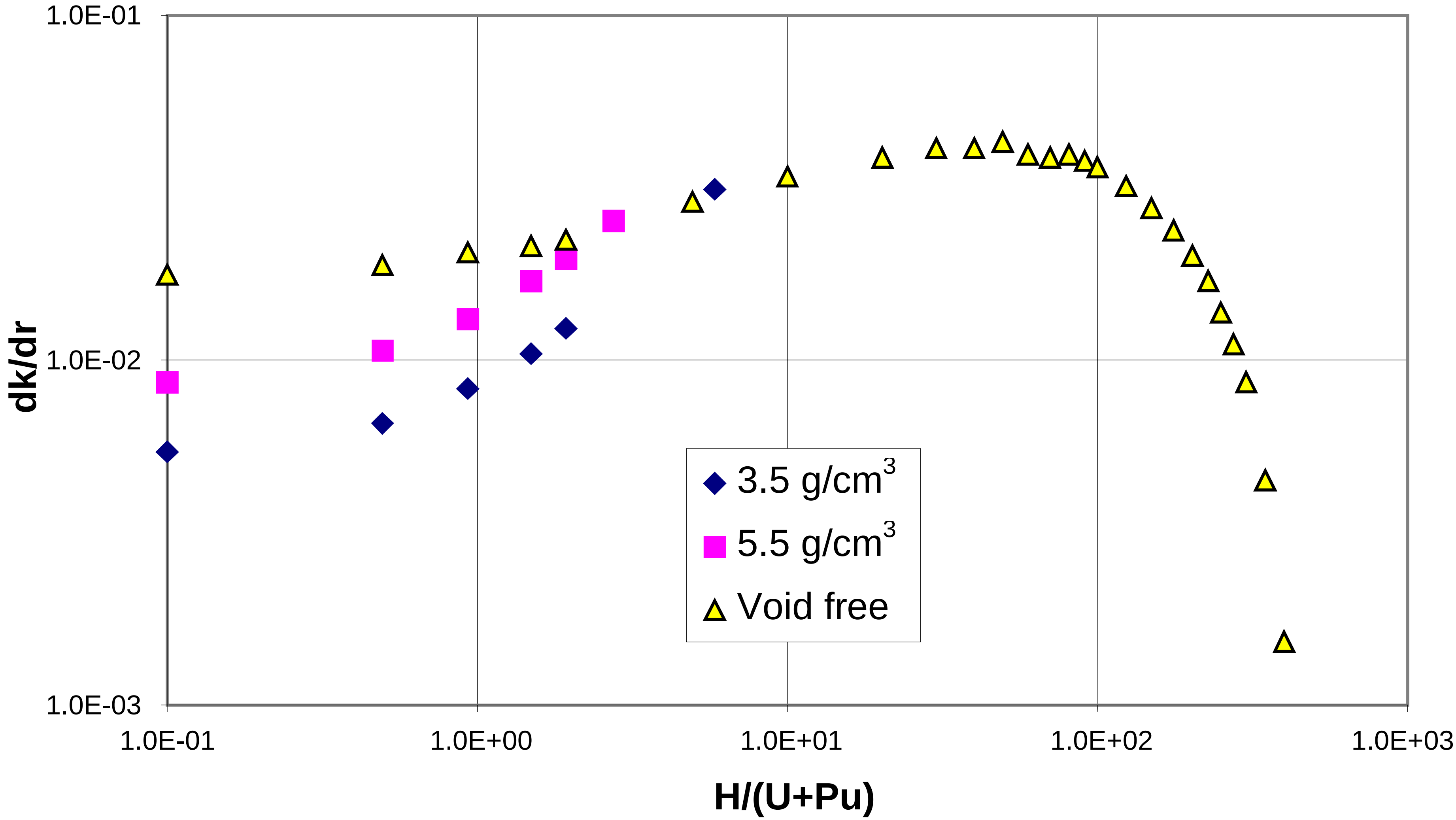

Fig. A.4.c.4. Delta lambda divided by delta dimension [sphere, $^{235}U/U$ = 0.718%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

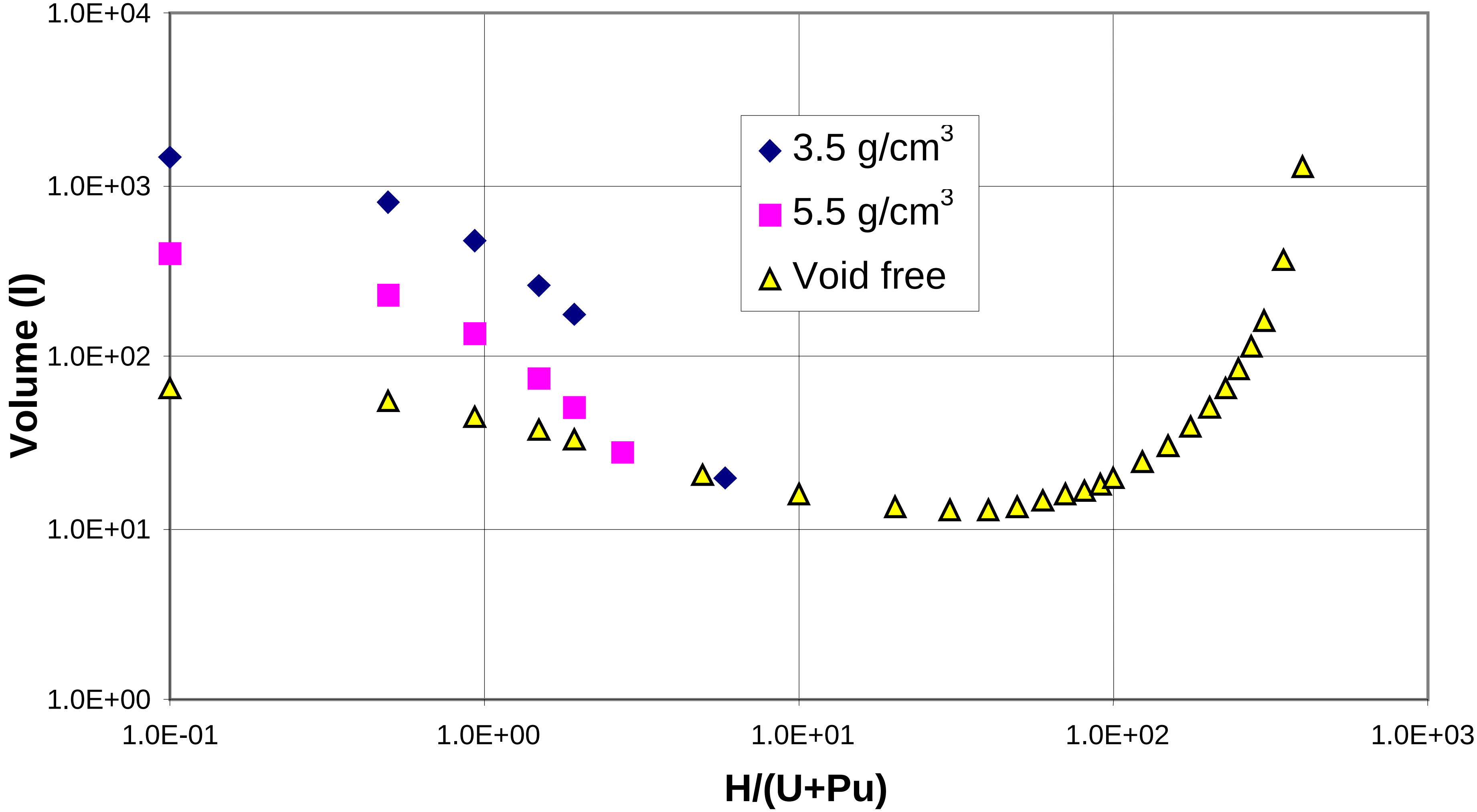

Fig. A.4.c.5. Sphere volume [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

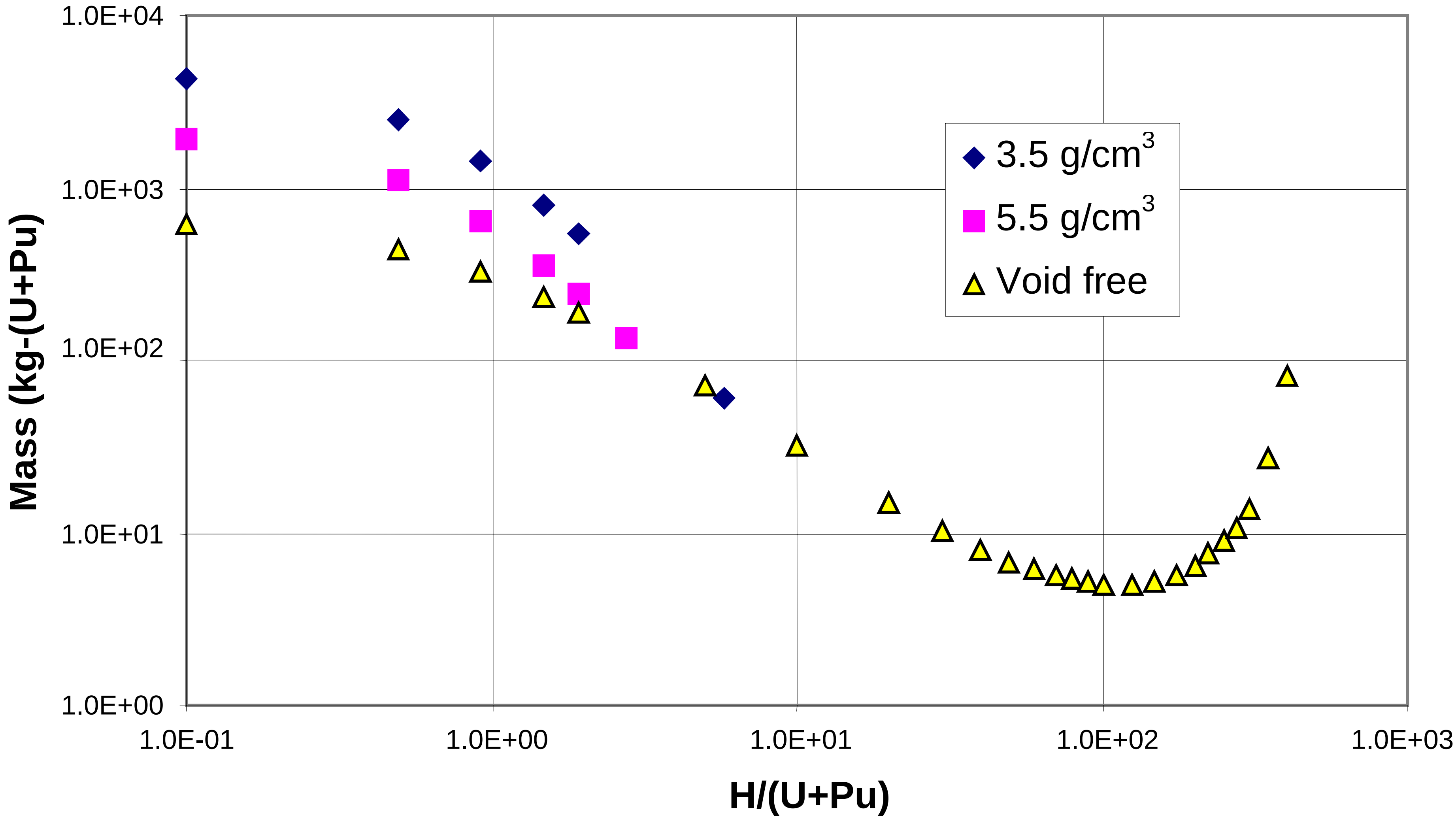

Fig. A.4.c.6. U + Pu mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

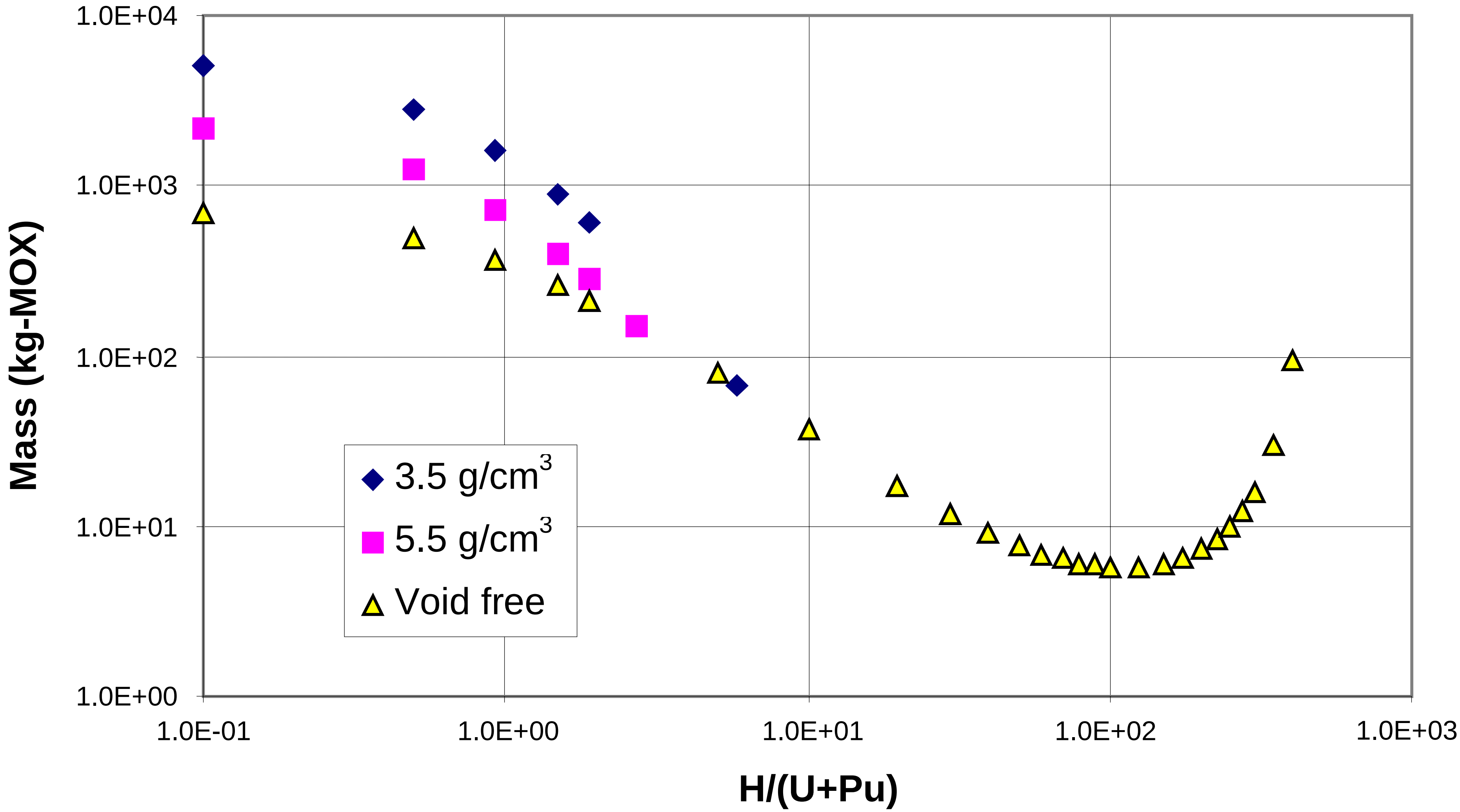

Fig. A.4.c.7. MOX mass [$^{235}U/U$ = 0.718%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

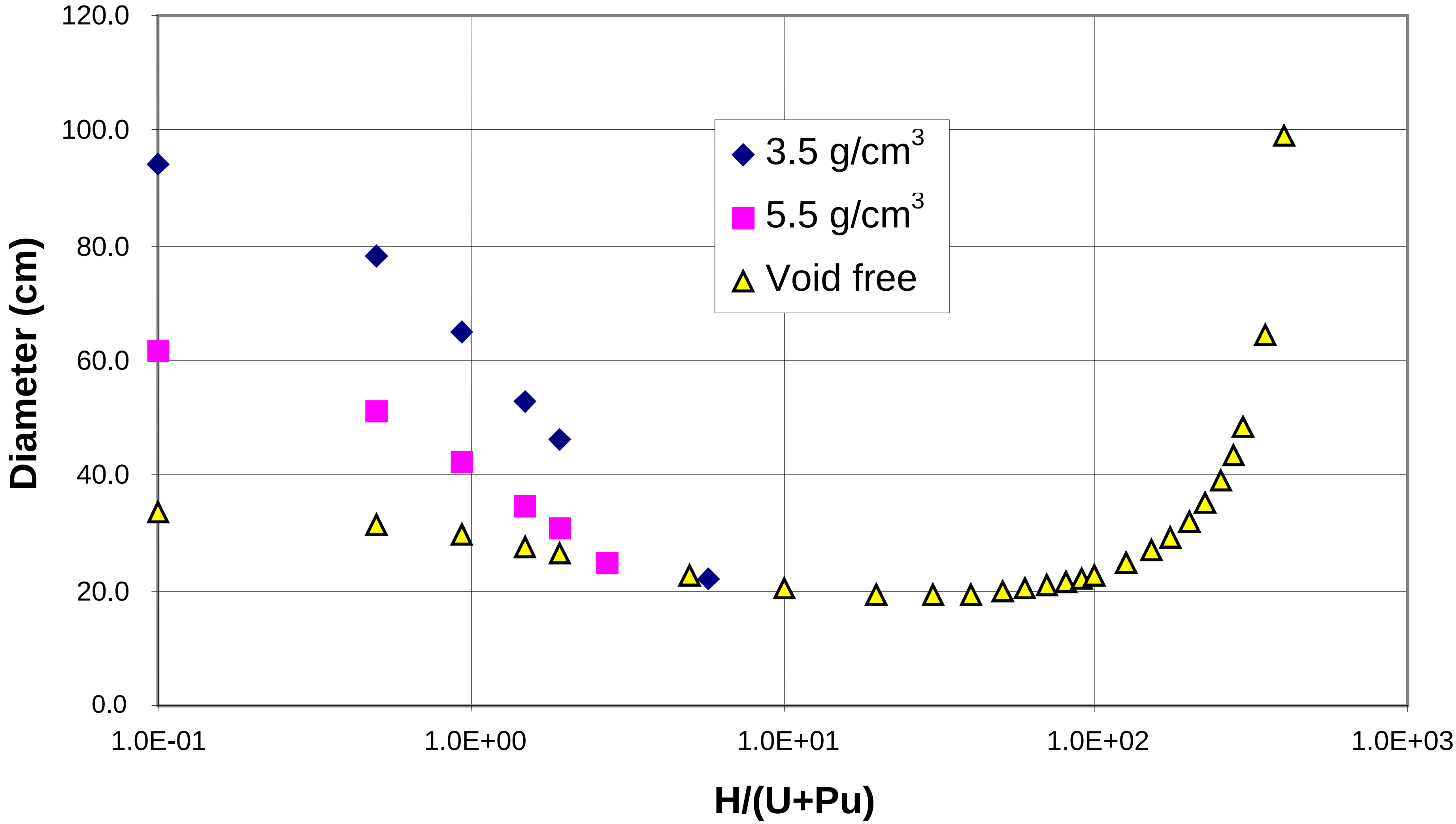

Fig. A.4.c.8. Cylinder diameter [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

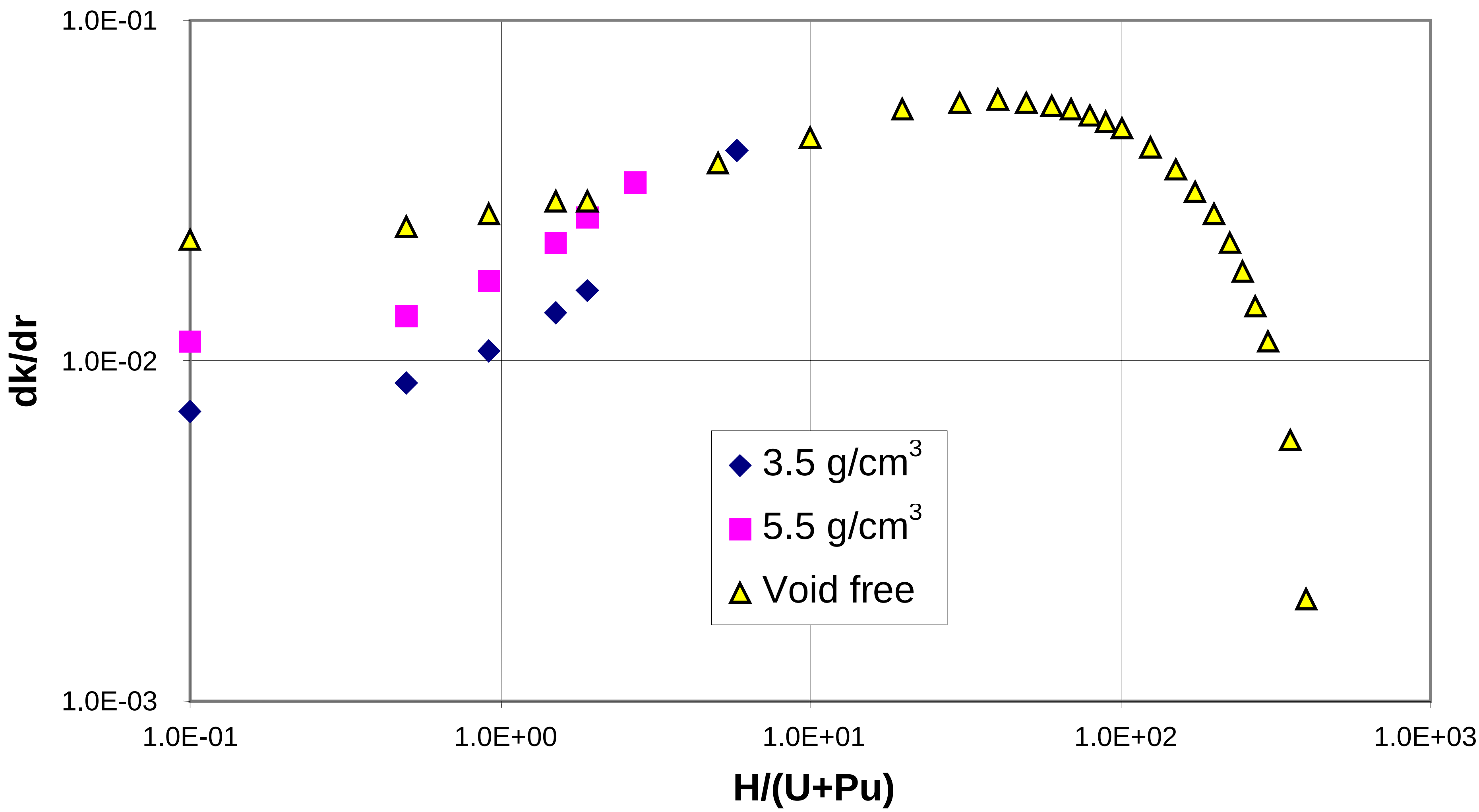

Fig. A.4.c.9. Delta lambda divided by delta dimension [cylinder, ^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

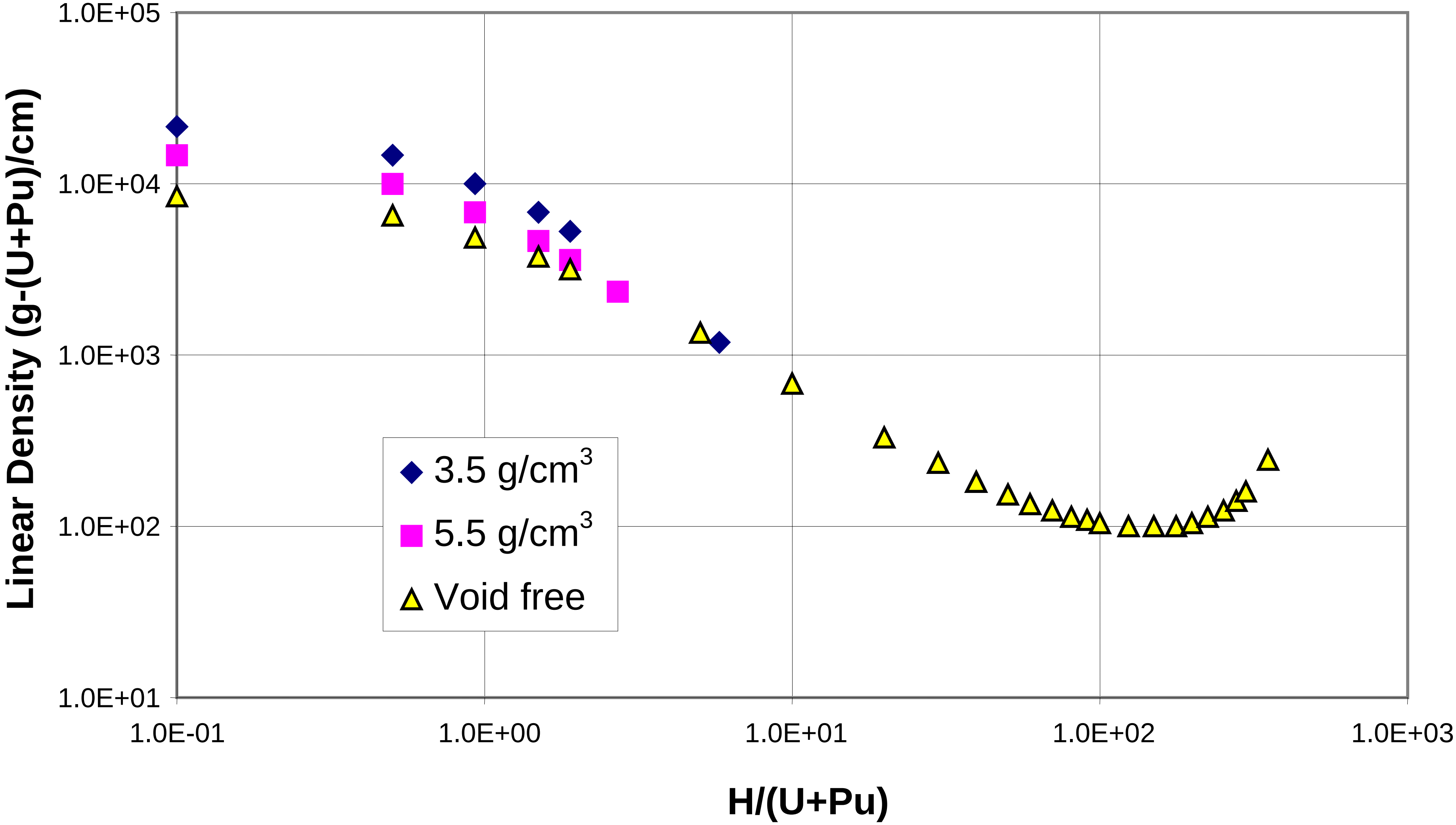

Fig. A.4.c.10. Linear density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

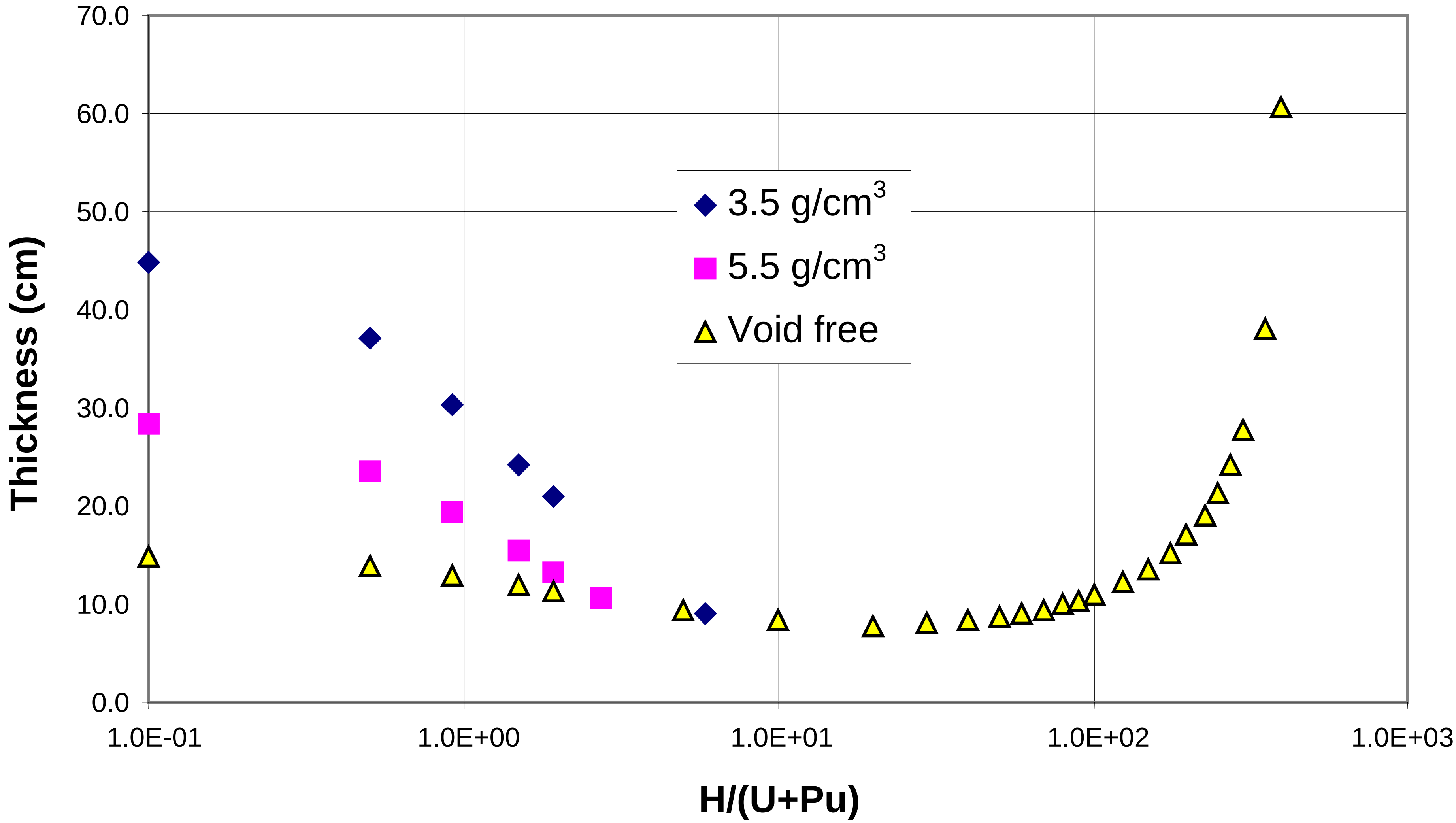

Fig. A.4.c.11. Slab thickness [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

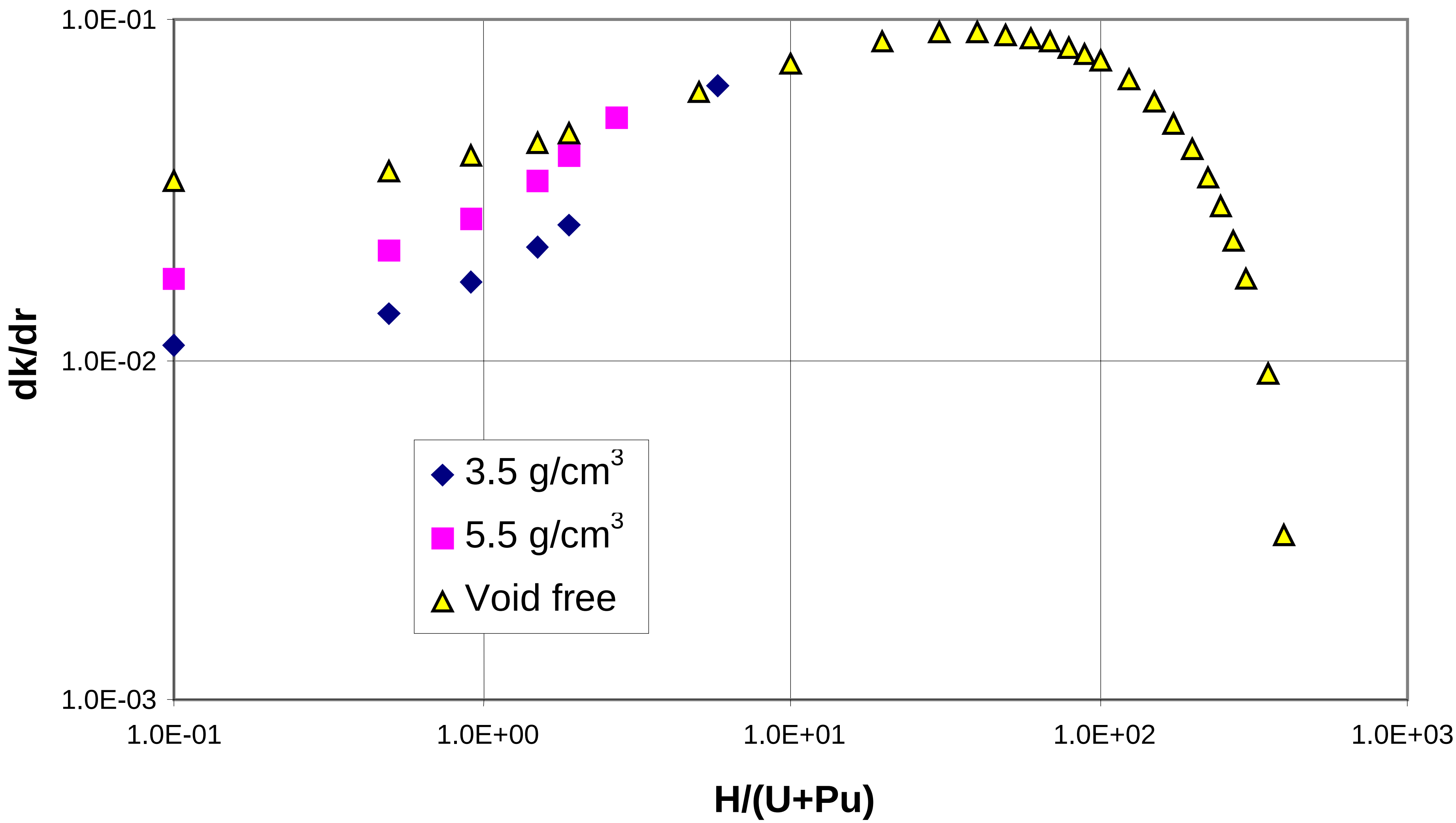

Fig. A.4.c.12. Delta lambda divided by delta dimension [slab, ^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

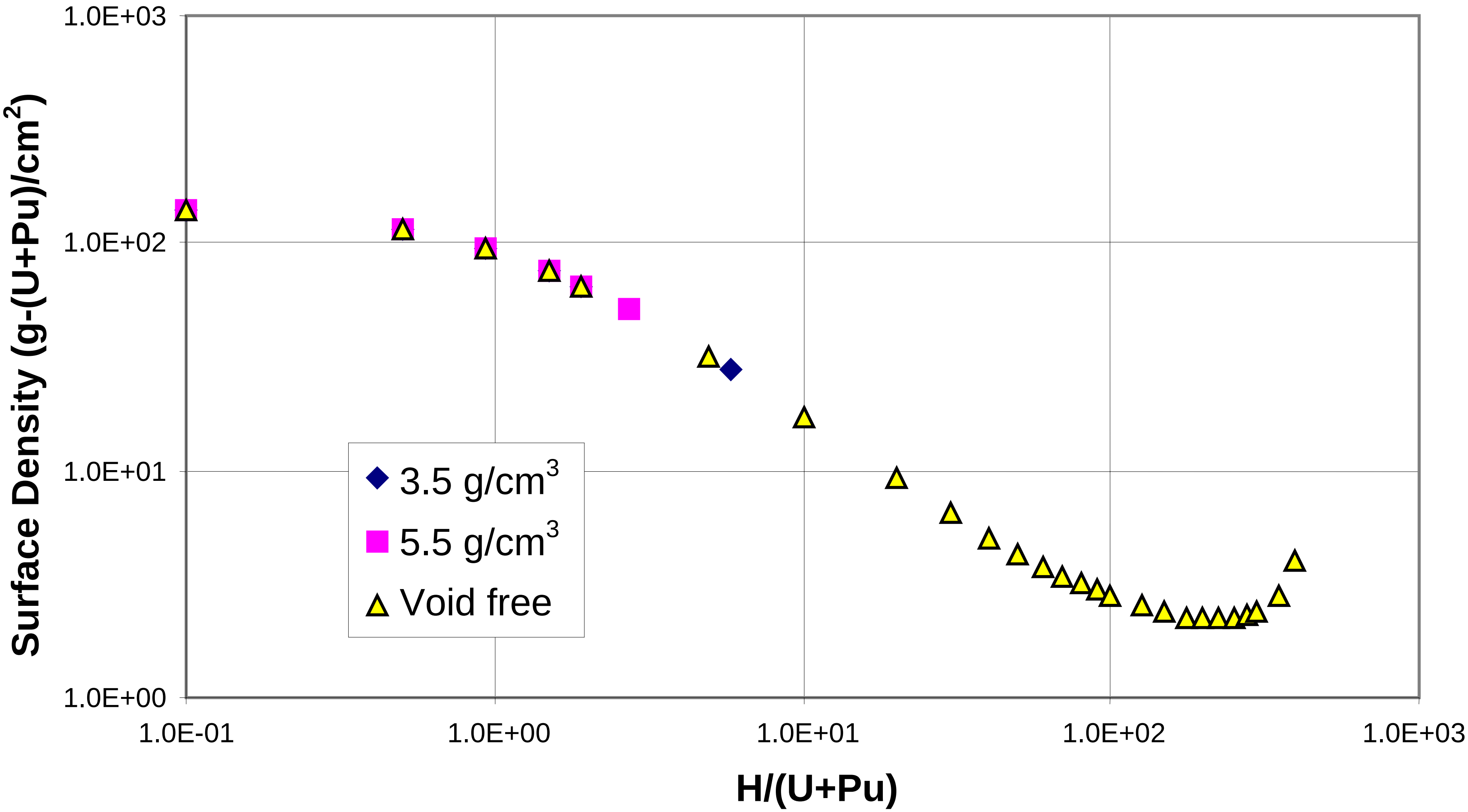

Fig. A.4.c.13. Surface density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

Table A.4.d.1. MOX data [$^{235}U/U$ = 0.718%, $^{239}Pu/Pu$ = 100%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**100.000**	**0.000**	**0.000**	**0.000**

Fissile material oxide density
3.5 g ($UO_2 + PuO_2$)/cm^3

Water reflector
2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08544	3.50000	1.45567	8.881E-04	89.547	6.052E-03	3007.730	9280.175	10527.054	130.208	7.753E-03	41084.932	75.204	1.189E-02	232.039
0.5	1.64	3.08544	3.50000	1.42377	1.346E-03	72.246	7.126E-03	1579.551	4873.612	5528.428	104.731	9.289E-03	26579.966	59.985	1.458E-02	185.079
0.928	3.00	3.08544	3.50000	1.42440	1.952E-03	59.465	8.817E-03	880.809	2717.684	3082.831	85.922	1.126E-02	17890.316	48.785	1.786E-02	150.524
1.5	4.76	3.08544	3.50000	1.43492	2.935E-03	48.045	1.073E-02	464.554	1433.353	1625.938	69.150	1.398E-02	11587.416	38.859	2.208E-02	119.897
1.916	6.00	3.08544	3.50000	1.44413	3.777E-03	42.129	1.236E-02	313.203	966.370	1096.210	60.490	1.576E-02	8867.012	33.776	2.562E-02	104.213
5.84	16.30	3.08544	3.50000	1.51764	1.734E-02	19.268	3.067E-02	29.966	92.458	104.880	27.315	4.036E-02	1808.020	14.624	6.261E-02	45.122
10	25.01	2.07868	2.35797	1.56575	1.968E-02	17.863	3.327E-02	23.875	49.628	56.296	25.192	4.403E-02	1036.070	13.312	6.929E-02	27.670
20	40.01	1.16374	1.32010	1.62420	2.213E-02	16.673	3.805E-02	19.414	22.592	25.628	23.421	5.048E-02	501.368	12.273	7.964E-02	14.283
30	50.01	0.80807	0.91664	1.64574	2.289E-02	**16.374**	3.976E-02	**18.389**	14.859	16.856	**22.996**	5.280E-02	335.605	**12.085**	8.313E-02	9.766
40	57.15	0.61891	0.70207	1.64985	2.295E-02	16.387	4.006E-02	18.433	11.408	12.941	23.037	5.322E-02	257.974	12.148	8.386E-02	7.519
50	62.51	0.50151	0.56889	1.64426	2.265E-02	16.554	3.961E-02	19.001	9.529	10.809	23.308	5.260E-02	213.976	12.352	8.288E-02	6.194
60	66.67	0.42155	0.47819	1.63283	2.214E-02	16.812	3.870E-02	19.904	8.391	9.518	23.714	5.138E-02	186.180	12.638	8.092E-02	5.328
70	70.01	0.36358	0.41243	1.61775	2.151E-02	17.131	3.751E-02	21.060	7.657	8.686	24.210	4.979E-02	167.376	12.979	7.835E-02	4.719
80	72.73	0.31963	0.36258	1.60033	2.082E-02	17.497	3.614E-02	22.436	7.171	8.135	24.775	5.120E-02	154.089	13.362	7.539E-02	4.271
90	75.01	0.28516	0.32347	1.58142	2.008E-02	17.899	3.719E-02	24.019	6.849	7.769	25.395	4.916E-02	144.434	13.778	7.225E-02	3.929
100	76.93	0.25740	0.29198	1.56157	1.932E-02	18.333	3.315E-02	25.810	6.643	7.536	26.062	4.704E-02	137.312	14.224	6.897E-02	3.661
125	80.65	0.20701	0.23482	1.51016	1.741E-02	19.542	3.153E-02	31.262	**6.472**	**7.341**	27.915	4.163E-02	126.690	15.391	6.095E-02	3.186
150	83.34	0.17312	0.19638	1.45862	1.554E-02	20.922	2.753E-02	38.362	6.641	7.534	30.023	3.629E-02	**122.557**	16.774	5.282E-02	2.904
175	85.37	0.14877	0.16876	1.40847	1.376E-02	22.486	2.371E-02	47.622	7.085	8.037	32.410	3.123E-02	122.732	18.298	4.857E-02	2.722
200	86.96	0.13042	0.14794	1.36042	1.208E-02	24.267	2.014E-02	59.862	7.807	8.856	35.128	2.649E-02	126.395	20.044	4.114E-02	2.614
225	88.24	0.11611	0.13171	1.31472	1.050E-02	26.314	1.684E-02	76.324	8.862	10.053	38.250	2.212E-02	133.422	22.057	3.431E-02	2.561
250	89.29	0.10462	0.11868	1.27141	9.021E-03	28.709	1.381E-02	99.118	10.370	11.763	41.904	1.813E-02	144.280	24.417	2.807E-02	**2.554**
275	90.17	0.09520	0.10799	1.23048	7.631E-03	31.562	1.107E-02	131.699	12.538	14.222	46.257	1.452E-02	159.989	27.233	2.243E-02	2.593
300	90.91	0.08734	0.09907	1.19181	6.328E-03	35.055	8.596E-03	180.449	15.760	17.878	51.590	1.127E-02	182.571	30.687	1.738E-02	2.680
350	92.11	0.07496	0.08503	1.12076	3.958E-03	45.425	4.476E-03	392.621	29.431	33.385	67.439	5.592E-03	267.754	40.960	9.020E-03	3.070
400	93.03	0.06565	0.07447	1.05722	1.863E-03	68.194	1.514E-03	1328.400	87.209	98.927	102.244	1.980E-03	539.019	63.619	3.027E-03	4.177
450	93.75	0.05840	0.06625	1.00020												
451	**93.76**	**0.05818**	**0.06600**	**0.99912**												
452	93.78	0.05805	0.06585	0.99805												
453	93.79	0.05792	0.06570	0.99697												

* [grey shading] means the data are the same as the data of Table A.4.b.2.

Table A.4.d.2. MOX data [$^{235}U/U$ = 0.718%, $^{239}Pu/Pu$ = 100%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5 % and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**100.000**	**0.000**	**0.000**	**0.000**

Fissile material oxide density
5.5 g (UO_2 + PuO_2)/cm^3

Water reflector
2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	4.84855	5.50000	1.45568	2.193E-03	57.182	9.461E-03	783.177	3797.273	4307.472	83.107	1.223E-02	26301.419	47.857	1.868E-02	232.038
0.5	1.64	4.84855	5.50000	1.42378	3.324E-03	46.162	1.083E-02	412.048	1997.837	2266.266	66.882	1.456E-02	17034.350	38.159	2.244E-02	185.016
0.928	3.00	4.84855	5.50000	1.42441	4.820E-03	38.024	1.349E-02	230.276	1116.504	1266.517	54.911	1.785E-02	11482.080	31.026	2.678E-02	150.431
1.5	4.76	4.84855	5.50000	1.43491	7.246E-03	30.764	1.709E-02	121.954	591.300	670.747	44.238	2.227E-02	7452.276	24.720	3.521E-02	119.856
1.916	6.00	4.84855	5.50000	1.44413	9.327E-03	26.993	2.013E-02	82.385	399.447	453.116	38.731	2.569E-02	5712.291	21.476	3.968E-02	104.128
2.73	8.34	4.84855	5.50000	1.46219	1.419E-02	21.752	2.537E-02	43.108	209.013	237.096	31.088	3.319E-02	3680.241	17.025	5.071E-02	82.546
5	14.29	3.42507	3.88526	1.50475	1.671E-02	19.726	2.808E-02	32.151	110.119	124.914	28.004	3.705E-02	2109.597	15.067	5.790E-02	51.605
10	25.01	2.07868	2.35797	1.56575	1.968E-02	17.863	3.327E-02	23.875	49.628	56.296	25.192	4.403E-02	1036.070	13.312	6.929E-02	27.670
20	40.01	1.16374	1.32010	1.62420	2.213E-02	16.673	3.805E-02	19.414	22.592	25.628	23.421	5.048E-02	501.368	12.273	7.964E-02	14.283
30	50.01	0.80807	0.91664	1.64574	2.289E-02	**16.374**	3.976E-02	**18.389**	14.859	16.856	**22.996**	5.280E-02	335.605	**12.085**	8.313E-02	9.766
40	57.15	0.61891	0.70207	1.64985	2.295E-02	16.387	4.006E-02	18.433	11.408	12.941	23.037	5.322E-02	257.974	12.148	8.386E-02	7.519
50	62.51	0.50151	0.56889	1.64426	2.265E-02	16.554	3.961E-02	19.001	9.529	10.809	23.308	5.260E-02	213.976	12.352	8.288E-02	6.194
60	66.67	0.42155	0.47819	1.63283	2.214E-02	16.812	3.870E-02	19.904	8.391	9.518	23.714	5.138E-02	186.180	12.638	8.092E-02	5.328
70	70.01	0.36358	0.41243	1.61775	2.151E-02	17.131	3.751E-02	21.060	7.657	8.686	24.210	4.979E-02	167.376	12.979	7.835E-02	4.719
80	72.73	0.31963	0.36258	1.60033	2.082E-02	17.497	3.614E-02	22.436	7.171	8.135	24.775	5.120E-02	154.089	13.362	7.539E-02	4.271
90	75.01	0.28516	0.32347	1.58142	2.008E-02	17.899	3.719E-02	24.019	6.849	7.769	25.395	4.916E-02	144.434	13.778	7.225E-02	3.929
100	76.93	0.25740	0.29198	1.56157	1.932E-02	18.333	3.315E-02	25.810	6.643	7.536	26.062	4.704E-02	137.312	14.224	6.897E-02	3.661
125	80.65	0.20701	0.23482	1.51016	1.741E-02	19.542	3.153E-02	31.262	**6.472**	**7.341**	27.915	4.163E-02	126.690	15.391	6.095E-02	3.186
150	83.34	0.17312	0.19638	1.45862	1.554E-02	20.922	2.753E-02	38.362	6.641	7.534	30.023	3.629E-02	**122.557**	16.774	5.282E-02	2.904
175	85.37	0.14877	0.16876	1.40847	1.376E-02	22.486	2.371E-02	47.622	7.085	8.037	32.410	3.123E-02	122.732	18.298	4.857E-02	Pu+U
200	86.96	0.13042	0.14794	1.36042	1.208E-02	24.267	2.014E-02	59.862	7.807	8.856	35.128	2.649E-02	126.395	20.044	4.114E-02	2.614
225	88.24	0.11611	0.13171	1.31472	1.050E-02	26.314	1.684E-02	76.324	8.862	10.053	38.250	2.212E-02	133.422	22.057	3.431E-02	2.561
250	89.29	0.10462	0.11868	1.27141	9.021E-03	28.709	1.381E-02	99.118	10.370	11.763	41.904	1.813E-02	144.280	24.417	2.807E-02	**2.554**
275	90.17	0.09520	0.10799	1.23048	7.631E-03	31.562	1.107E-02	131.699	12.538	14.222	46.257	1.452E-02	159.989	27.233	2.243E-02	2.593
300	90.91	0.08734	0.09907	1.19181	6.328E-03	35.055	8.596E-03	180.449	15.760	17.878	51.590	1.127E-02	182.571	30.687	1.738E-02	2.680
350	92.11	0.07496	0.08503	1.12076	3.958E-03	45.425	4.476E-03	392.621	29.431	33.385	67.439	5.592E-03	267.754	40.960	9.020E-03	3.070
400	93.03	0.06565	0.07447	1.05722	1.863E-03	68.194	1.514E-03	1328.400	87.209	98.927	102.244	1.980E-03	539.019	63.619	3.027E-03	4.177
450	93.75	0.05840	0.06625	1.00020												
451	**93.76**	**0.05818**	**0.06600**	**0.99912**												
452	93.78	0.05805	0.06585	0.99805												
453	93.79	0.05792	0.06570	0.99697												

* [grey shading] means the data are the same as the data of Table A.4.b.2.

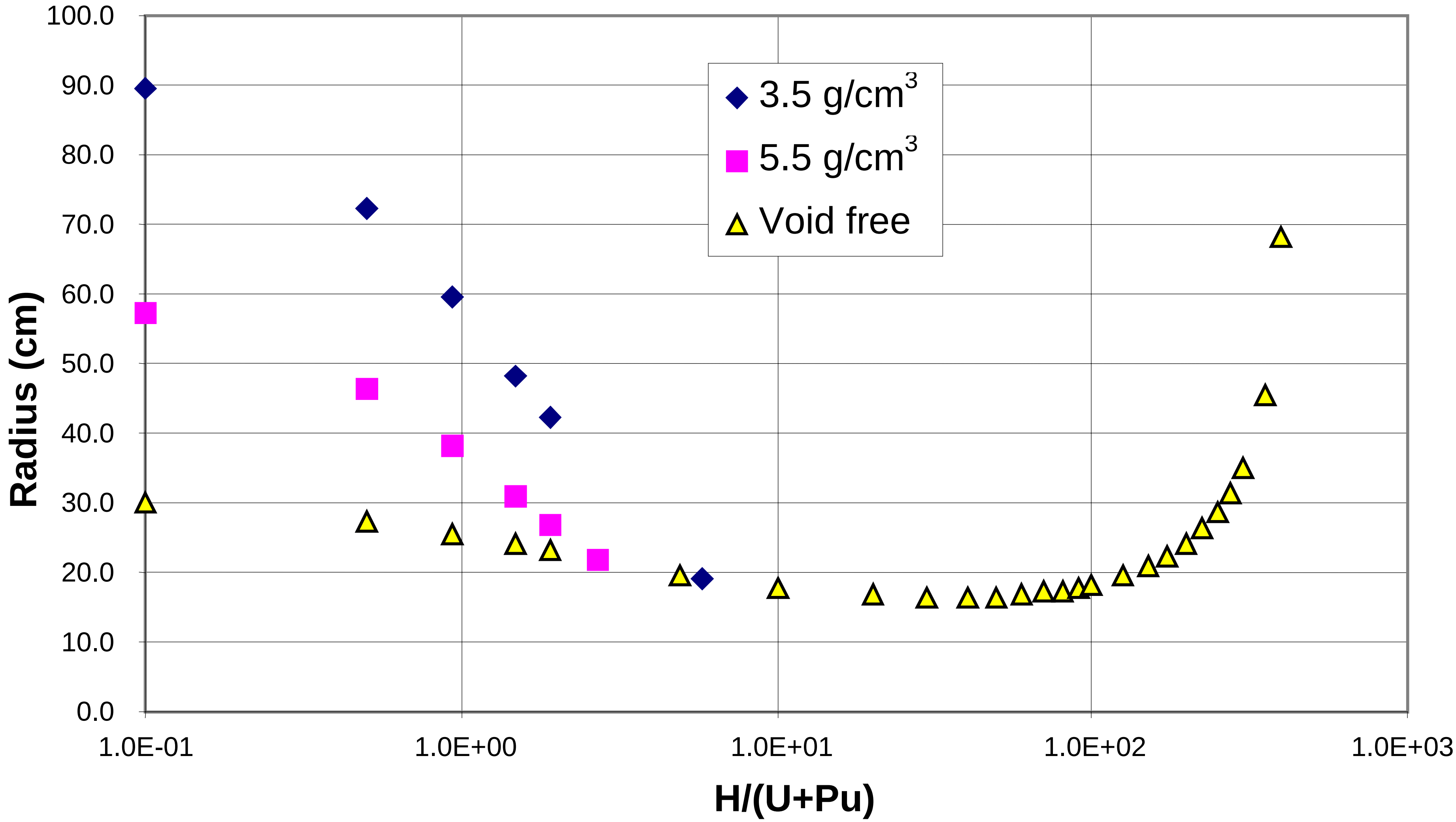

Fig. A.4.d.1. Sphere radius [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

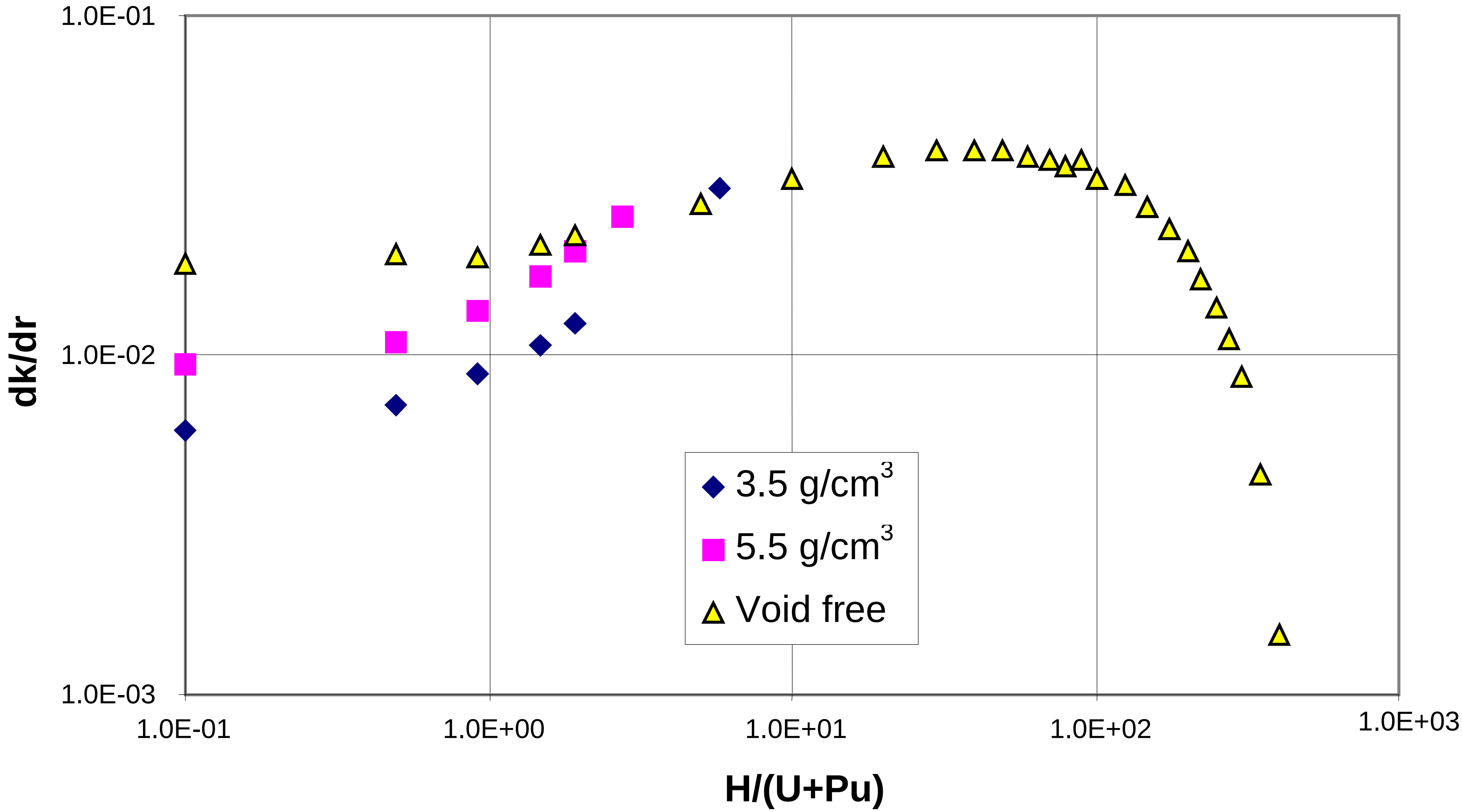

Fig. A.4.d.2. Delta lambda divided by delta dimension [sphere, ^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

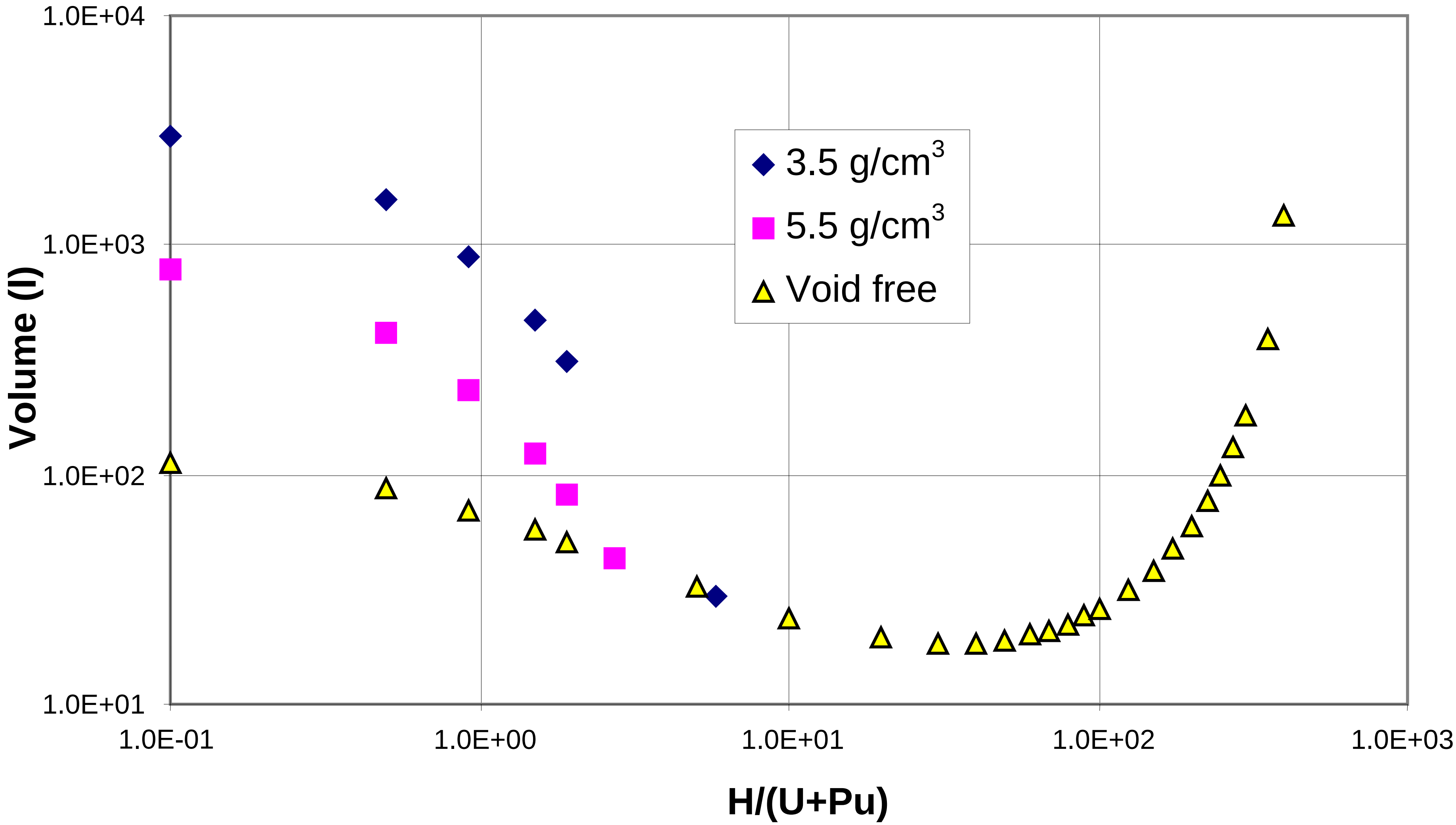

Fig. A.4.d.3. Sphere volume [$^{235}U/U$ = 0.718%, $^{239}Pu/Pu$ = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

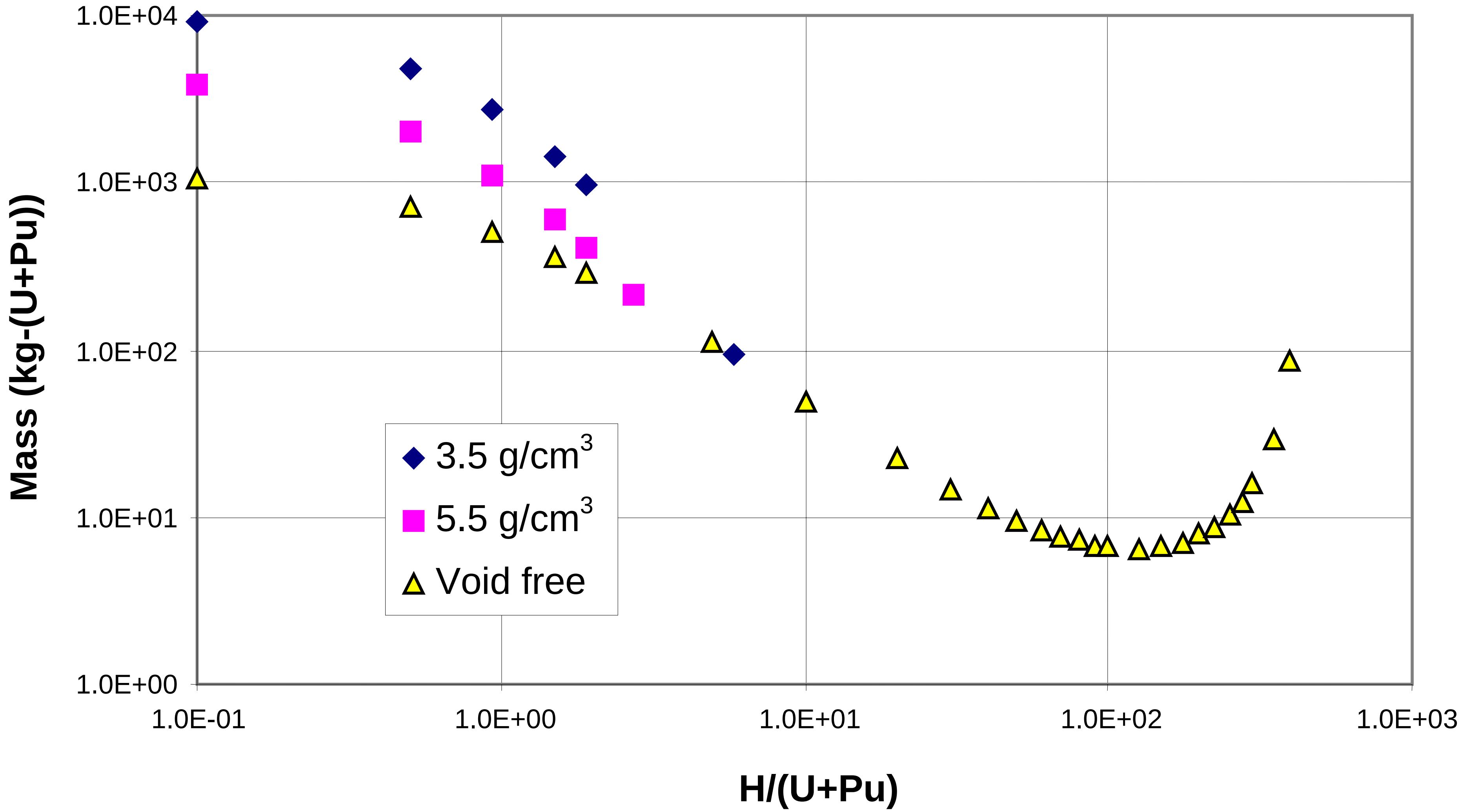

Fig. A.4.d.4. U + Pu mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

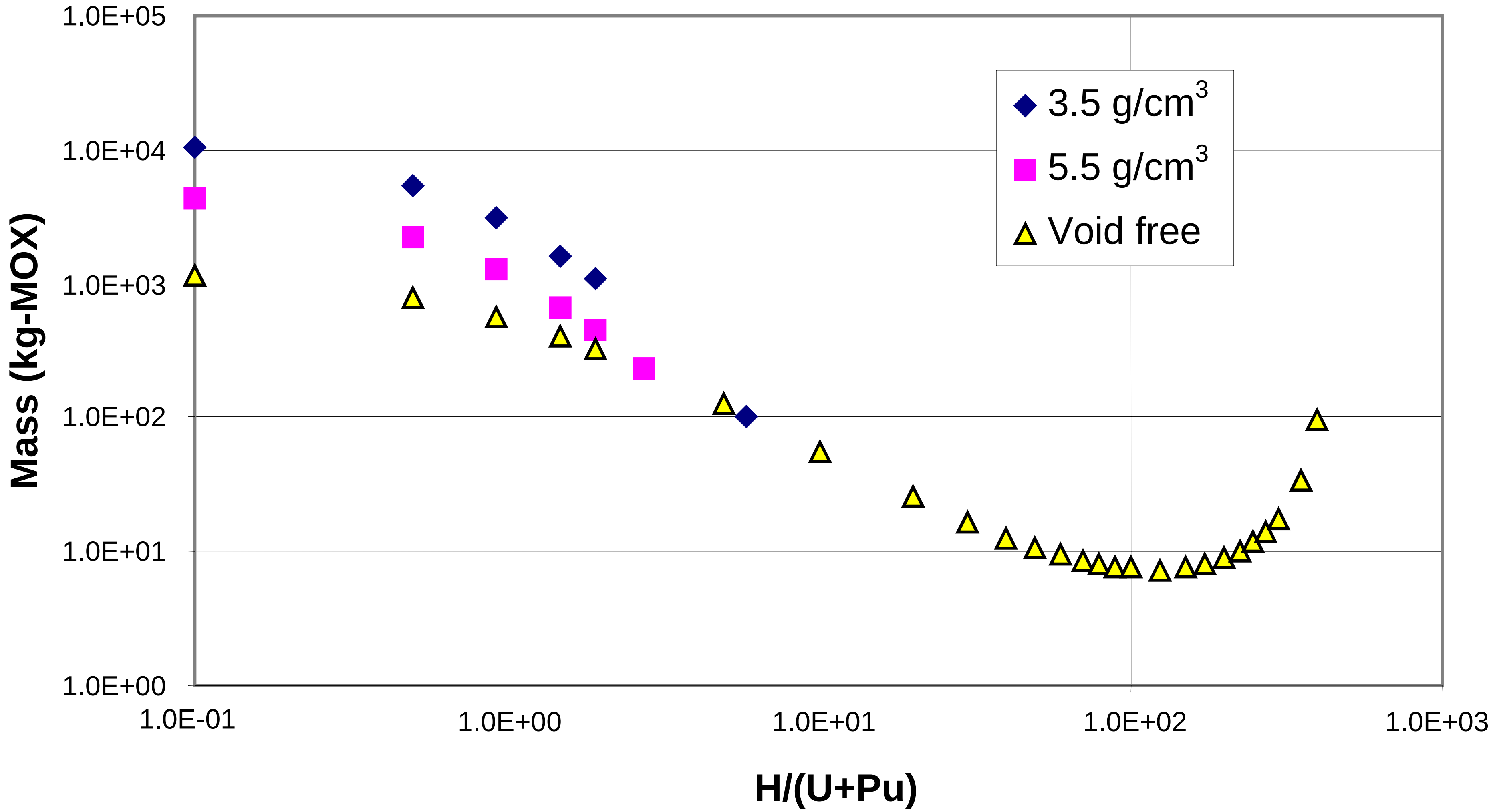

Fig. A.4.d.5. MOX mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

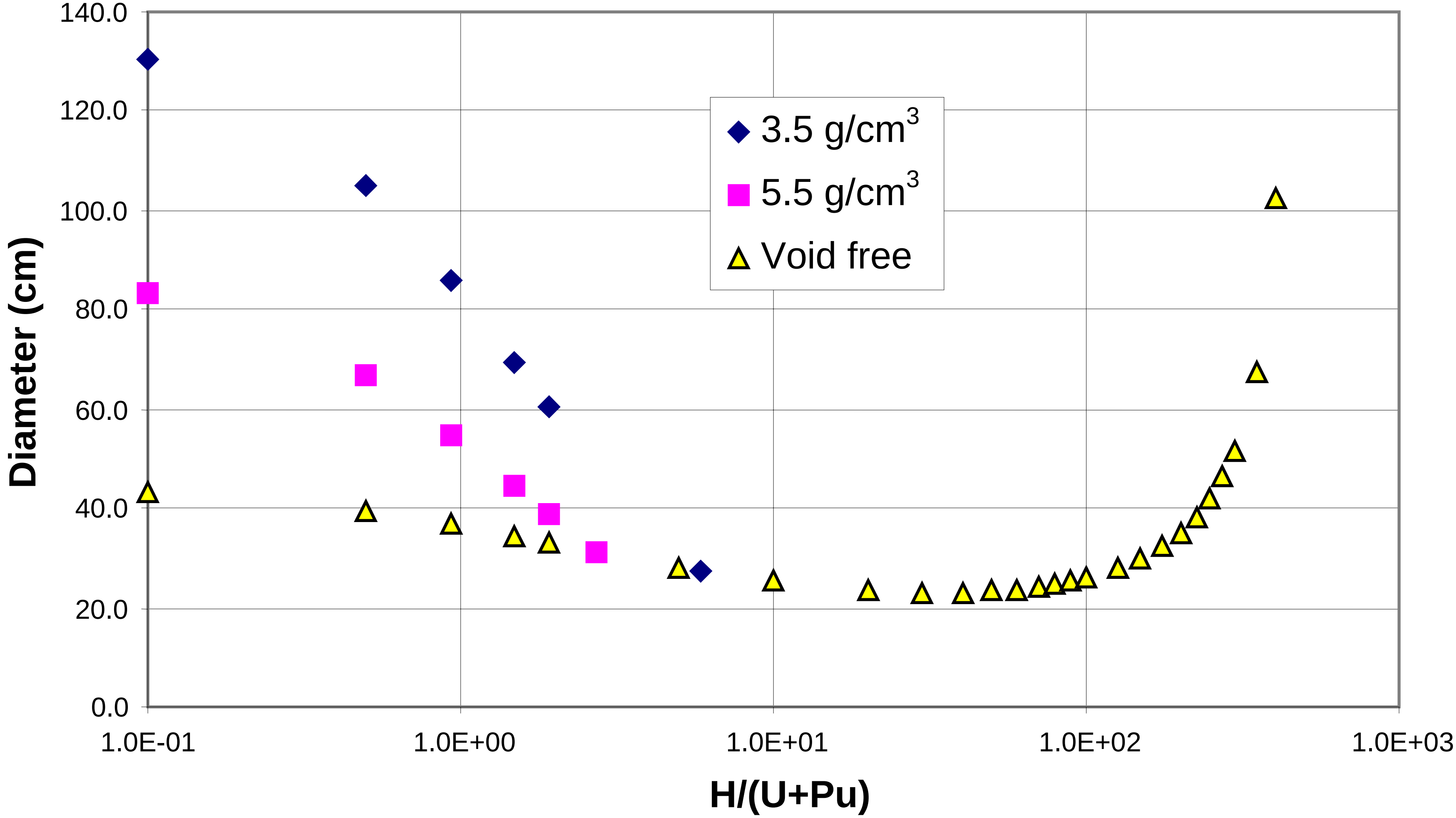

Fig. A.4.d.6. Cylinder diameter [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

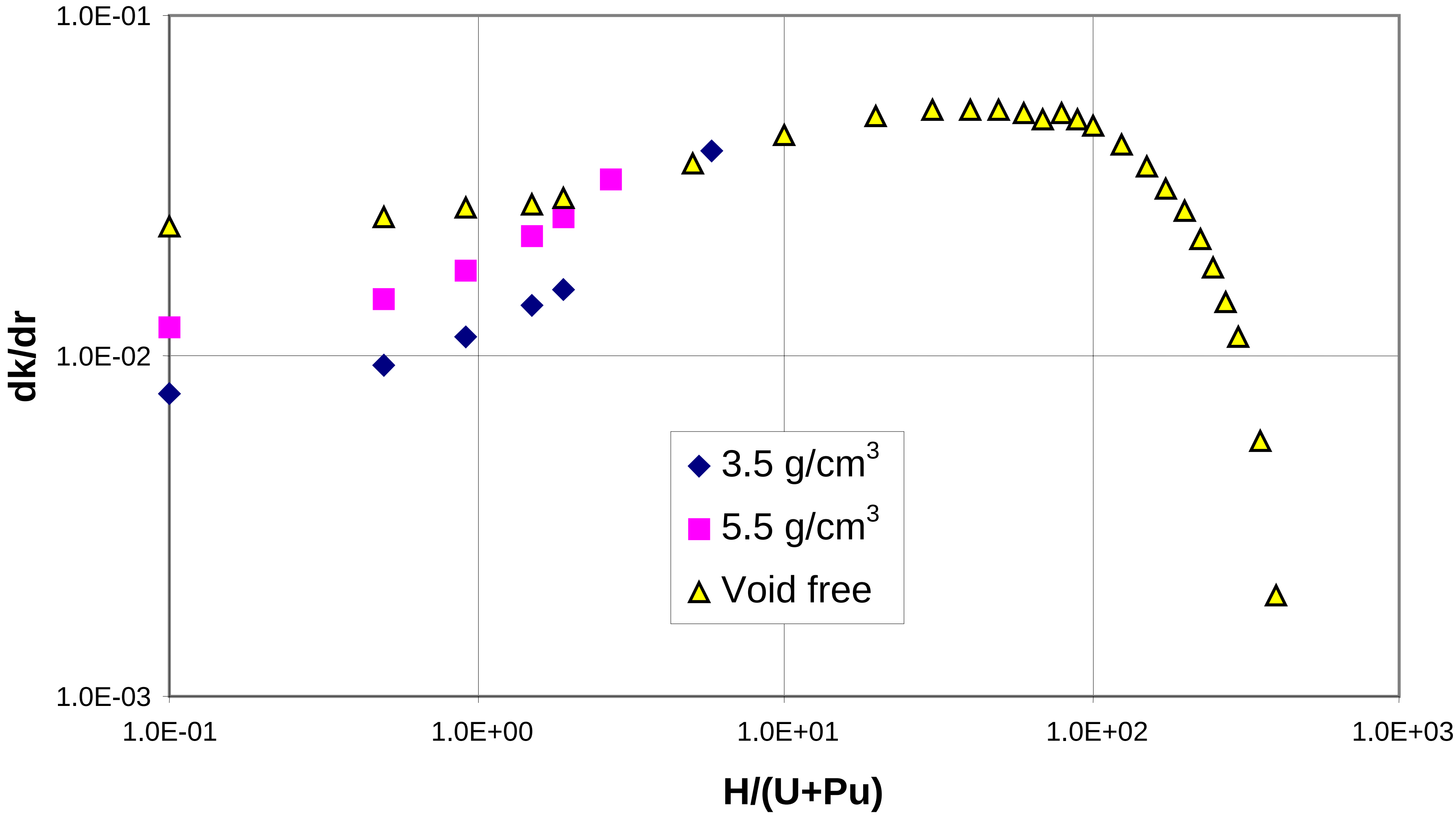

Fig. A.4.d.7. Delta lambda divided by delta dimension [cylinder, $^{235}U/U = 0.718\%$, $^{239}Pu/Pu = 100\%$, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

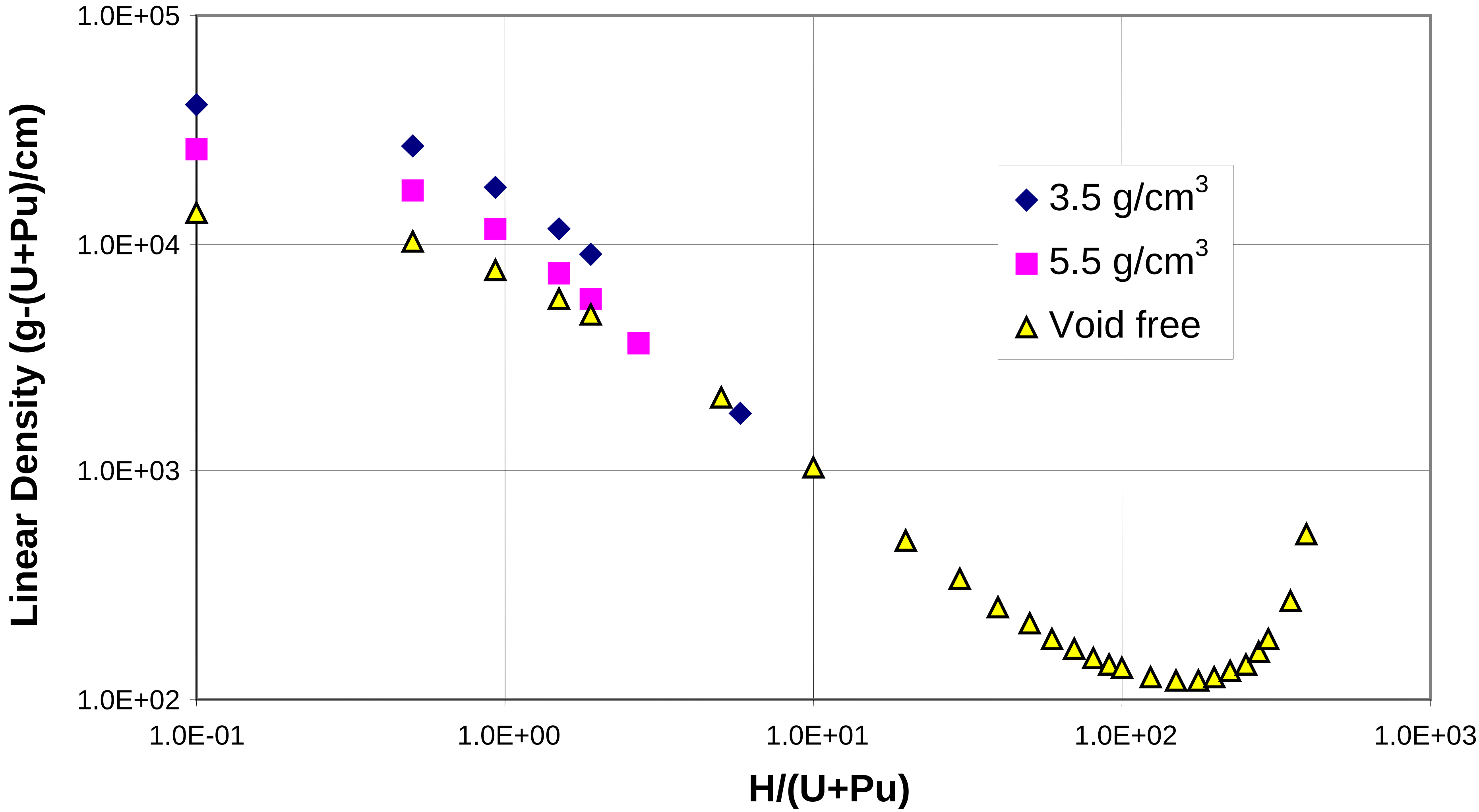

Fig. A.4.d.8. Linear density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

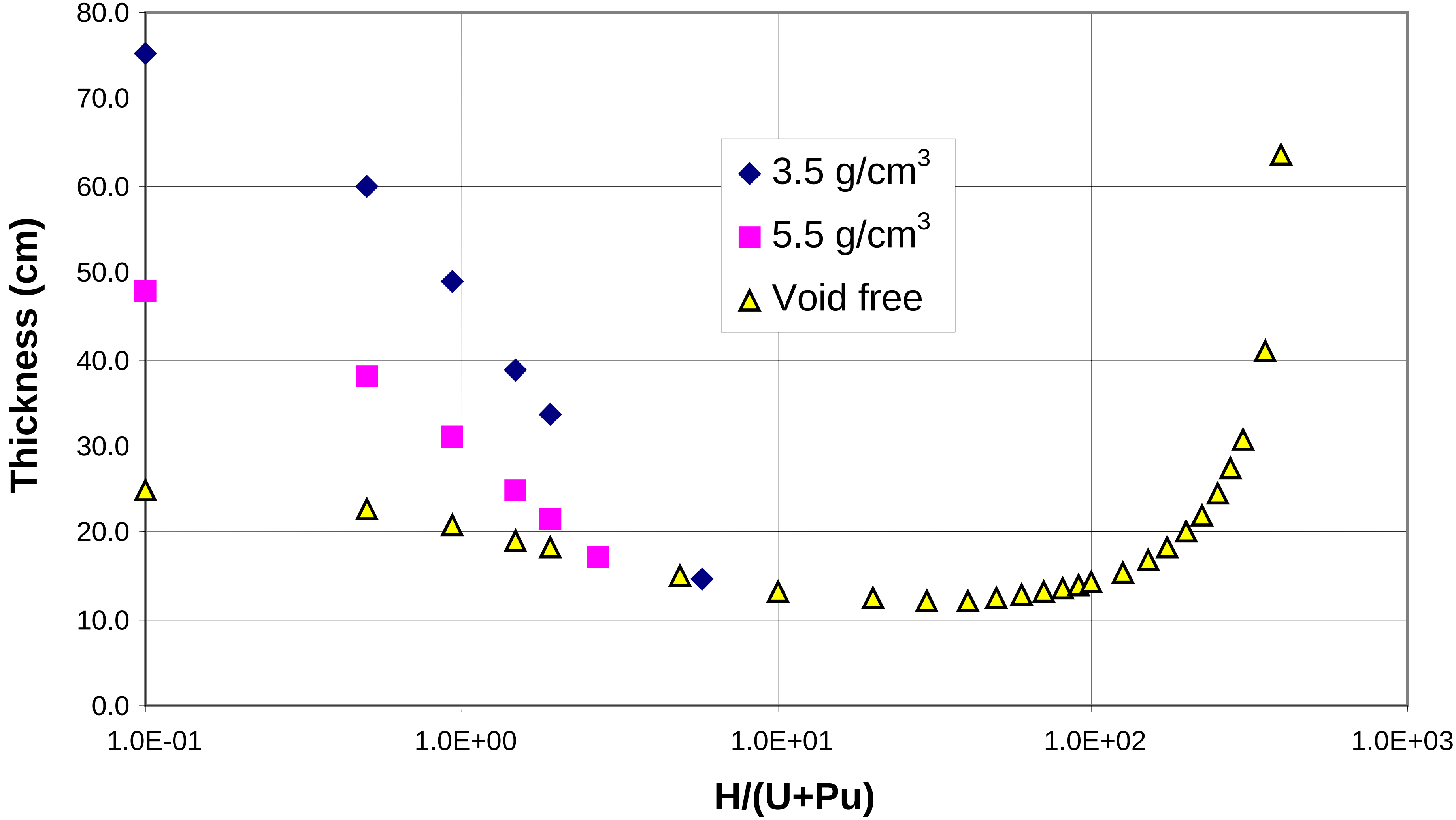

Fig. A.4.d.9. Slab thickness [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

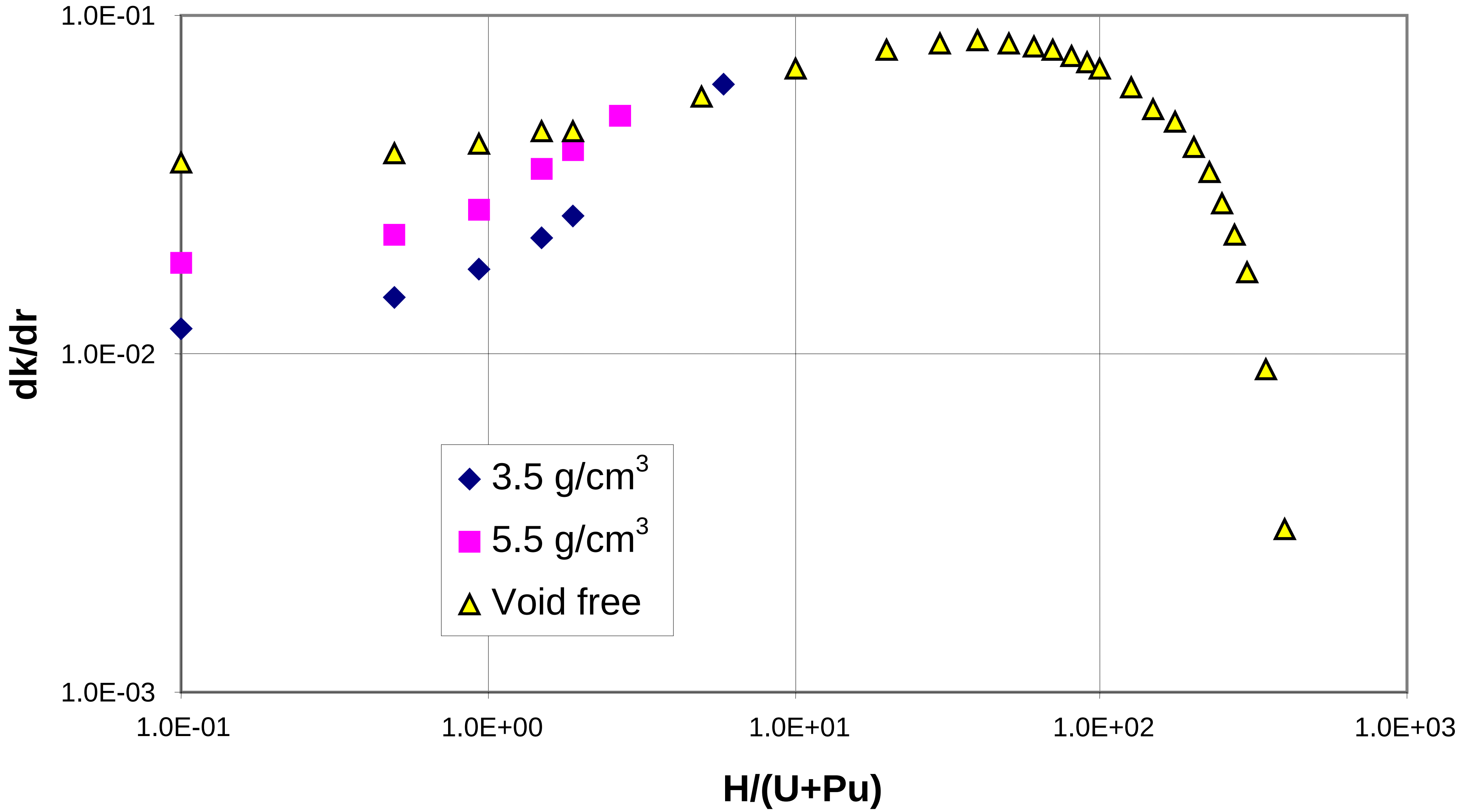

Fig. A.4.d.10. Delta lambda divided by delta dimension [slab, ^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

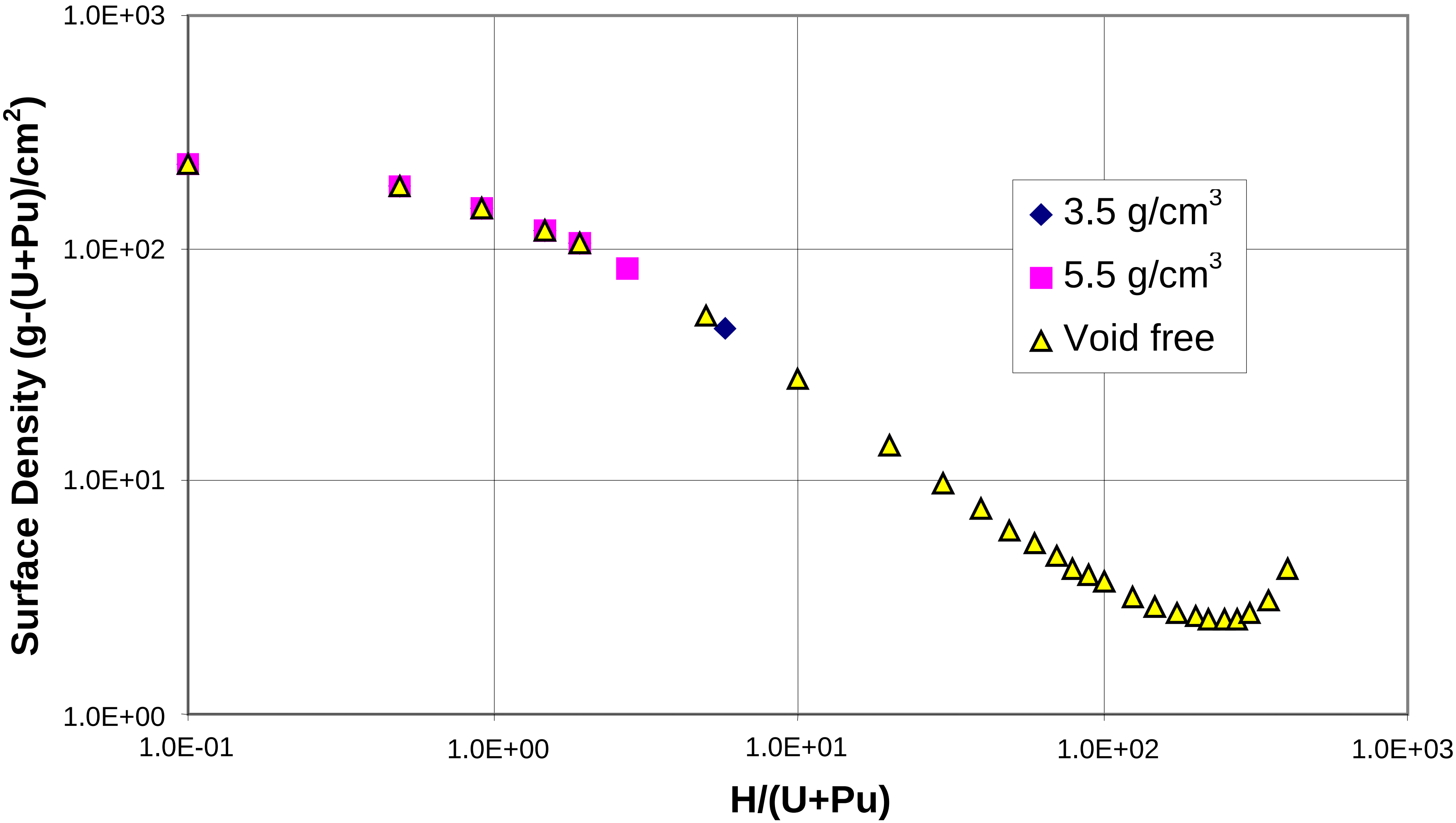

Fig. A.4.d.11. Surface density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

APPENDIX A.5

DATA PLOTS

(^{235}U/U = <u>0.718%</u>, ^{239}Pu/Pu = <u>95%</u>)

APPENDIX A.5

DATA PLOTS (^{235}U/U = <u>0.718%</u>, ^{239}Pu/Pu = <u>95%</u>)

(a) Plutonium weight percentages: 35% and density: 3.5 g/cm^3

Figure A.5.a.11. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 30.0 cm]

Figure A.5.a.12. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 2.5 cm]

(b) Plutonium weight percentages: <u>12.5%</u> and density: <u>void-free</u>

Table A.5.b.1. MOX data [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Table A.5.b.2. MOX data [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Figure A.5.b.1. *k*-infinity [^{235}U/U = 0.718%,^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.5.b.2. B_m^2 [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.5.b.3-1. Sphere radius [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.5.b.3-2. Sphere radius [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.5.b.4. Sphere volume [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.5.b.5. U + Pu mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.5.b.6. MOX mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.5.b.7-1. Cylinder diameter [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.5.b.7-2. Cylinder diameter infinity [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.5.b.8. Linear density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.5.b.9-1. Slab thickness [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

Figure A.5.b.9-2: Slab thickness [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free]

(b) Plutonium weight percentages: 12.5%, density: 3.5 and 5.5 g/cm^3 and water reflector: 30 cm

(d) Plutonium weight percentages: 12.5%, density: 3.5 and 5.5 g/cm^3 and water reflector: 2.5 cm

Table A.5.a.1. MOX data [$^{235}U/U$ = 0.718%, $^{239}Pu/Pu$ = 95%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	99.282	95.000	5.000	0.000	0.000

Maximum fissile material oxide density = 3.5 g (UO_2 + PuO_2)/cm^3

Water reflector 30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 35 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08582	3.49998	2.10445	2.813E-03	34.987	1.579E-02	179.388	553.560	627.856	45.236	2.102E-02	4959.309	18.385	3.367E-02	56.734
0.5	1.64	3.08582	3.49998	1.88621	3.440E-03	32.573	1.662E-02	144.764	446.717	506.673	42.300	2.205E-02	4336.478	17.333	3.490E-02	53.487
0.928	3.00	3.08582	3.49998	1.77646	4.234E-03	30.059	1.779E-02	113.769	351.072	398.191	39.165	2.355E-02	3717.587	16.149	3.699E-02	49.834
1.5	4.76	3.08582	3.49998	1.68672	5.380E-03	27.282	1.923E-02	85.061	262.484	297.713	35.640	2.544E-02	3078.511	14.741	3.981E-02	45.487
1.916	6.00	3.08582	3.49998	1.64204	6.275E-03	25.598	2.023E-02	70.260	216.809	245.908	33.482	2.676E-02	2716.960	13.848	4.182E-02	42.731
5.88	16.38	3.08582	3.49998	1.49478	1.836E-02	16.102	3.107E-02	17.489	53.967	61.211	21.140	4.098E-02	1083.105	8.509	6.349E-02	26.257
10	24.99	2.08477	2.36458	1.47792	1.801E-02	16.222	2.837E-02	17.881	37.277	42.280	21.308	4.007E-02	743.405	8.628	6.265E-02	17.988
20	39.98	1.16618	1.32270	1.50591	1.908E-02	15.660	3.076E-02	16.086	18.759	21.277	20.537	4.358E-02	386.304	8.292	6.891E-02	9.670
40	57.13	0.61990	0.70310	1.56768	2.116E-02	14.834	3.552E-02	13.674	8.476	9.614	19.449	5.034E-02	184.172	7.906	7.991E-02	4.901
50	62.49	0.50226	0.56967	1.58886	2.182E-02	14.630	3.951E-02	13.115	6.587	7.471	19.200	5.259E-02	145.422	**7.852**	8.346E-02	3.944
60	66.65	0.42215	0.47881	1.60478	2.229E-02	14.509	4.074E-02	12.794	5.401	6.126	19.069	5.425E-02	120.560	7.854	8.618E-02	3.316
70	69.99	0.36408	0.41295	1.61652	2.260E-02	14.448	4.164E-02	12.634	4.600	5.217	**19.020**	5.545E-02	103.443	7.895	8.812E-02	2.874
80	72.71	0.32005	0.36301	1.62492	2.280E-02	**14.431**	4.223E-02	**12.588**	4.029	4.570	19.031	5.623E-02	91.037	7.964	8.940E-02	2.549
90	74.99	0.28553	0.32385	1.63063	2.291E-02	14.446	4.260E-02	12.627	3.605	4.089	19.086	5.672E-02	81.687	8.053	9.020E-02	2.299
100	76.91	0.25772	0.29231	1.63413	2.294E-02	14.487	4.281E-02	12.734	3.282	3.722	19.176	5.698E-02	74.432	8.158	9.061E-02	2.102
150	83.32	0.17333	0.19659	1.62990	2.240E-02	14.928	4.215E-02	13.935	2.415	2.739	19.950	5.604E-02	54.181	8.825	8.893E-02	1.530
200	86.95	0.13057	0.14809	1.60568	2.126E-02	15.595	3.995E-02	15.888	2.074	2.353	21.030	5.305E-02	45.352	9.627	8.389E-02	1.257
250	89.28	0.10474	0.11880	1.57255	1.989E-02	16.393	3.710E-02	18.453	1.933	2.192	22.288	4.920E-02	40.864	10.514	7.755E-02	1.101
275	90.16	0.09531	0.10810	1.55432	1.917E-02	16.831	3.557E-02	19.970	1.903	2.159	22.971	4.714E-02	39.500	10.985	7.418E-02	1.047
300	90.90	0.08744	0.09918	1.53548	1.845E-02	17.291	3.401E-02	21.656	**1.894**	**2.148**	23.687	4.503E-02	38.533	11.474	7.076E-02	1.003
350	92.10	0.07504	0.08511	1.49694	1.700E-02	18.283	3.086E-02	25.599	1.921	2.179	25.221	4.082E-02	37.490	12.509	6.391E-02	0.939
400	93.02	0.06572	0.07454	1.45827	1.558E-02	19.369	2.777E-02	30.439	2.000	2.269	26.894	3.668E-02	**37.333**	13.627	5.722E-02	0.896
450	93.75	0.05847	0.06632	1.42020	1.422E-02	20.555	2.479E-02	36.379	2.127	2.413	28.716	3.271E-02	37.867	14.793	5.109E-02	0.865
500	94.34	0.05265	0.05972	1.38312	1.290E-02	21.864	2.196E-02	43.778	2.305	2.614	30.720	2.894E-02	39.025	16.112	4.505E-02	0.848
550	94.82	0.04789	0.05432	1.34726	1.165E-02	23.307	1.928E-02	53.035	2.540	2.881	32.930	2.538E-02	40.786	17.535	3.948E-02	**0.840**
600	95.24	0.04391	0.04980	1.31272	1.045E-02	24.922	1.676E-02	64.836	2.847	3.229	35.398	2.204E-02	43.213	19.147	3.420E-02	0.841
650	95.59	0.04055	0.04599	1.27954	9.308E-03	26.732	1.442E-02	80.014	3.245	3.680	38.164	1.894E-02	46.387	20.933	2.935E-02	0.849
700	95.89	0.03766	0.04271	1.24770	8.219E-03	28.800	1.223E-02	100.060	3.768	4.274	41.324	1.606E-02	50.510	22.976	2.484E-02	0.865
800	96.38	0.03297	0.03740	1.18796	6.201E-03	33.994	8.360E-03	164.549	5.425	6.153	49.258	1.096E-02	62.830	28.120	1.690E-02	0.927
900	96.77	0.02932	0.03326	1.13316	4.370E-03	41.565	5.136E-03	300.798	8.819	10.003	60.827	6.742E-03	85.202	35.625	1.036E-02	1.045
1000	97.086	0.02640	0.02994	1.08285	2.705E-03									48.365	5.211E-03	1.277
1150	97.456	0.02292	0.02600	1.01481												
1175	97.509	0.02244	0.02545	1.00426												
1180	97.559	0.02197	0.02492	1.00219												
1184	97.608	0.02152	0.02441	1.00052												
1185	97.519	0.02234	0.02534	1.00010												
1186	**97.527**	**0.02227**	**0.02526**	**0.99968**												
1190	97.529	0.02225	0.02524	0.99804												
1200	97.531	0.02223	0.02521	0.99394												
1225	97.539	0.02216	0.02513	0.98379												
1250	97.655	0.02109	0.02392	0.97386												
1500	98.038	0.01759	0.01995	0.88418												

Table A.5.a.2. MOX data [$^{235}U/U$ = 0.718%, $^{239}Pu/Pu$ = 95%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	99.282	95.000	5.000	0.000	0.000

Maximum fissile material oxide density = 3.5 g (UO_2 + PuO_2)/cm^3

Water reflector 2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 35 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08582	3.49998	2.10445	2.813E-03	45.596	1.730E-02	397.077	1225.308	1389.763	63.998	2.271E-02	9926.372	33.711	3.541E-02	104.025
0.5	1.64	3.08582	3.49998	1.88621	3.440E-03	41.605	1.794E-02	301.674	930.911	1055.854	58.533	2.356E-02	8303.516	31.003	3.672E-02	95.671
0.928	3.00	3.08582	3.49998	1.77646	4.234E-03	37.744	1.886E-02	225.231	695.024	788.306	53.178	2.479E-02	6853.690	28.258	3.868E-02	87.200
1.5	4.76	3.08582	3.49998	1.68672	5.380E-03	33.696	2.001E-02	160.258	494.527	560.901	47.537	2.632E-02	5476.718	25.323	4.110E-02	78.142
1.916	6.00	3.08582	3.49998	1.64204	6.275E-03	31.318	2.083E-02	128.664	397.035	450.323	44.213	2.740E-02	4737.579	23.578	4.279E-02	72.759
5.88	16.38	3.08582	3.49998	1.49478	1.836E-02	18.660	2.849E-02	27.218	83.989	95.262	26.398	4.025E-02	1688.894	14.050	6.258E-02	43.355
10	24.99	2.08477	2.36458	1.47792	1.801E-02	18.799	2.761E-02	27.829	58.016	65.803	26.580	3.655E-02	1156.834	14.138	6.097E-02	29.475
20	39.98	1.16618	1.32270	1.50591	1.908E-02	18.111	2.986E-02	24.883	29.018	32.913	25.532	3.958E-02	597.089	13.481	6.251E-02	15.722
40	57.13	0.61990	0.70310	1.56768	2.116E-02	17.044	3.447E-02	20.738	12.855	14.581	23.945	4.577E-02	279.152	12.555	7.234E-02	7.783
60	66.65	0.42215	0.47881	1.60478	2.229E-02	16.561	3.720E-02	19.025	8.031	9.109	23.243	4.942E-02	179.119	12.191	7.795E-02	5.147
70	69.99	0.36408	0.41295	1.61652	2.260E-02	16.441	3.804E-02	18.616	6.778	7.688	23.075	5.056E-02	152.249	12.103	7.978E-02	4.407
80	72.71	0.32005	0.36301	1.62492	2.280E-02	16.375	4.125E-02	18.390	5.886	6.676	22.985	5.461E-02	132.795	12.064	8.099E-02	3.861
90	74.99	0.28553	0.32385	1.63063	2.291E-02	16.347	4.164E-02	18.297	5.224	5.926	22.953	5.514E-02	118.146	12.060	8.623E-02	3.443
100	76.91	0.25772	0.29231	1.63413	2.294E-02	16.351	4.187E-02	18.311	4.719	5.353	22.969	5.544E-02	106.784	12.085	8.673E-02	3.115
125	80.64	0.20727	0.23509	1.63564	2.278E-02	16.458	4.188E-02	18.674	3.871	4.390	23.152	5.545E-02	87.255	12.235	8.674E-02	2.536
150	83.32	0.17333	0.19659	1.62990	2.240E-02	16.663	4.133E-02	19.380	3.359	3.810	23.478	5.473E-02	75.041	12.473	8.557E-02	2.162
200	86.95	0.13057	0.14809	1.60568	2.126E-02	17.252	3.928E-02	21.509	2.808	3.185	24.397	5.197E-02	61.040	13.107	8.112E-02	1.711
250	89.28	0.10474	0.11880	1.57255	1.989E-02	17.997	3.656E-02	24.416	2.557	2.901	25.546	4.834E-02	53.685	13.881	7.100E-02	1.454
275	90.16	0.09531	0.10810	1.55432	1.917E-02	18.414	3.509E-02	26.155	2.493	2.827	26.188	4.636E-02	51.336	14.309	6.796E-02	1.364
300	90.90	0.08744	0.09918	1.53548	1.845E-02	18.858	3.358E-02	28.091	2.456	2.786	26.868	4.435E-02	49.574	14.704	6.930E-02	1.286
350	92.10	0.07504	0.08511	1.49694	1.700E-02	19.822	3.052E-02	32.623	2.448	2.777	28.343	4.028E-02	47.346	15.675	6.280E-02	1.176
400	93.02	0.06572	0.07454	1.45827	1.558E-02	20.887	2.751E-02	38.168	2.508	2.845	29.970	3.626E-02	46.361	16.741	5.644E-02	1.100
450	93.75	0.05847	0.06632	1.42020	1.422E-02	22.056	2.459E-02	44.944	2.628	2.981	31.755	3.239E-02	46.307	17.874	5.042E-02	1.045
500	94.34	0.05265	0.05972	1.38312	1.290E-02	23.352	2.181E-02	53.339	2.808	3.185	33.732	2.870E-02	47.051	19.161	4.459E-02	1.009
550	94.82	0.04789	0.05432	1.34726	1.165E-02	24.785	1.916E-02	63.777	3.054	3.464	35.919	2.521E-02	48.526	20.560	3.913E-02	0.985
600	95.24	0.04391	0.04980	1.31272	1.045E-02	26.392	1.668E-02	77.003	3.381	3.835	38.369	2.192E-02	50.771	22.135	3.398E-02	0.972
650	95.59	0.04055	0.04599	1.27954	9.308E-03	28.196	1.436E-02	93.893	3.807	4.318	41.121	1.886E-02	53.852	23.921	2.918E-02	0.970
700	95.89	0.03766	0.04271	1.24770	8.219E-03	30.259	1.219E-02	116.048	4.370	4.957	44.269	1.601E-02	57.966	25.952	2.473E-02	0.977
800	96.38	0.03297	0.03740	1.18796	6.201E-03	35.447	8.350E-03	186.557	6.151	6.976	52.187	1.094E-02	70.525	31.069	1.687E-02	1.024
900	96.77	0.02932	0.03326	1.13316	4.370E-03	43.015	5.150E-03	333.396	9.775	11.087	63.747	6.735E-03	93.578	38.569	1.036E-02	1.131
1000	97.086	0.02640	0.02994	1.08285	2.705E-03	55.827	2.598E-03	728.826	19.241	21.823	83.331	3.396E-03	143.982	51.301	5.203E-03	1.354
1150	97.456	0.02292	0.02600	1.01481												
1175	97.509	0.02244	0.02545	1.00426												
1180	97.559	0.02197	0.02492	1.00219												
1184	97.608	0.02152	0.02441	1.00052												
1185	97.519	0.02234	0.02534	1.00010												
1186	97.527	0.02227	0.02526	0.99968												
1190	97.529	0.02225	0.02524	0.99804												
1200	97.531	0.02223	0.02521	0.99394												
1225	97.539	0.02216	0.02513	0.98379												
1250	97.655	0.02109	0.02392	0.97386												
1500	98.038	0.01759	0.01995	0.88418												

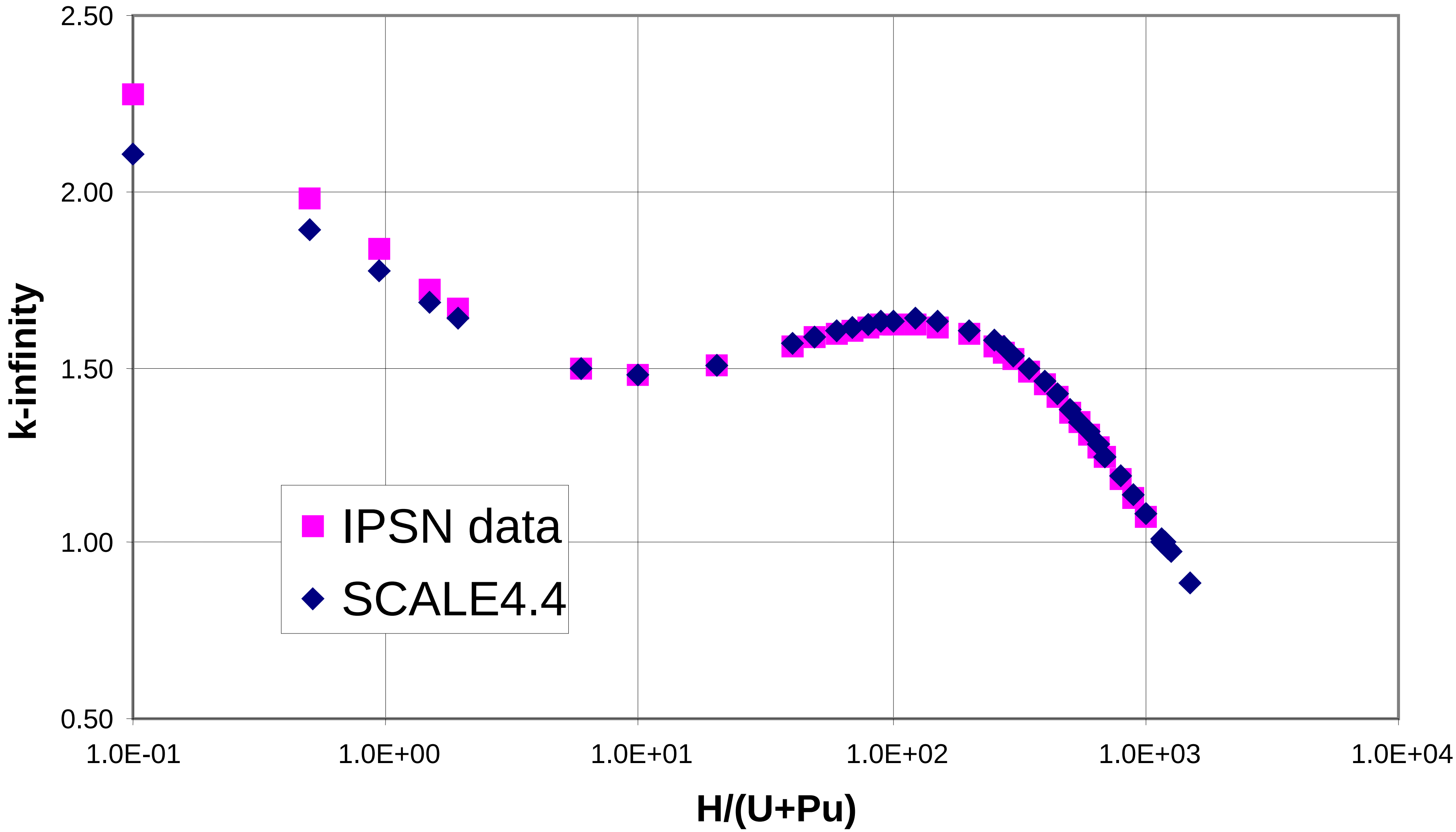

Fig. A.5.a.1. *k*-infinity [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

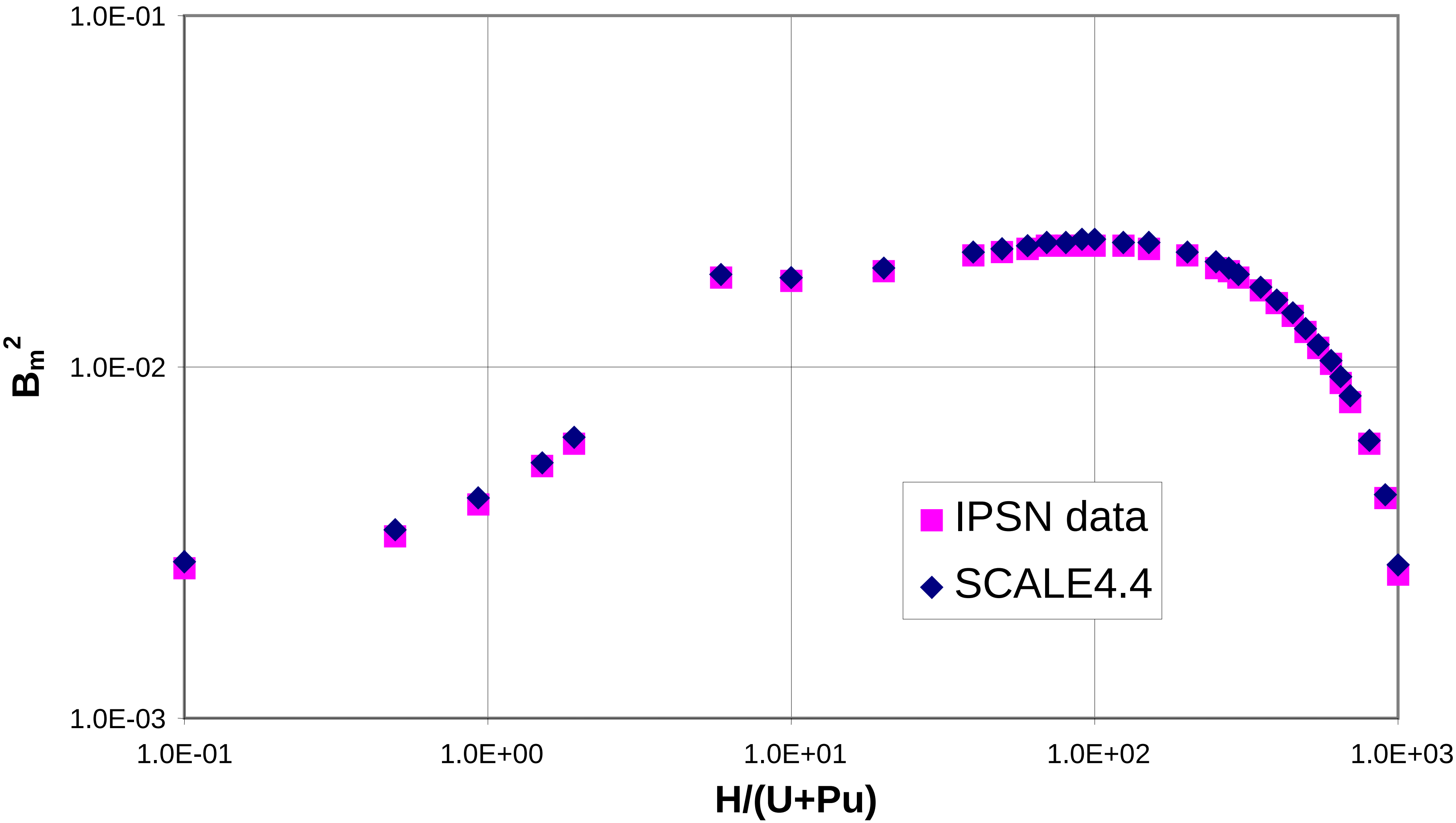

Fig. A.5.a.2. B_m^2 [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

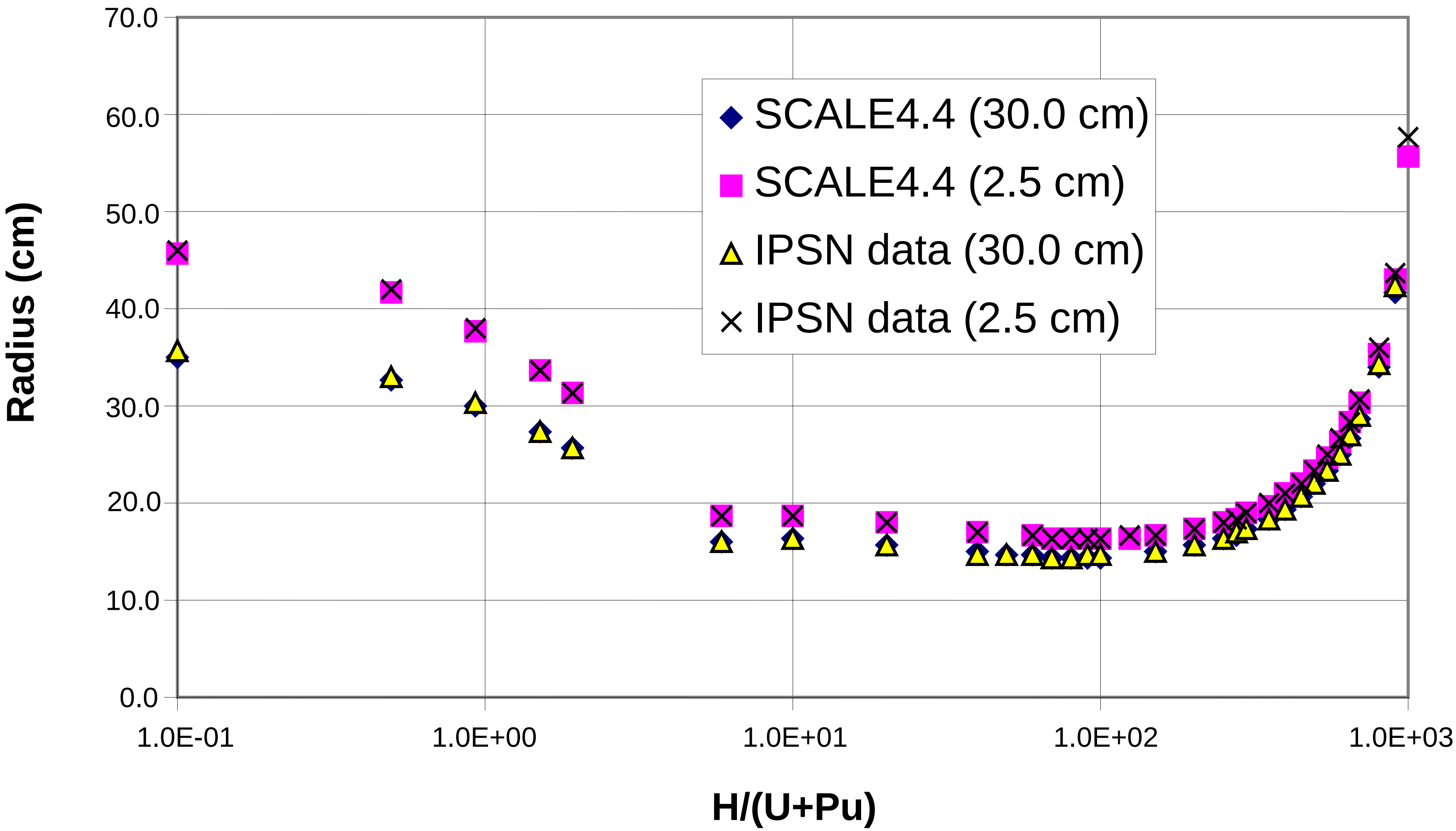

Fig. A.5.a.3-1. Sphere radius [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

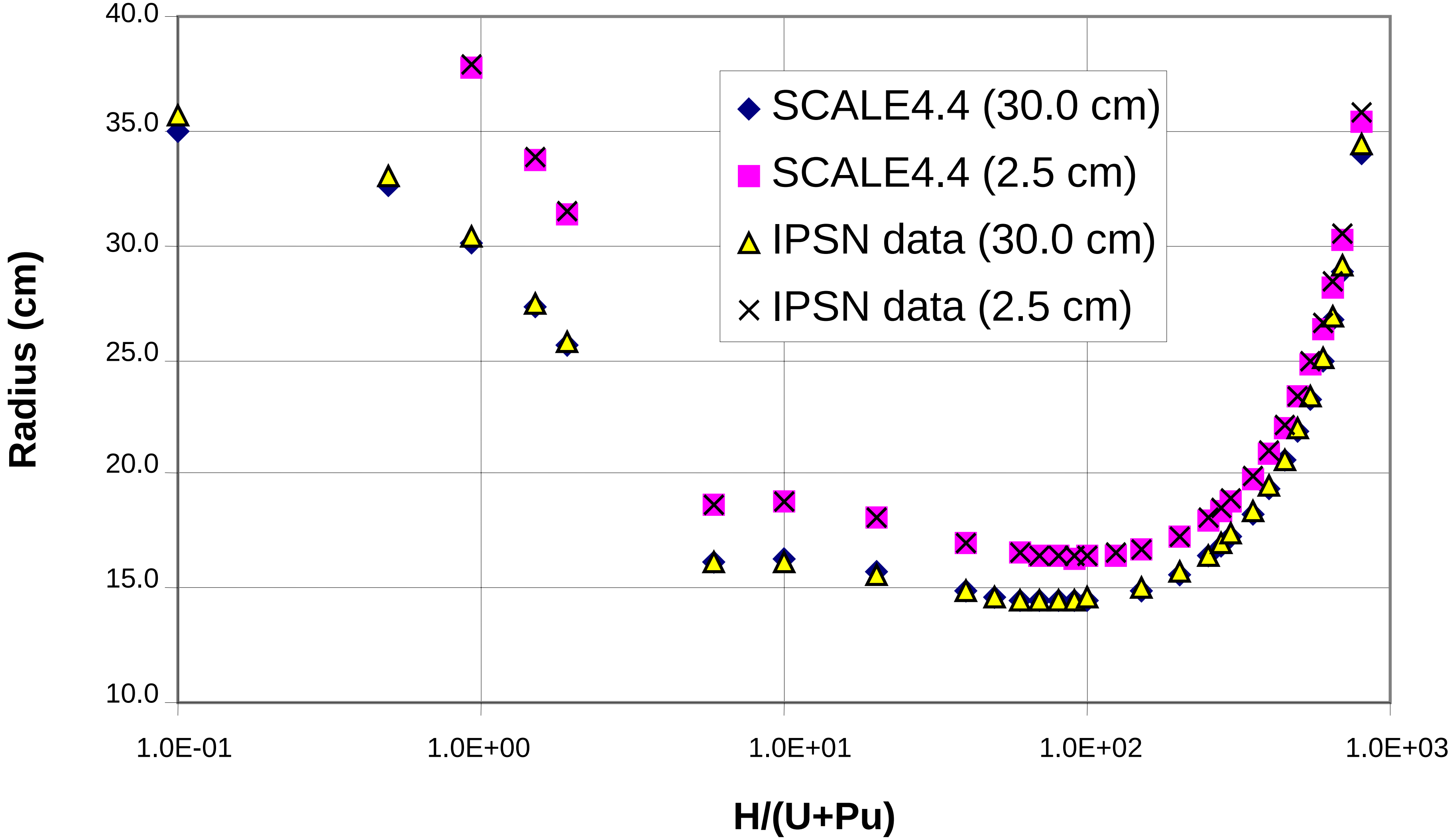

Fig. A.5.a.3-2. Sphere radius [$^{235}U/U$ = 0.718%, $^{239}Pu/Pu$ = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

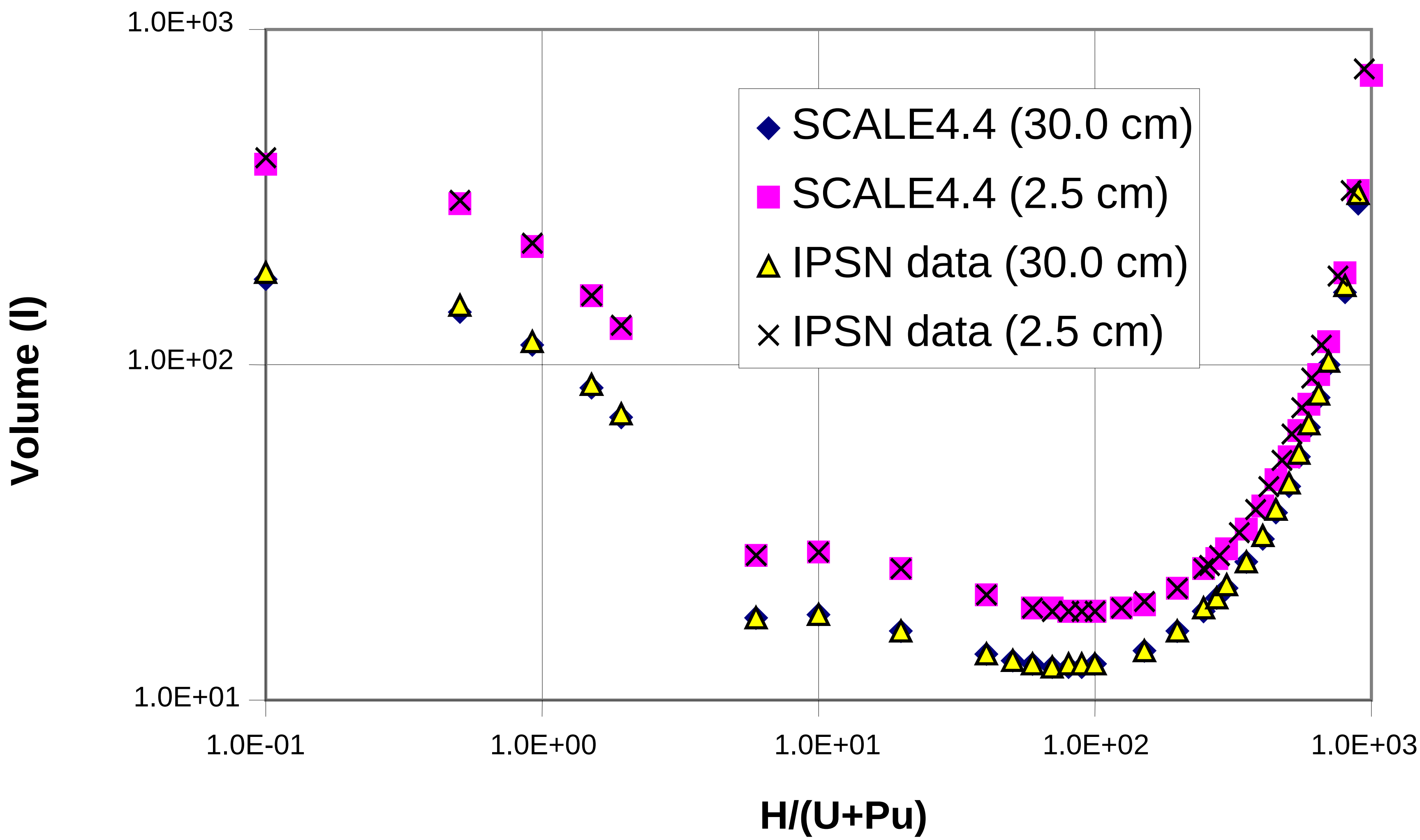

Fig. A.5.a.4. Sphere volume [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

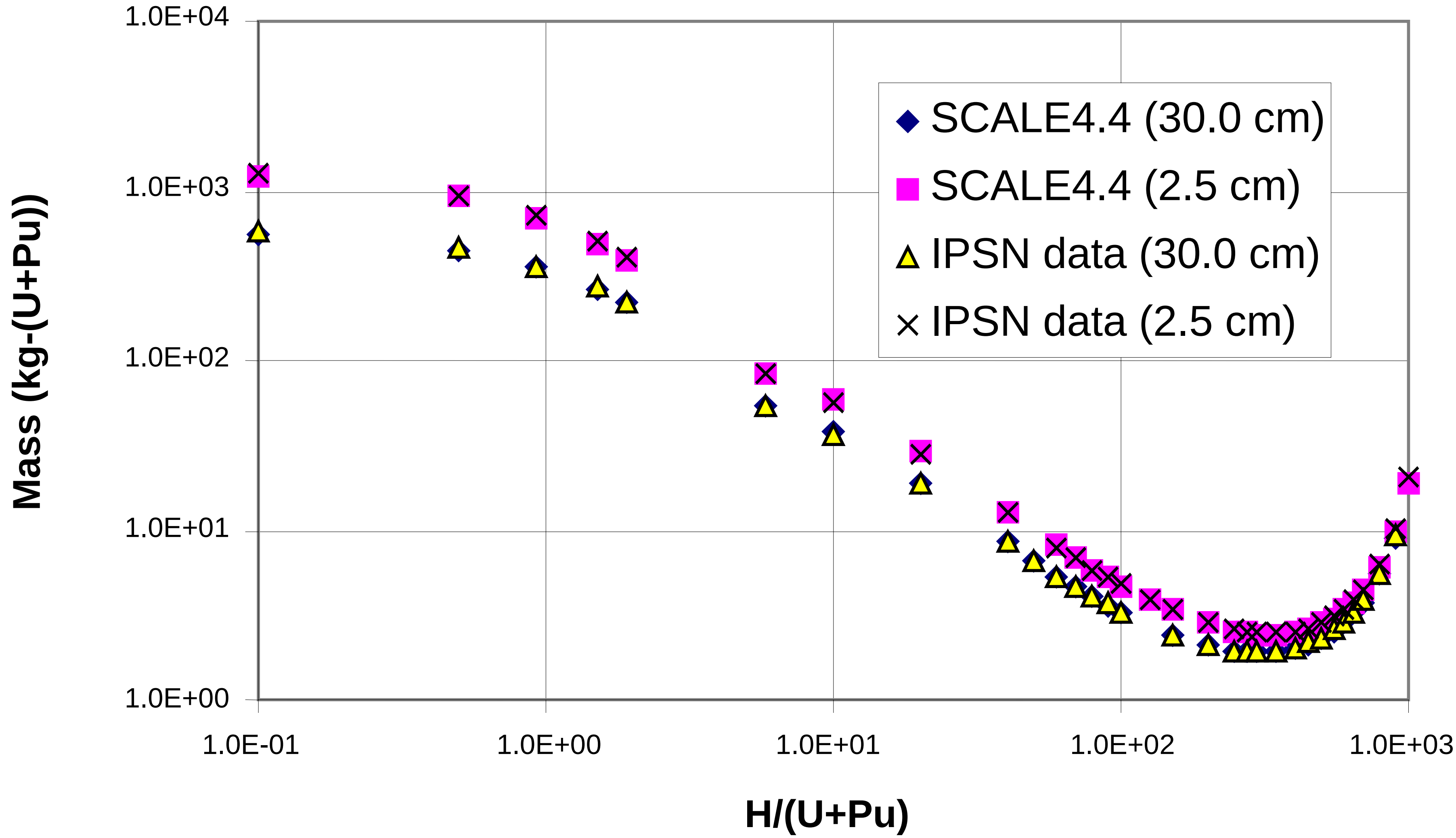

Fig. A.5.a.5. U + Pu mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

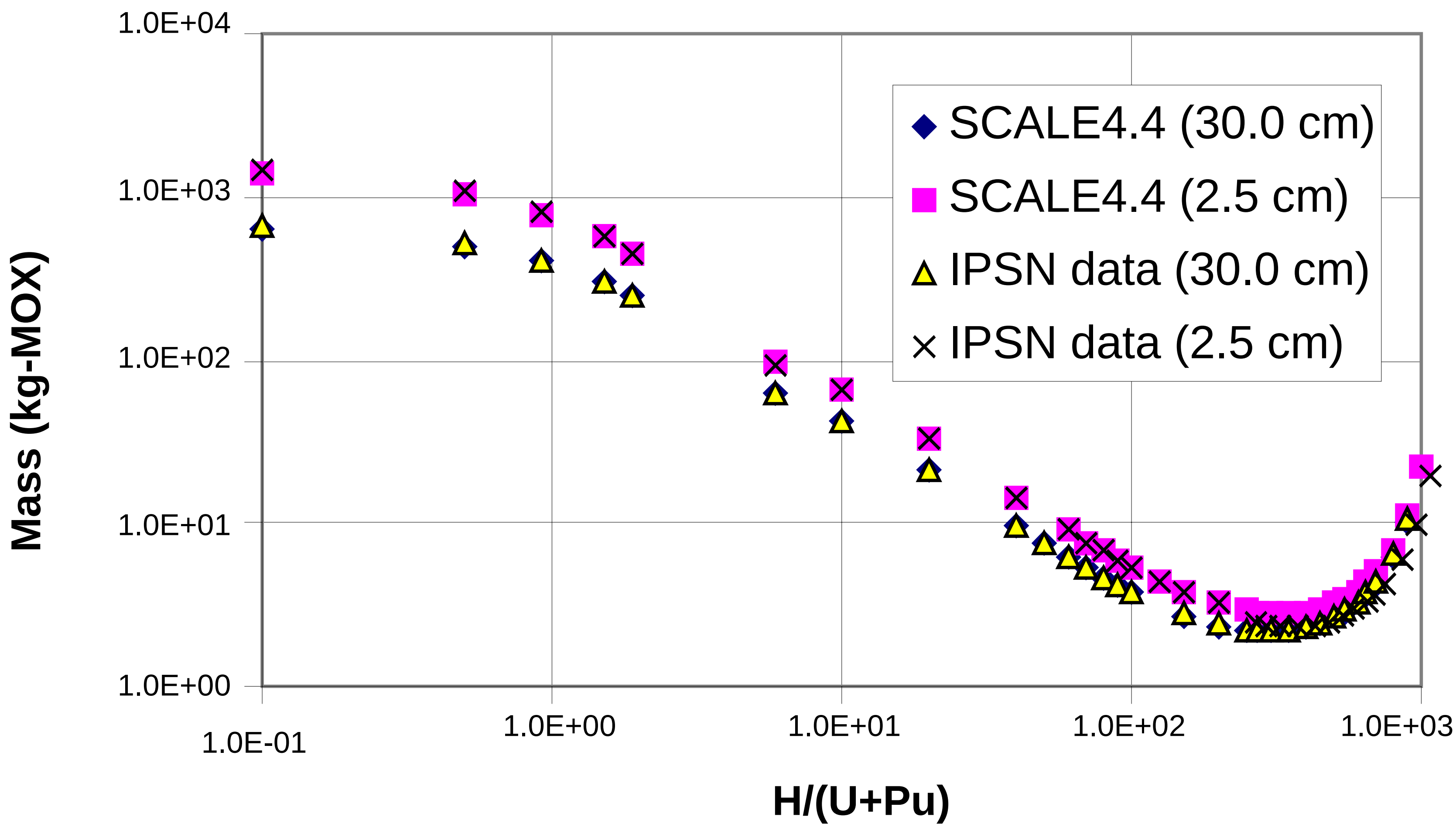

Fig. A.5.a.6. MOX mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

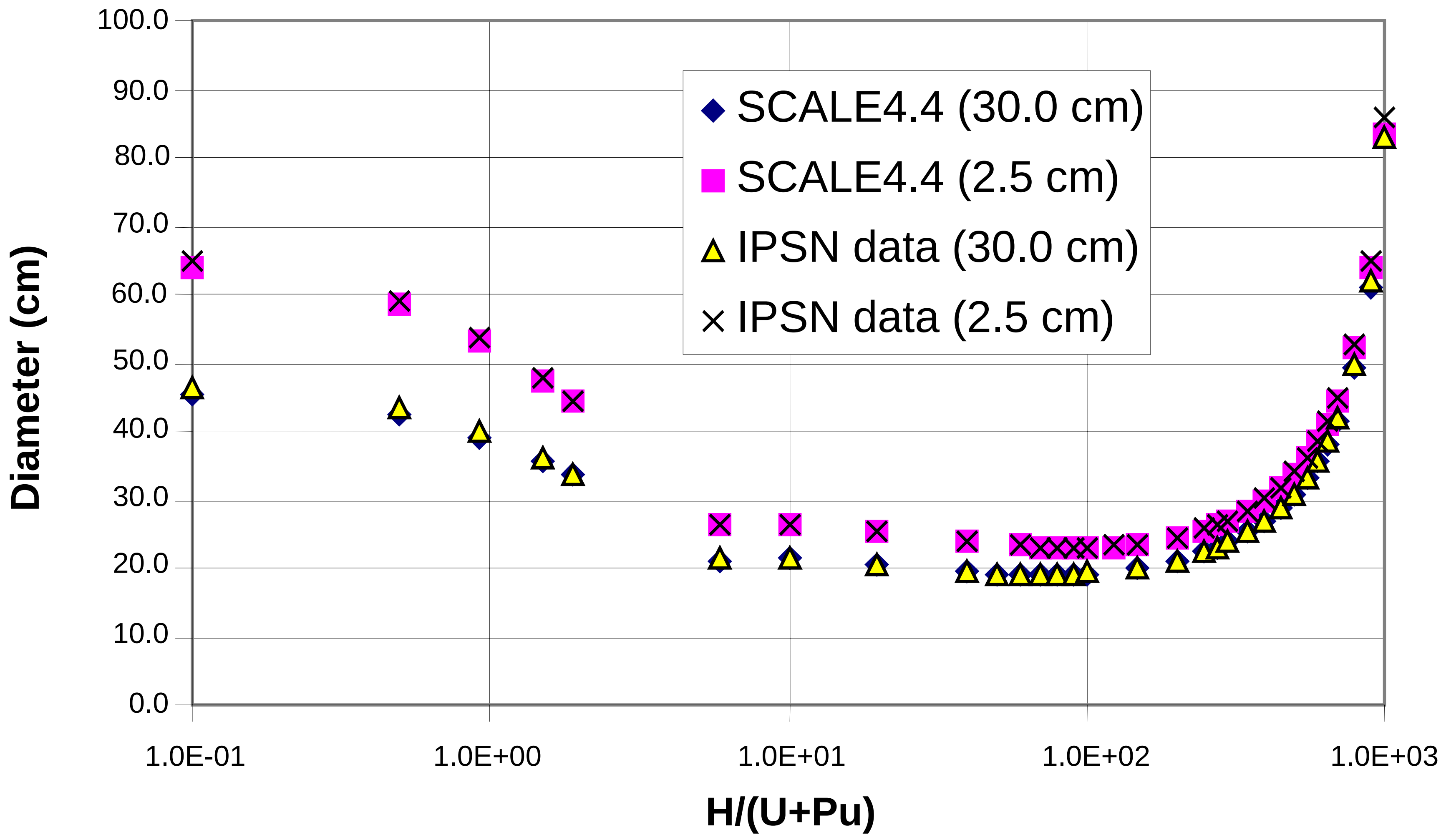

Fig. A.5.a.7-1. Cylinder diameter [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

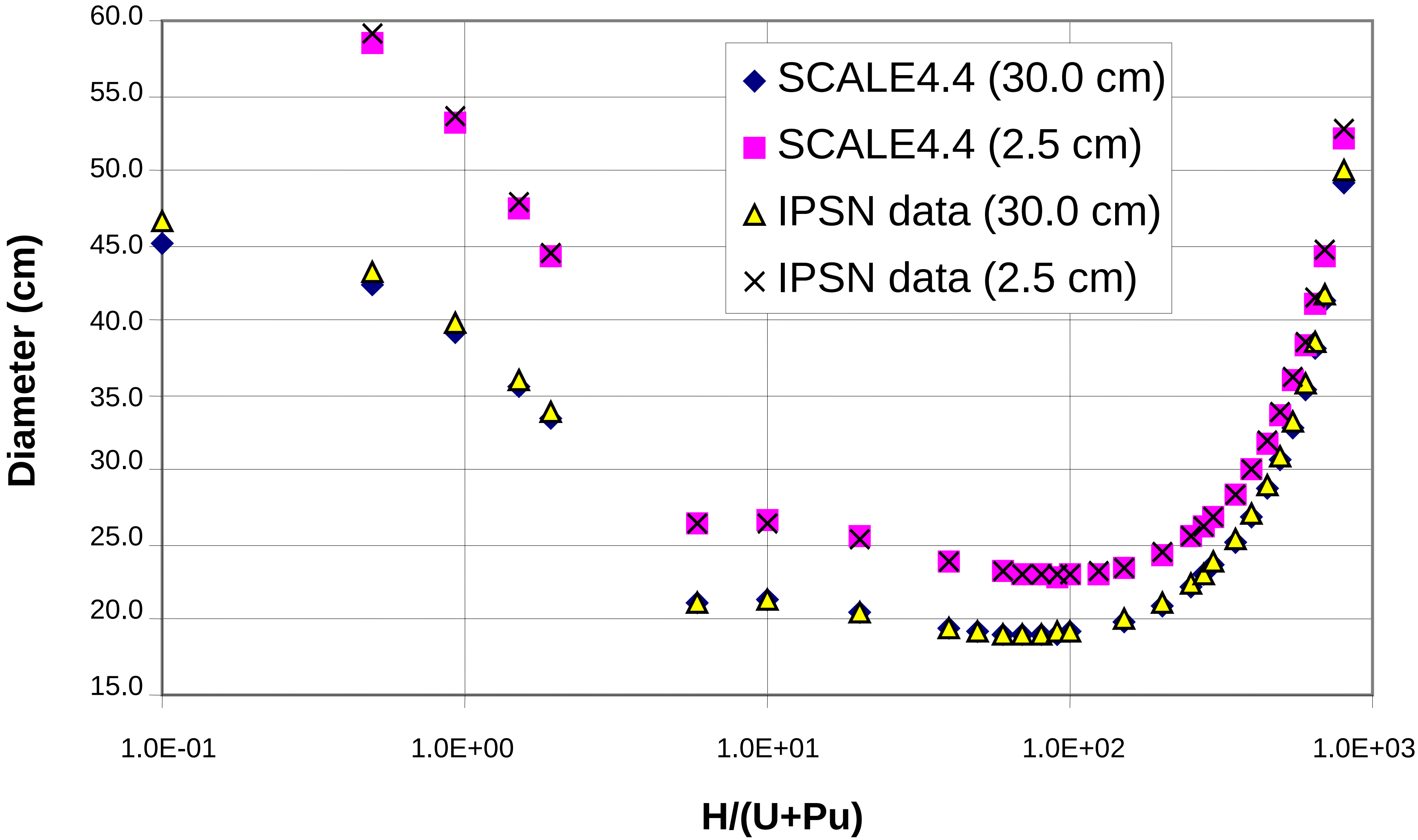

Fig. A.5.a.7-2. Cylinder diameter infinity [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

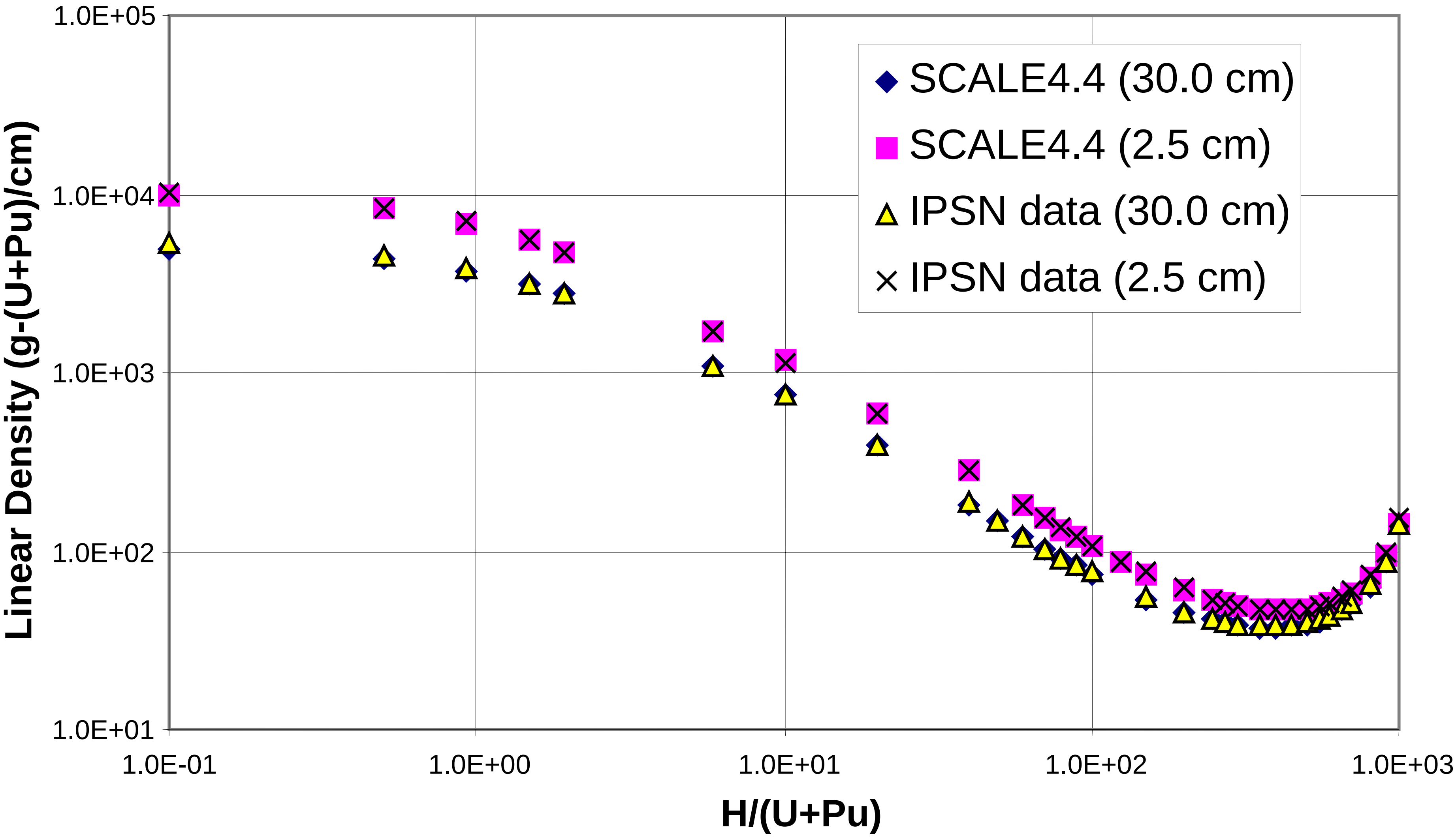

Fig. A.5.a.8. Linear density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

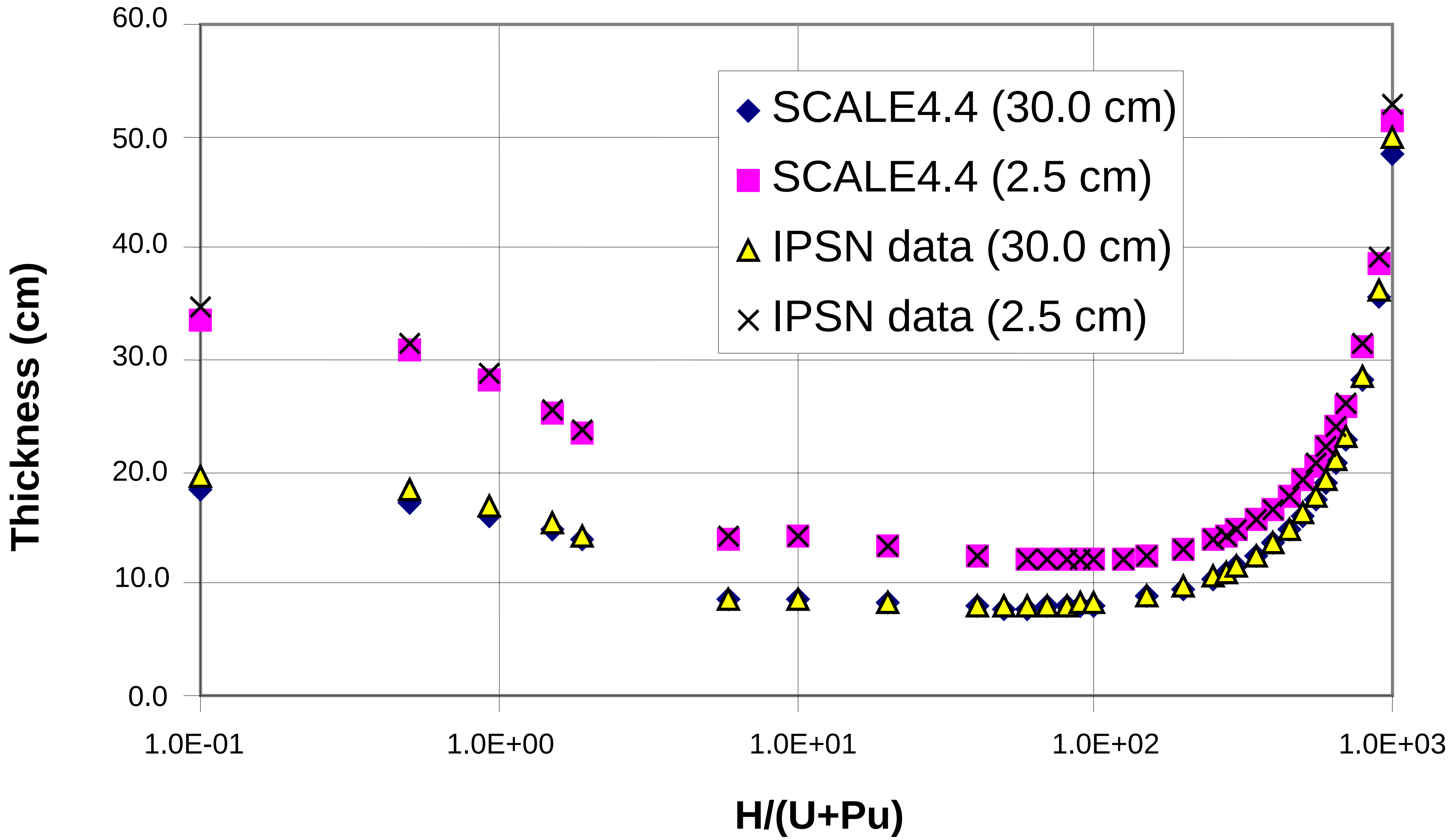

Fig. A.5.a.9-1. Slab thickness [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

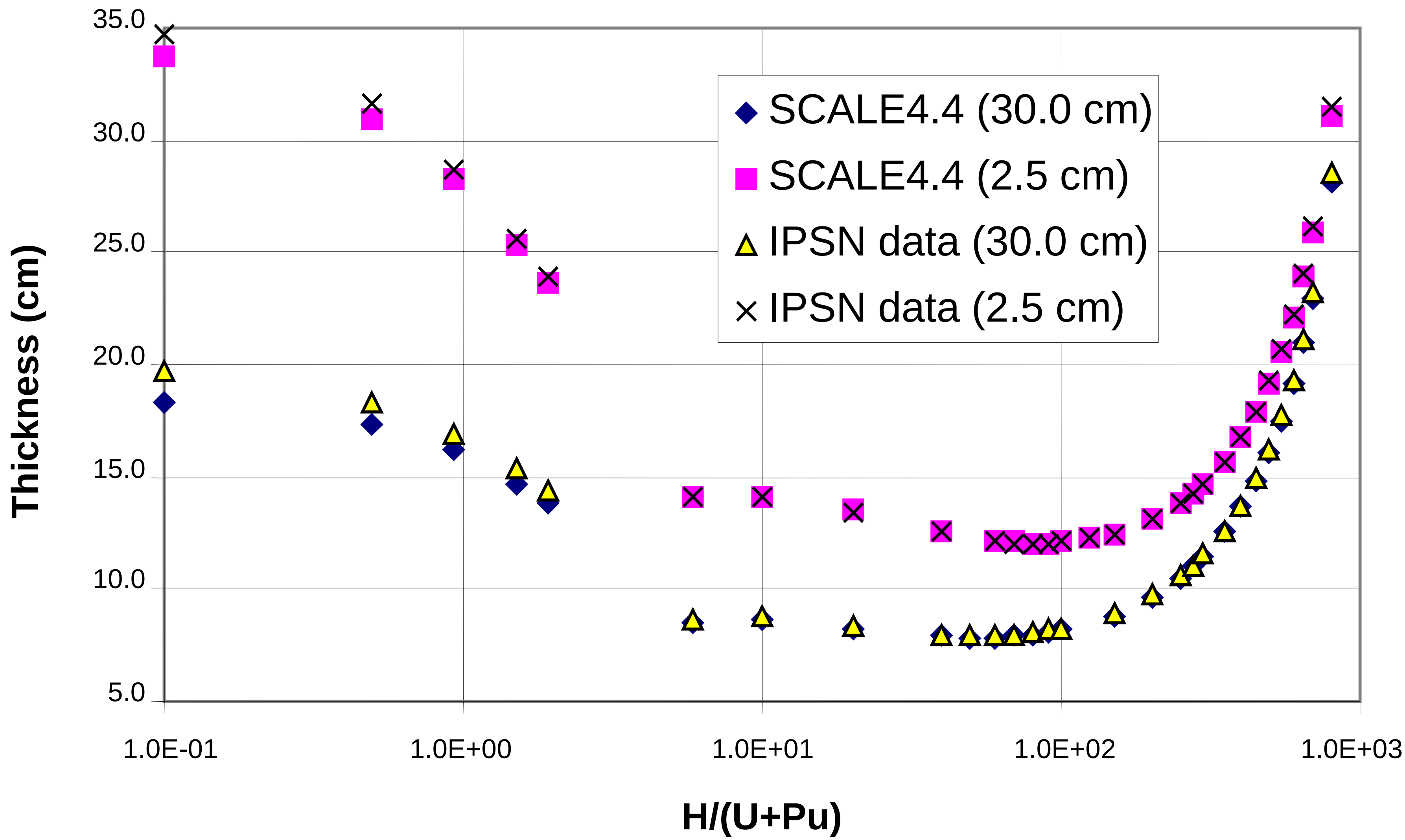

Fig. A.5.a.9-2. Slab thickness [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

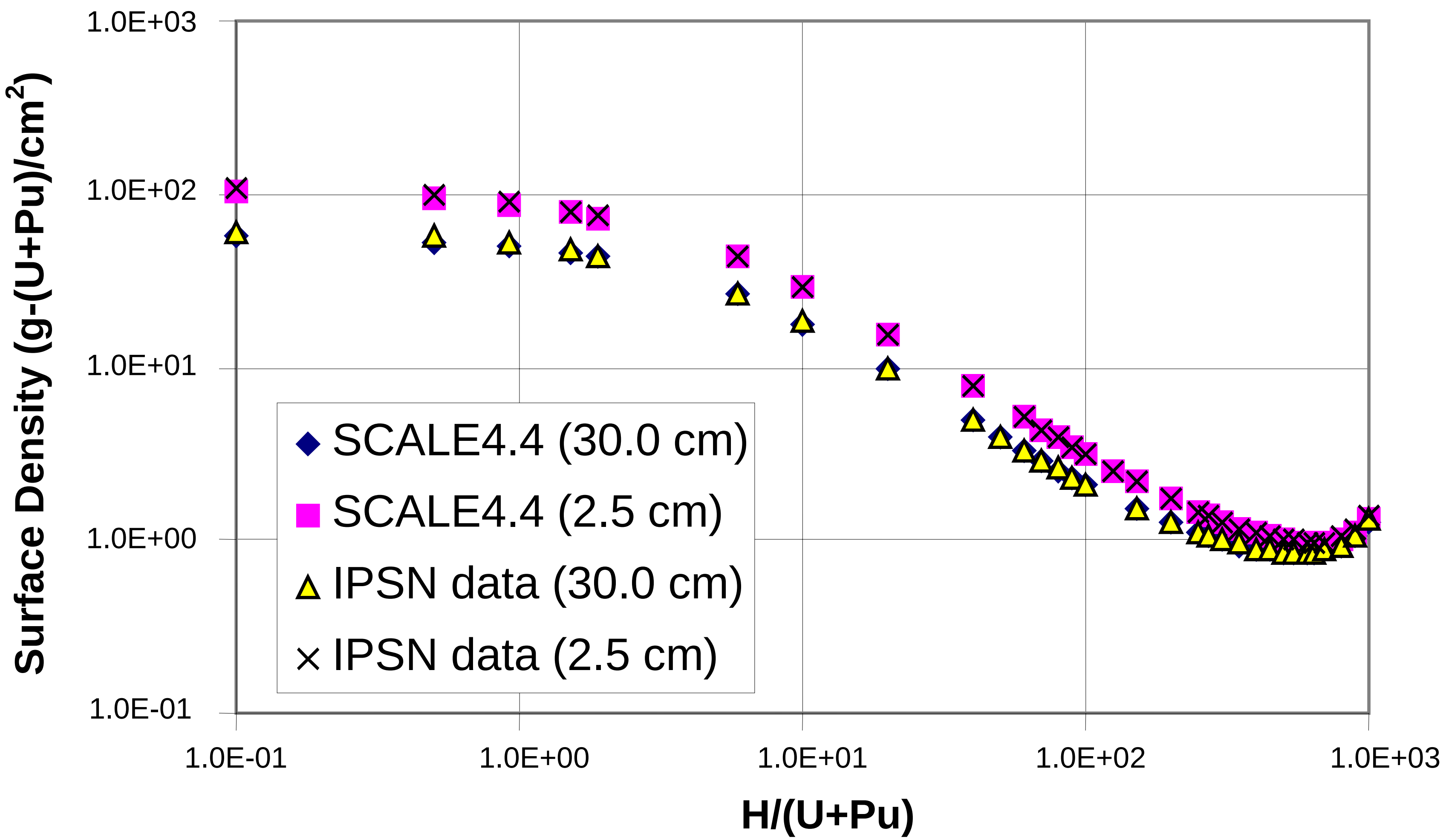

Fig. A.5.a.10. Surface density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

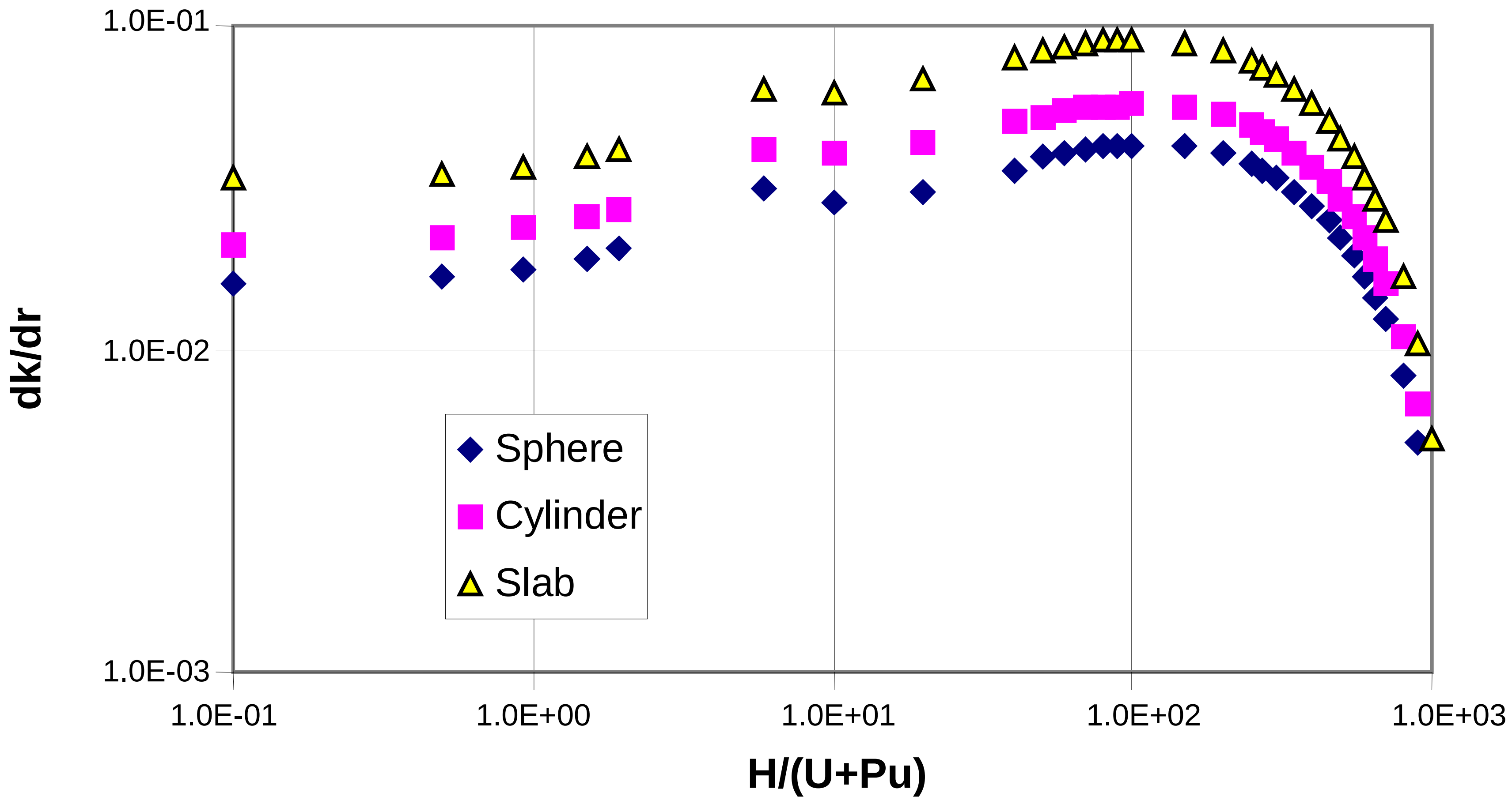

Fig. A.5.a.11. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 30.0 cm].

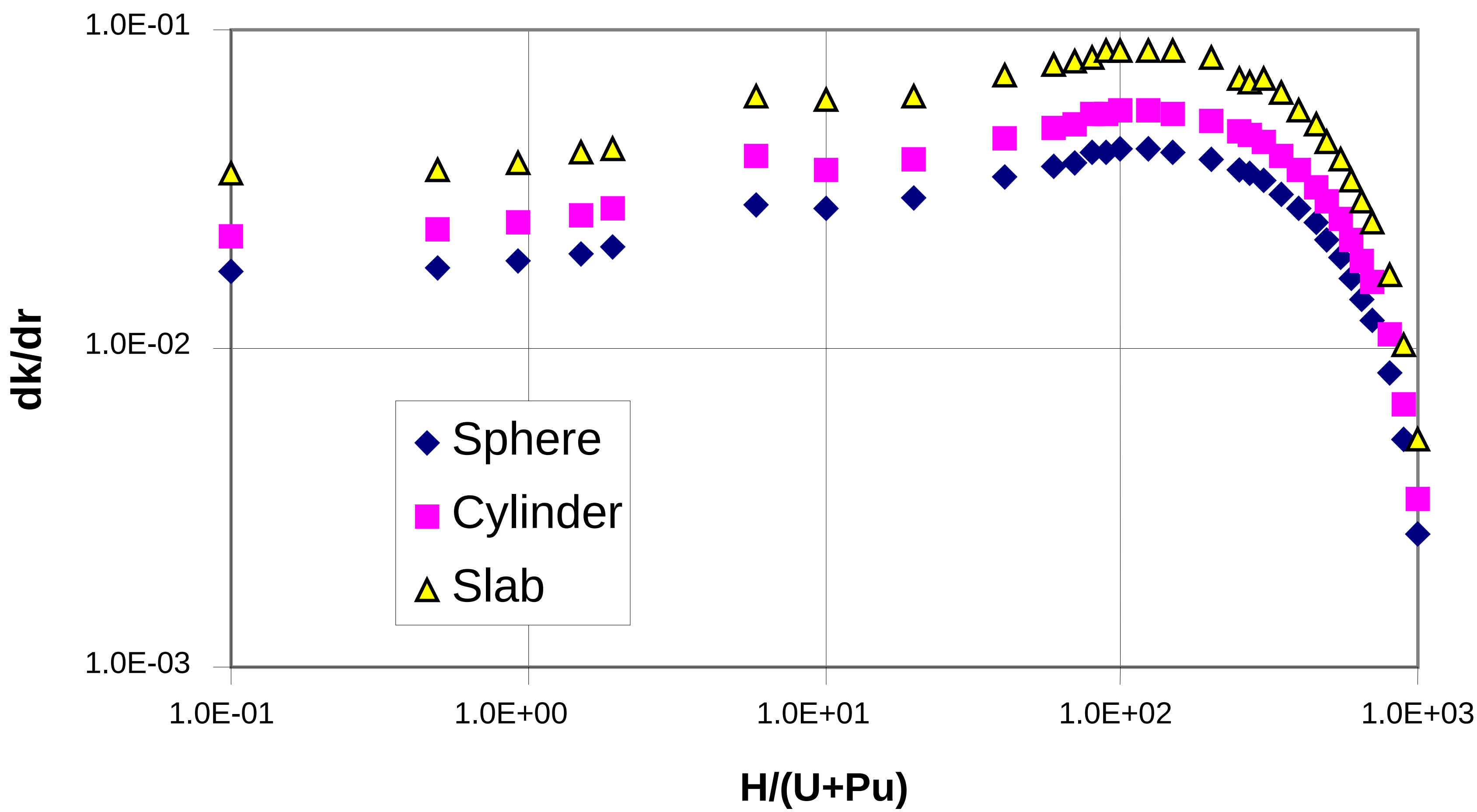

Fig. A.5.a.12. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 2.5 cm].

Table A.5.b.1. MOX data [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**95.000**	**5.000**	**0.000**	**0.000**

Fissile material oxide density void-free

Water reflector 30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	9.37796	10.63794	1.42507	7.682E-03	26.661	1.637E-02	79.383	744.451	844.472	36.305	2.100E-02	9707.924	16.763	3.060E-02	157.200
0.5	1.64	8.21277	9.31620	1.36467	8.357E-03	25.853	1.589E-02	72.378	594.424	674.288	35.350	2.050E-02	8060.342	16.604	3.009E-02	136.364
0.928	3.00	7.24905	8.22300	1.33292	8.678E-03	25.377	1.537E-02	68.457	496.250	562.924	34.708	1.991E-02	6858.595	16.339	2.955E-02	118.445
1.5	4.76	6.26634	7.10826	1.31482	9.022E-03	24.811	1.517E-02	63.974	400.885	454.746	33.894	1.973E-02	5654.051	15.910	2.953E-02	99.694
1.916	6.00	5.70397	6.47033	1.31101	9.306E-03	24.349	1.534E-02	60.465	344.891	391.230	33.218	1.998E-02	4943.386	15.527	3.004E-02	88.567
5	14.29	3.42516	3.88535	1.34723	1.174E-02	21.128	1.774E-02	39.507	135.317	153.497	28.506	2.507E-02	2186.027	12.838	3.841E-02	43.971
10	25.00	2.07873	2.35802	1.41973	1.483E-02	18.397	2.337E-02	26.080	54.213	61.497	24.579	3.307E-02	986.333	10.713	5.138E-02	22.270
20	40.01	1.16377	1.32013	1.50435	1.808E-02	16.493	3.198E-02	18.792	21.870	24.808	21.940	4.237E-02	439.961	9.468	6.639E-02	11.018
30	50.01	0.80809	0.91666	1.54326	1.944E-02	15.955	3.508E-02	17.013	13.748	15.595	21.264	4.652E-02	286.967	**9.269**	7.323E-02	7.490
40	57.15	0.61893	0.70209	1.55916	1.991E-02	**15.875**	3.628E-02	**16.758**	10.372	11.766	**21.235**	4.814E-02	219.202	9.404	7.589E-02	5.820
50	62.51	0.50153	0.56891	1.56202	1.989E-02	16.010	3.644E-02	17.190	8.621	9.780	21.508	4.834E-02	182.209	9.689	7.621E-02	4.860
60	66.67	0.42156	0.47820	1.55693	1.960E-02	16.268	3.597E-02	18.034	7.603	8.624	21.950	4.769E-02	159.527	10.058	7.514E-02	4.240
70	70.01	0.36359	0.41244	1.54676	1.915E-02	16.606	3.508E-02	19.181	6.974	7.911	22.504	4.650E-02	144.618	10.481	7.318E-02	3.811
80	72.73	0.31964	0.36259	1.53324	1.858E-02	17.002	3.394E-02	20.586	6.580	7.464	23.139	4.496E-02	134.410	10.945	7.065E-02	3.498
90	75.00	0.28516	0.32347	1.51751	1.795E-02	17.445	3.263E-02	22.238	6.341	7.193	23.839	4.320E-02	127.280	11.442	6.777E-02	3.263
100	76.93	0.25740	0.29198	1.50030	1.729E-02	17.927	3.122E-02	24.133	**6.212**	**7.046**	24.595	4.130E-02	122.294	11.969	6.471E-02	3.081
125	80.65	0.20702	0.23483	1.45389	1.554E-02	19.287	2.749E-02	30.051	6.221	7.057	26.708	3.632E-02	115.982	13.411	5.666E-02	2.776
150	83.34	0.17313	0.19639	1.40588	1.379E-02	20.863	2.375E-02	38.036	6.585	7.470	29.138	3.132E-02	**115.450**	14.997	4.886E-02	2.596
175	85.37	0.14877	0.16876	1.35842	1.210E-02	22.679	2.015E-02	48.863	7.269	8.246	31.928	2.654E-02	119.110	16.842	4.124E-02	2.506
200	86.96	0.13043	0.14795	1.31250	1.049E-02	24.786	1.678E-02	63.780	8.319	9.437	35.155	2.207E-02	126.599	18.934	3.425E-02	**2.470**
225	88.24	0.11611	0.13171	1.26858	8.975E-03	27.267	1.368E-02	84.915	9.860	11.184	38.950	1.797E-02	138.351	21.397	2.783E-02	2.484
250	89.29	0.10462	0.11868	1.22679	7.544E-03	30.254	1.086E-02	115.993	12.135	13.766	43.517	1.425E-02	155.606	24.351	2.203E-02	2.548
275	90.17	0.09520	0.10799	1.18719	6.201E-03	33.953	8.330E-03	163.952	15.608	17.705	49.170	1.092E-02	180.770	28.024	1.684E-02	2.668
300	90.91	0.08734	0.09907	1.14972	4.940E-03	38.721	6.091E-03	243.178	21.239	24.093	56.457	7.979E-03	218.648	32.756	1.227E-02	2.861
350	92.11	0.07496	0.08503	1.08074	2.644E-03	55.039	2.499E-03	698.401	52.352	59.386	81.407	3.270E-03	390.164	48.982	5.023E-03	3.672
400	93.02	0.06565	0.07447	1.01901	6.179E-04						181.174	4.064E-04	1692.456	114.069	5.973E-04	**7.489**
415	93.260	0.06319	0.07168	1.00177												
416	93.275	0.06304	0.07151	1.00066												
417	**93.290**	**0.06289**	**0.07134**	**0.99952**												
418	93.305	0.06274	0.07117	0.99839												
419	93.320	0.06259	0.07100	0.99727												
420	93.335	0.06244	0.07083	0.99614												
425	93.408	0.06171	0.07000	0.99058												
430	93.480	0.06100	0.06920	0.98506												
450	93.751	0.05840	0.06625	0.96360												

Table A.5.b.2. MOX data [$^{235}U/U$ = 0.718%, $^{239}Pu/Pu$ = 95%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**95.000**	**5.000**	**0.000**	**0.000**

Fissile material oxide density void-free

Water reflector 2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	9.37796	10.63794	1.42507	7.682E-03	31.092	1.714E-02	125.900	1180.686	1339.319	45.299	2.229E-02	15113.596	26.169	3.372E-02	245.416
0.5	1.64	8.21277	9.31620	1.36467	8.357E-03	29.743	1.634E-02	110.217	905.184	1026.801	43.279	2.130E-02	12081.642	24.924	3.239E-02	204.692
0.928	3.00	7.24905	8.22300	1.33292	8.678E-03	29.083	1.562E-02	103.043	746.966	847.325	42.272	2.040E-02	10173.645	24.267	3.113E-02	175.911
1.5	4.76	6.26634	7.10826	1.31482	9.022E-03	28.394	1.531E-02	95.884	600.841	681.567	41.204	2.000E-02	8355.695	23.556	3.060E-02	147.611
1.916	6.00	5.70397	6.47033	1.31101	9.306E-03	27.862	1.542E-02	90.595	516.749	586.177	40.383	2.016E-02	7305.596	23.012	3.088E-02	131.261
5	14.29	3.42516	3.88535	1.34723	1.174E-02	24.234	1.746E-02	59.616	204.195	231.630	34.826	2.300E-02	3262.781	19.397	3.837E-02	66.437
10	25.00	2.07873	2.35802	1.41973	1.483E-02	21.094	2.287E-02	39.315	81.725	92.706	30.061	3.021E-02	1475.330	16.367	5.044E-02	34.022
20	40.01	1.16377	1.32013	1.50435	1.808E-02	18.783	2.921E-02	27.756	32.302	36.641	26.590	3.868E-02	646.250	14.242	6.090E-02	16.574
30	50.01	0.80809	0.91666	1.54326	1.944E-02	18.037	3.442E-02	24.580	19.863	22.531	25.493	4.545E-02	412.463	13.614	7.095E-02	11.001
40	57.15	0.61893	0.70209	1.55916	1.991E-02	**17.828**	3.562E-02	**23.734**	14.690	16.663	**25.202**	4.707E-02	308.741	**13.517**	7.322E-02	8.366
50	62.51	0.50153	0.56891	1.56202	1.989E-02	17.874	3.581E-02	23.918	11.996	13.607	25.292	4.733E-02	251.980	13.610	7.366E-02	6.826
60	66.67	0.42156	0.47820	1.55693	1.960E-02	18.066	3.539E-02	24.698	10.412	11.811	25.601	4.675E-02	217.005	13.837	7.276E-02	5.833
70	70.01	0.36359	0.41244	1.54676	1.915E-02	18.353	3.456E-02	25.895	9.415	10.680	26.051	4.565E-02	193.802	14.152	7.101E-02	5.145
80	72.73	0.31964	0.36259	1.53324	1.858E-02	18.709	3.346E-02	27.430	8.768	9.946	26.603	4.419E-02	177.675	14.529	6.871E-02	4.644
90	75.00	0.28516	0.32347	1.51751	1.795E-02	19.119	3.221E-02	29.274	8.348	9.469	27.236	4.252E-02	166.141	14.899	6.636E-02	4.249
100	76.93	0.25740	0.29198	1.50030	1.729E-02	19.574	3.084E-02	31.414	8.086	9.172	27.936	4.070E-02	157.775	15.365	6.346E-02	3.955
125	80.65	0.20702	0.23483	1.45389	1.554E-02	20.883	2.722E-02	38.145	**7.897**	**8.958**	29.942	3.588E-02	145.772	16.691	5.583E-02	3.455
150	83.34	0.17313	0.19639	1.40588	1.379E-02	22.423	2.354E-02	47.227	8.176	9.275	32.298	3.102E-02	**141.848**	18.201	4.825E-02	3.151
175	85.37	0.14877	0.16876	1.35842	1.210E-02	24.215	2.002E-02	59.478	8.848	10.037	35.034	2.634E-02	143.415	19.963	4.091E-02	2.970
200	86.96	0.13043	0.14795	1.31250	1.049E-02	26.303	1.669E-02	76.226	9.942	11.278	38.221	2.195E-02	149.650	22.020	3.403E-02	2.872
225	88.24	0.11611	0.13171	1.26858	8.975E-03	28.771	1.362E-02	99.757	11.583	13.139	41.987	1.789E-02	160.764	24.455	2.769E-02	**2.839**
250	89.29	0.10462	0.11868	1.22679	7.544E-03	31.748	1.083E-02	134.035	14.023	15.907	46.531	1.421E-02	177.905	27.396	2.195E-02	2.866
275	90.17	0.09520	0.10799	1.18719	6.201E-03	35.439	8.317E-03	186.442	17.749	20.134	52.167	1.090E-02	203.480	31.049	1.680E-02	2.956
300	90.91	0.08734	0.09907	1.14972	4.940E-03	40.203	6.091E-03	272.177	23.772	26.966	59.442	7.962E-03	242.378	35.761	1.227E-02	3.123
350	92.11	0.07496	0.08503	1.08074	2.644E-03	56.517	2.507E-03	756.189	56.684	64.300	84.379	3.280E-03	419.164	51.973	5.030E-03	3.896
400	93.02	0.06565	0.07447	1.01901	6.179E-04						184.143	3.230E-04	1748.381	117.051	5.954E-04	7.684
415	93.260	0.06319	0.07168	1.00177												
416	93.275	0.06304	0.07151	1.00066												
417	**93.290**	**0.06289**	**0.07134**	**0.99952**												
418	93.305	0.06274	0.07117	0.99839												
419	93.320	0.06259	0.07100	0.99727												
420	93.335	0.06244	0.07083	0.99614												
425	93.408	0.06171	0.07000	0.99058												
430	93.480	0.06100	0.06920	0.98506												
450	93.751	0.05840	0.06625	0.96360												

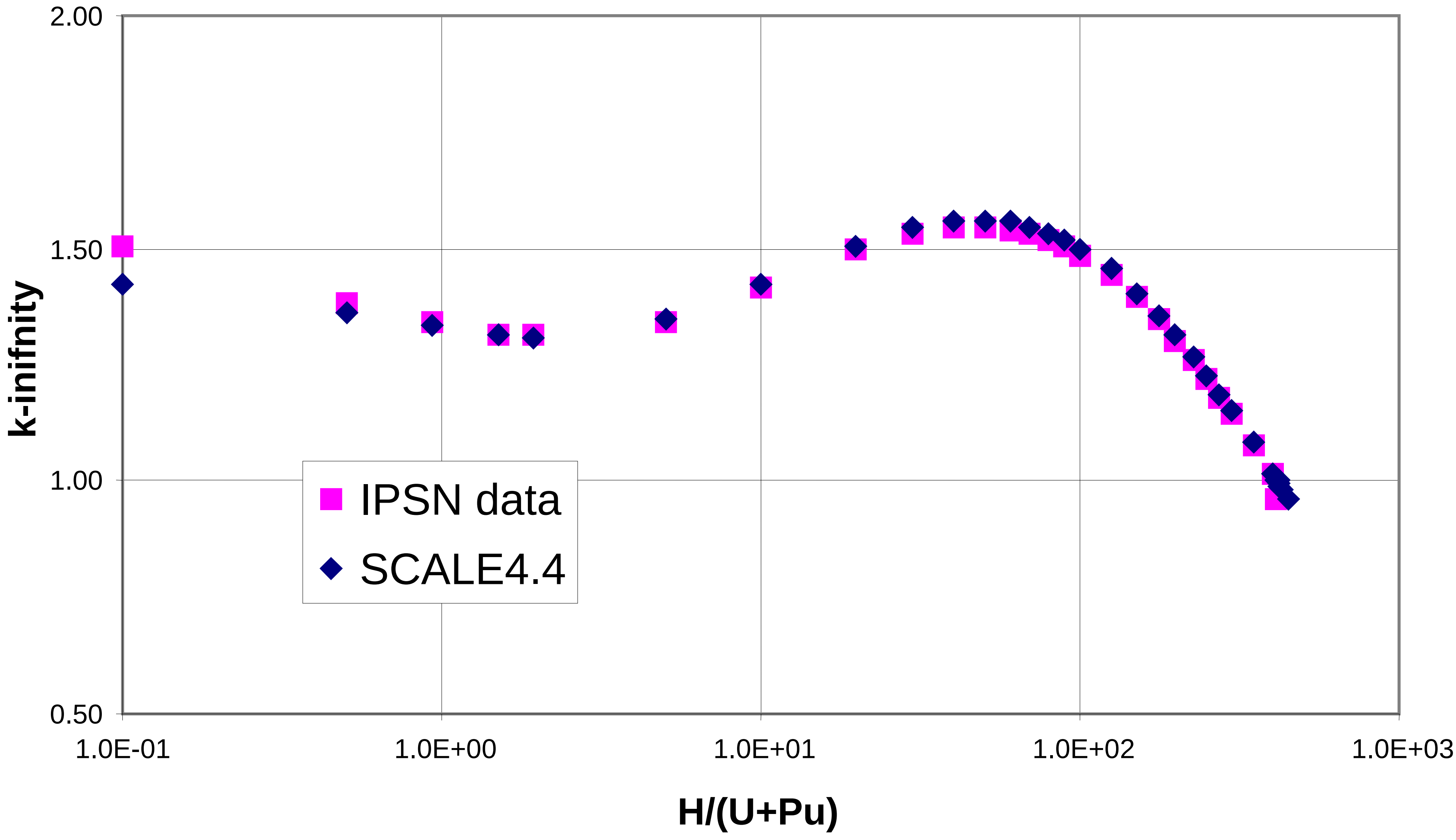

Fig. A.5.b.1. ***k*-infinity [^{235}U/U = 0.718%,^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].**

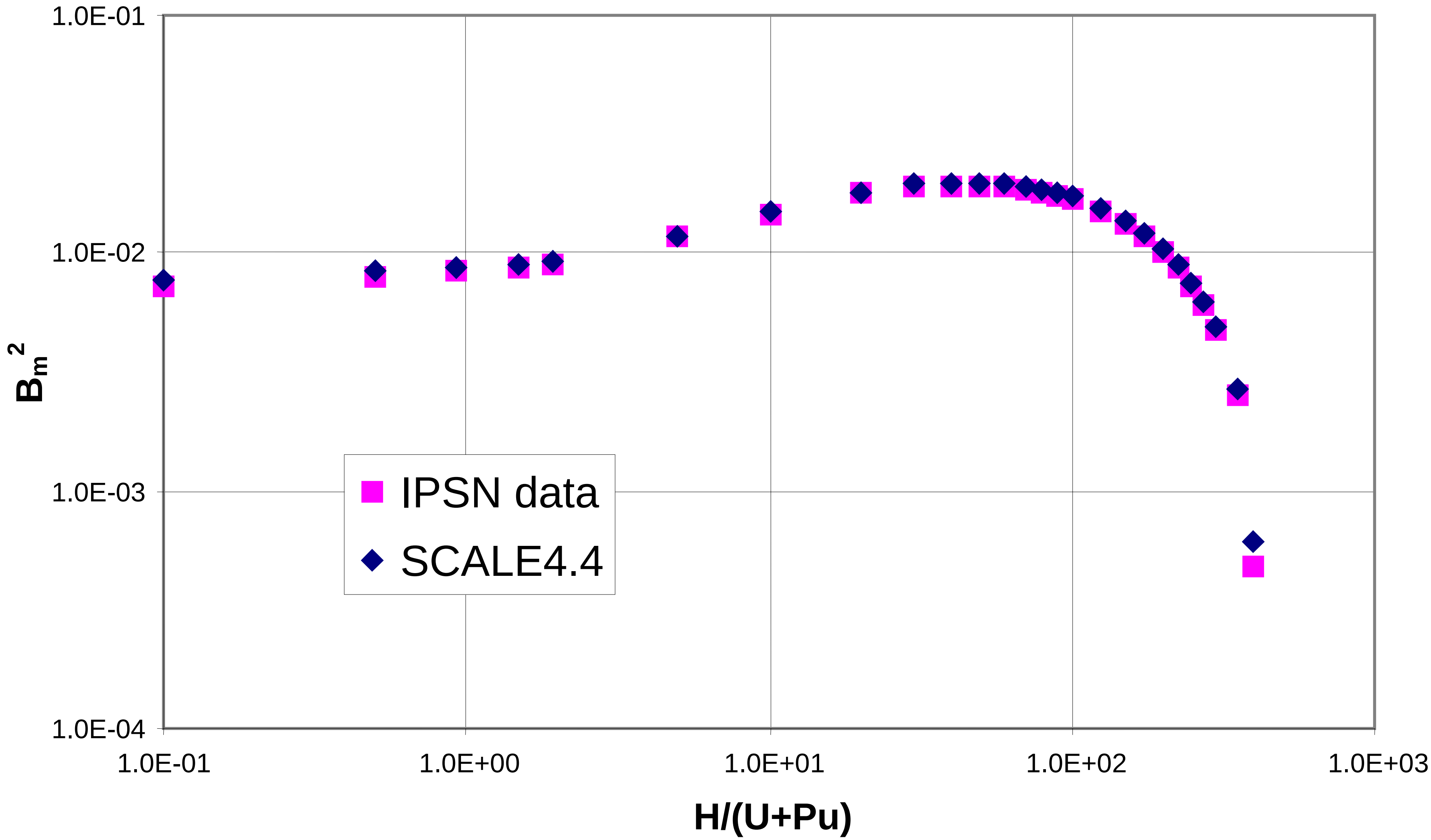

Fig. A.5.b.2. B_m^2 [^{235}U/U = 0.718%, ^{239}Pu/Pu = 100%, Pu/(U + Pu) = 12.5%, void-free].

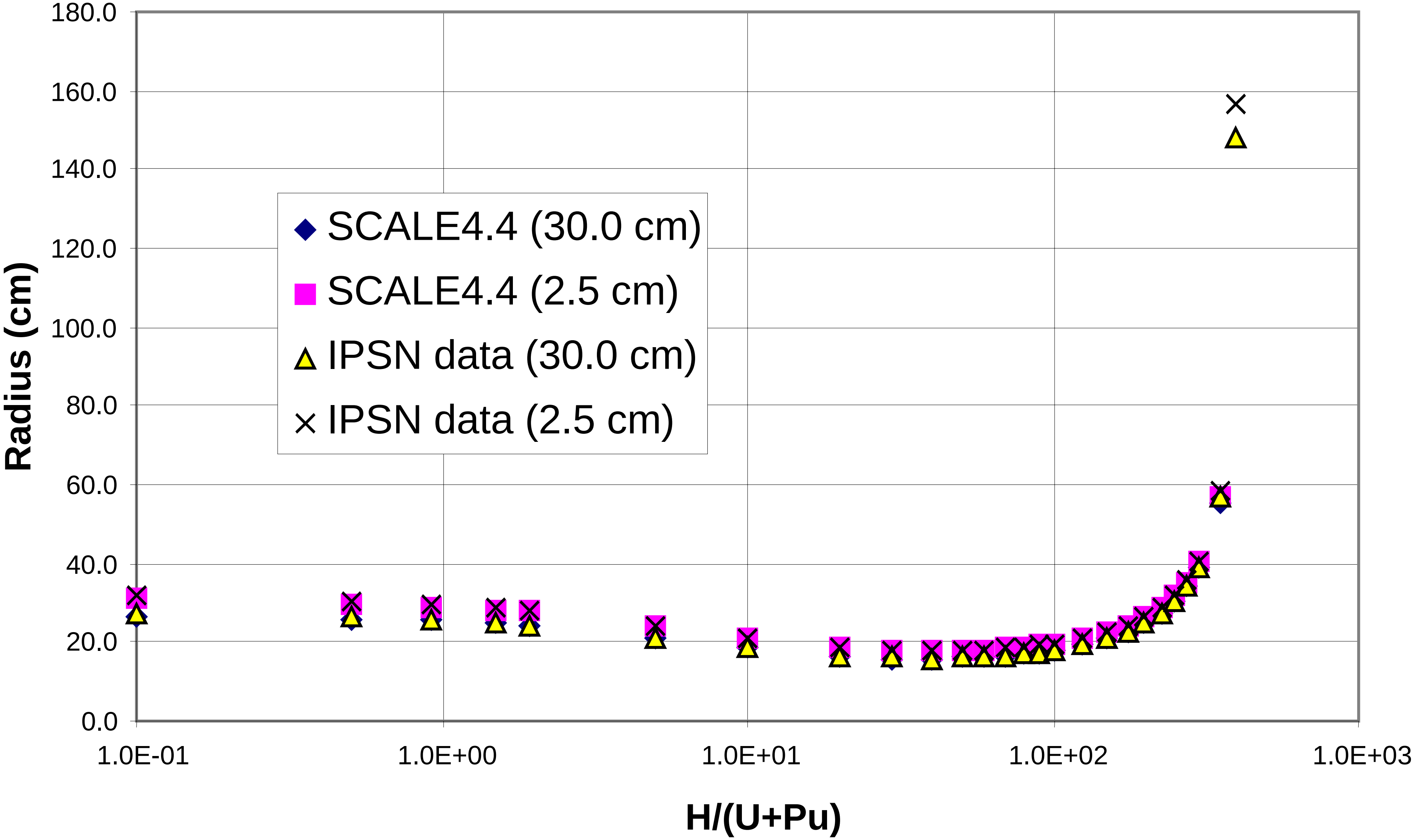

Fig. A.5.b.3-1. Sphere radius [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

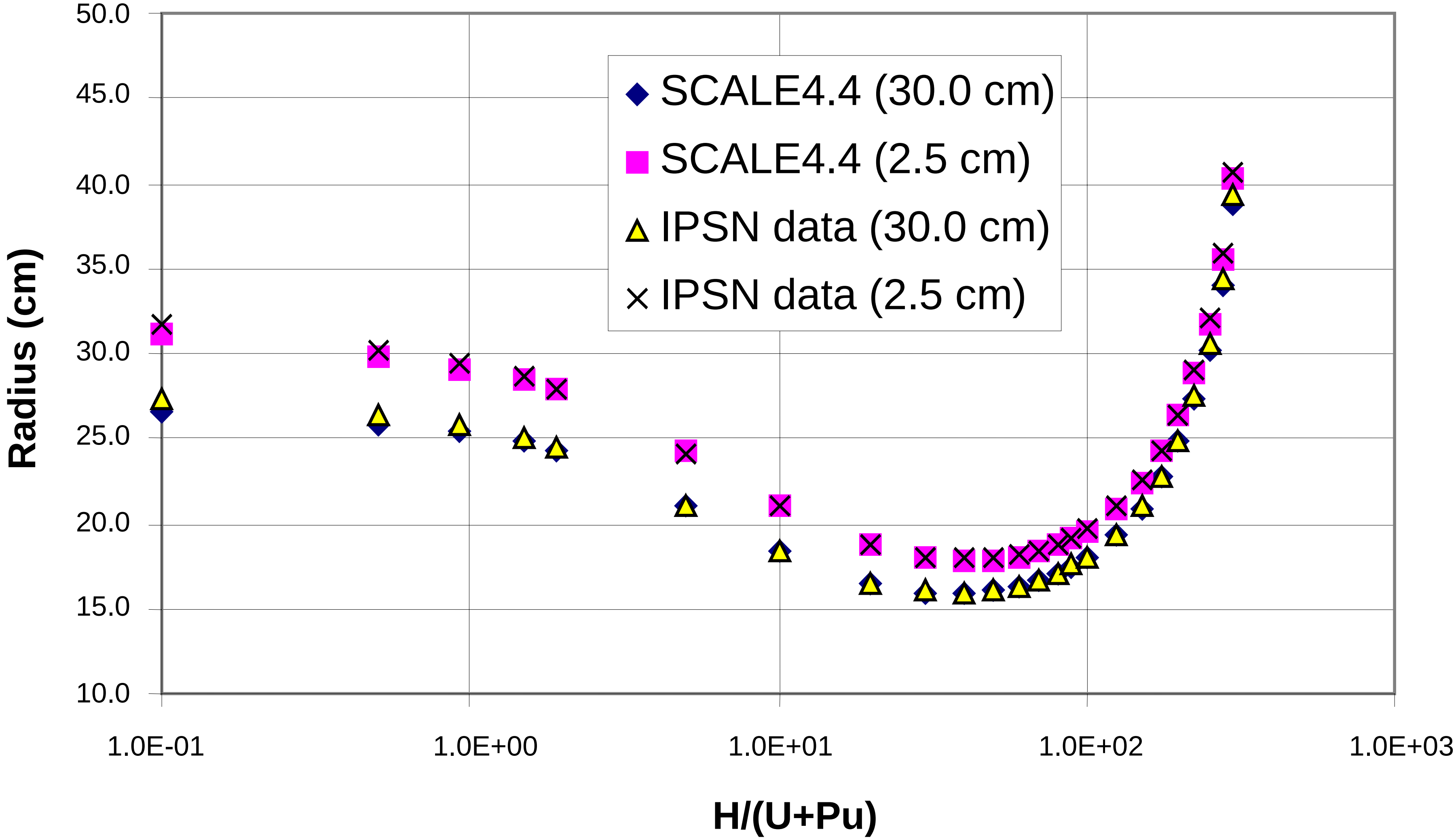

Fig. A.5.b.3-2. Sphere radius [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

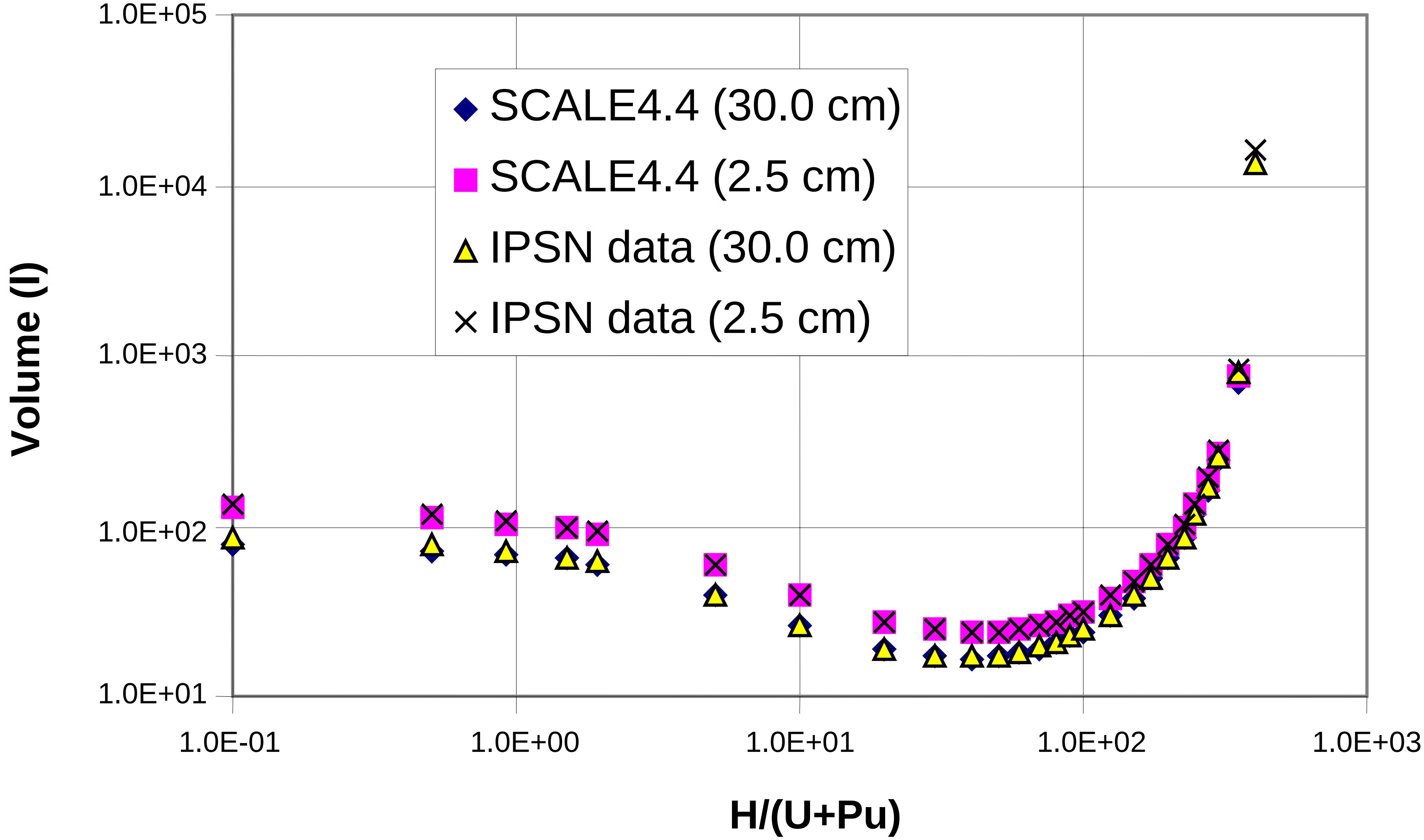

Fig. A.5.b.4. Sphere volume [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

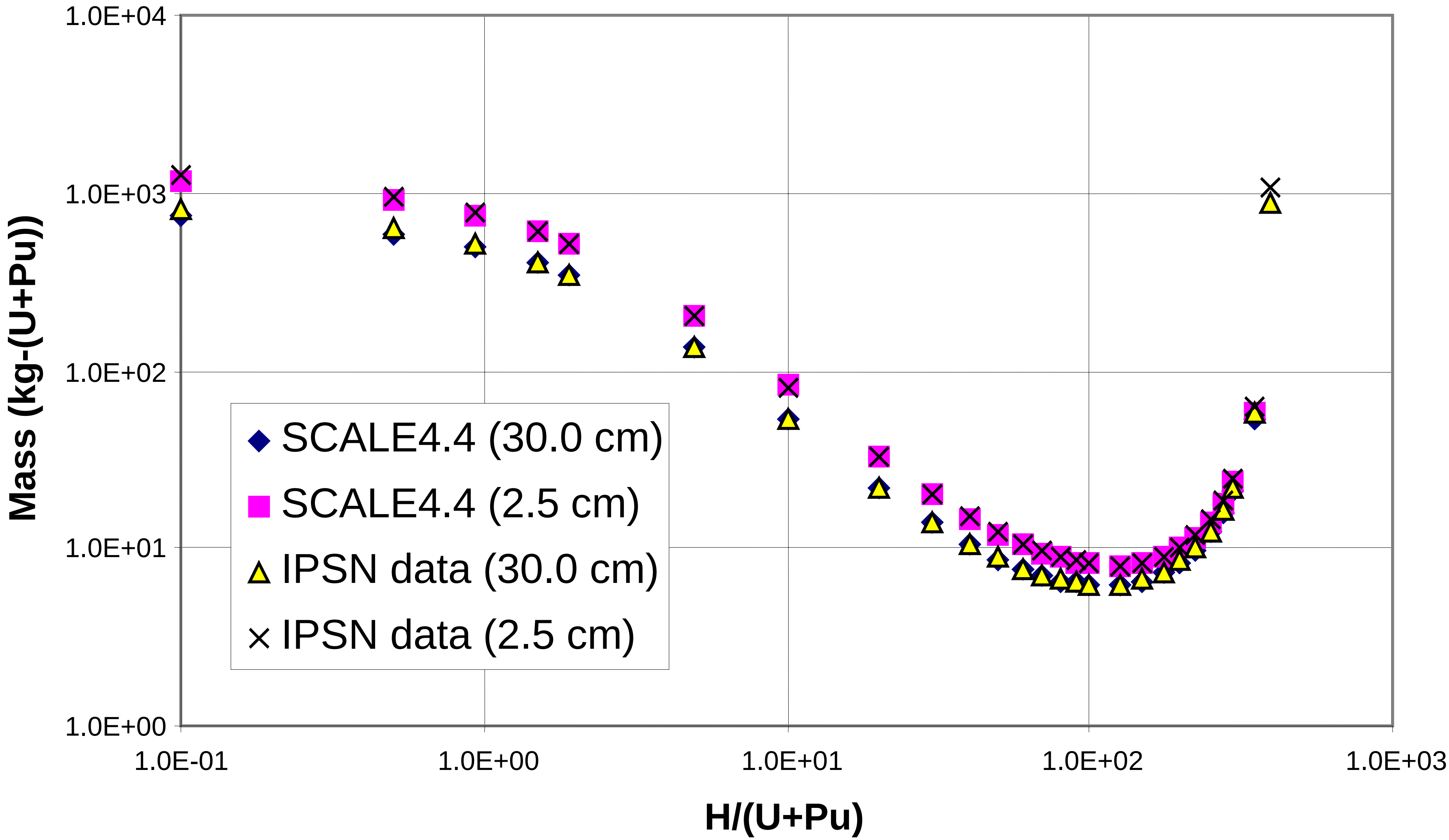

Fig. A.5.b.5. U + Pu mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

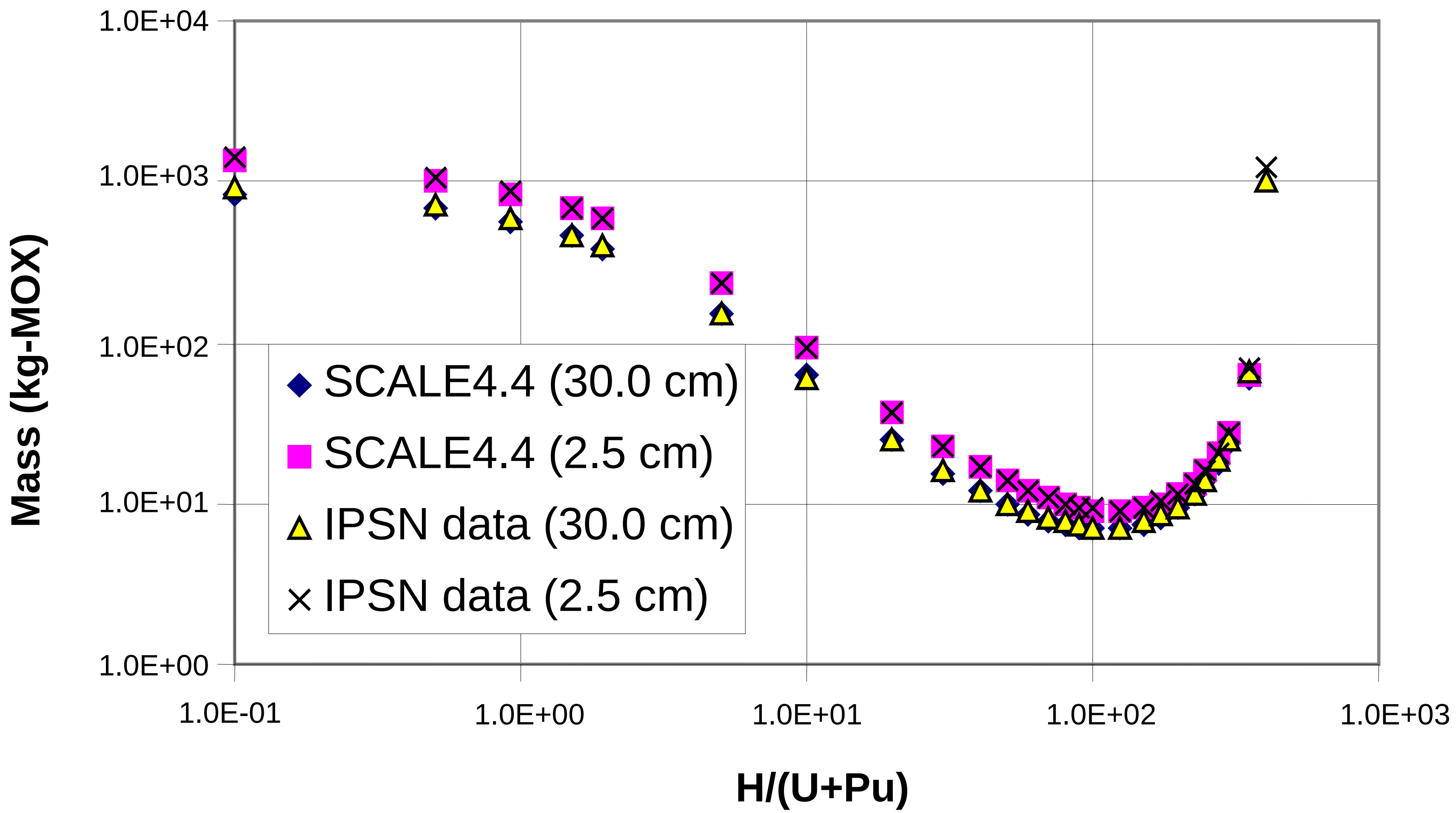

Fig. A.5.b.6. MOX mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

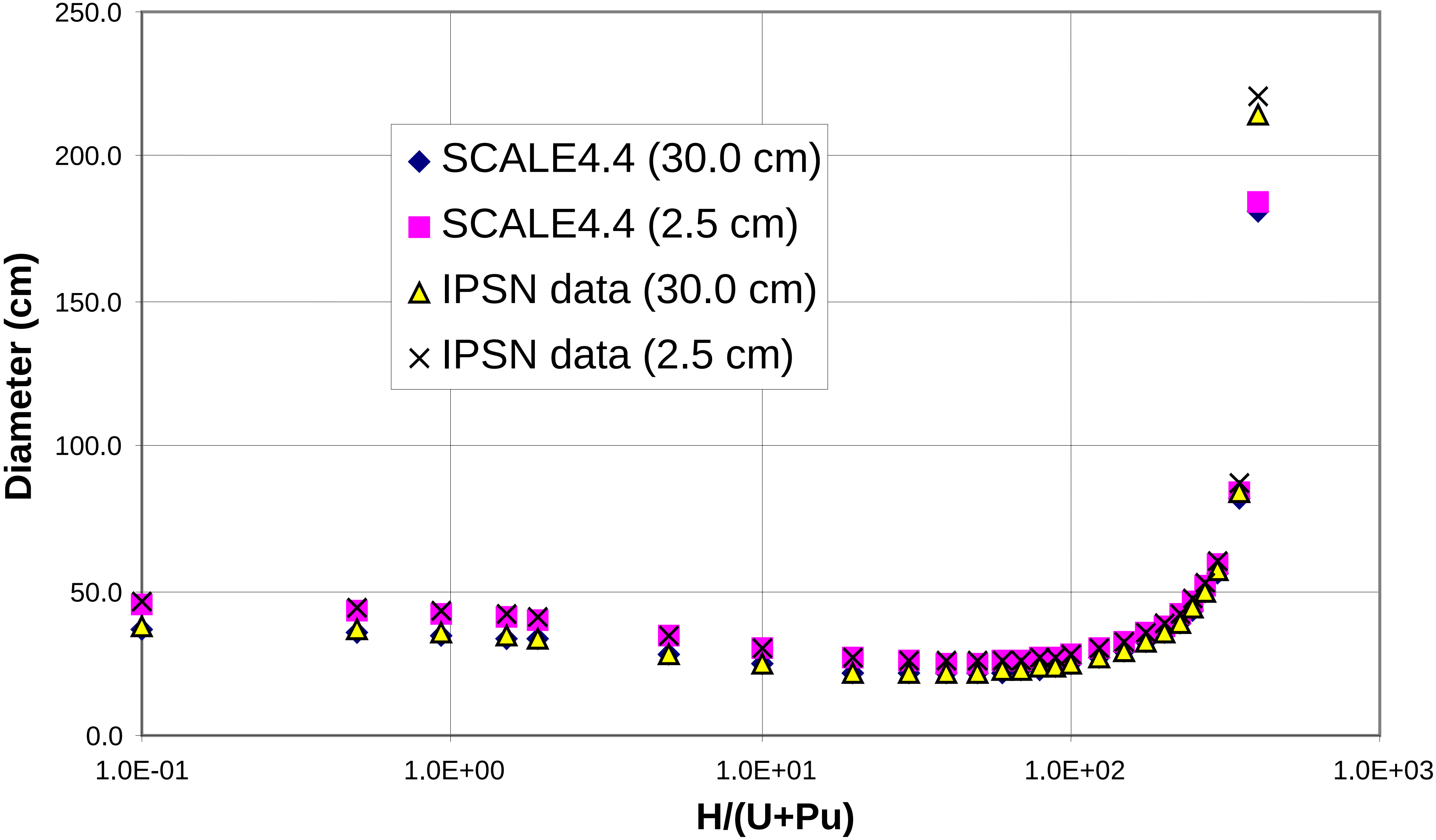

Fig. A.5.b.7-1. Cylinder diameter [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

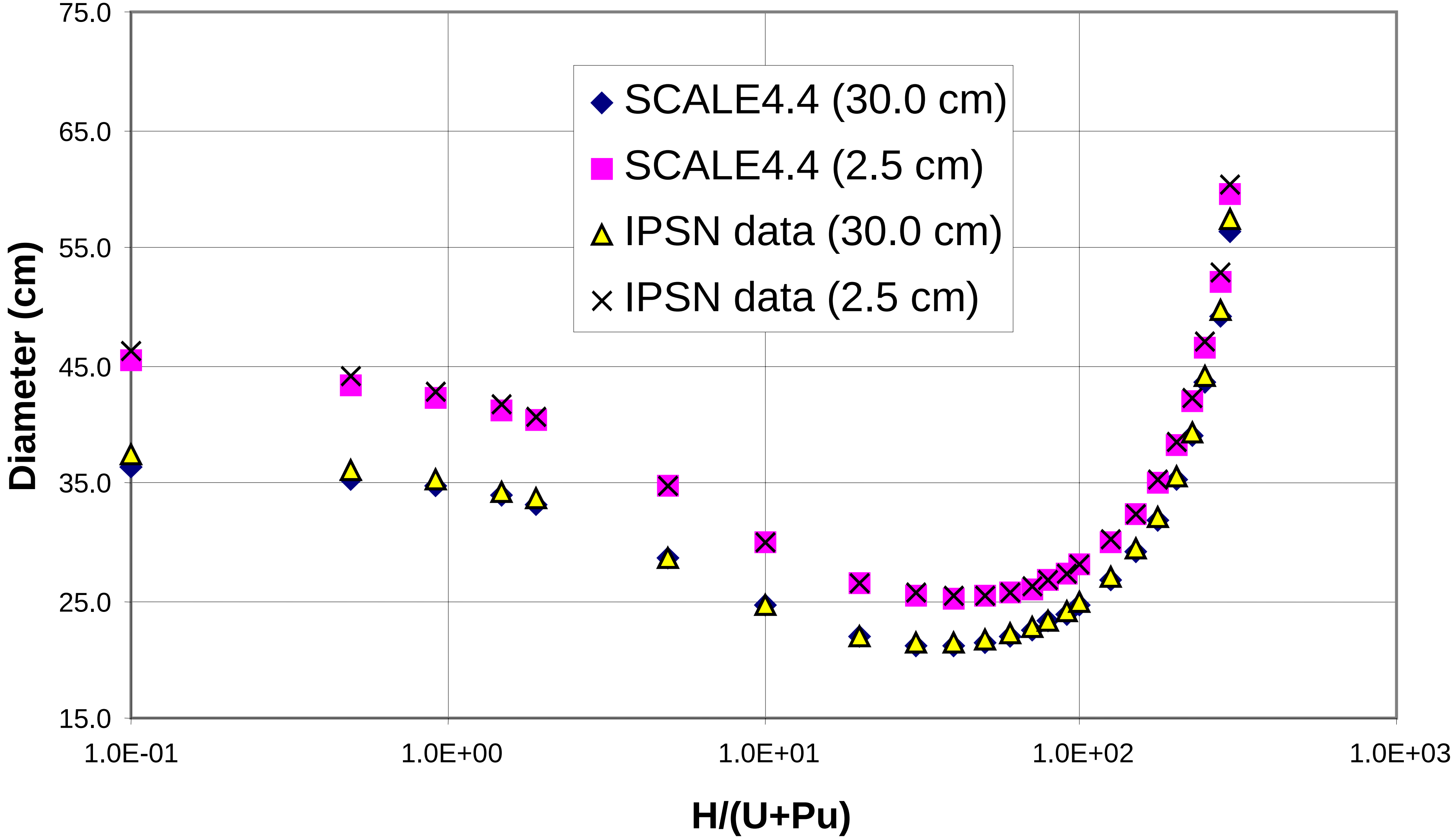

Fig. A.5.b.7-2. Cylinder diameter infinity [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

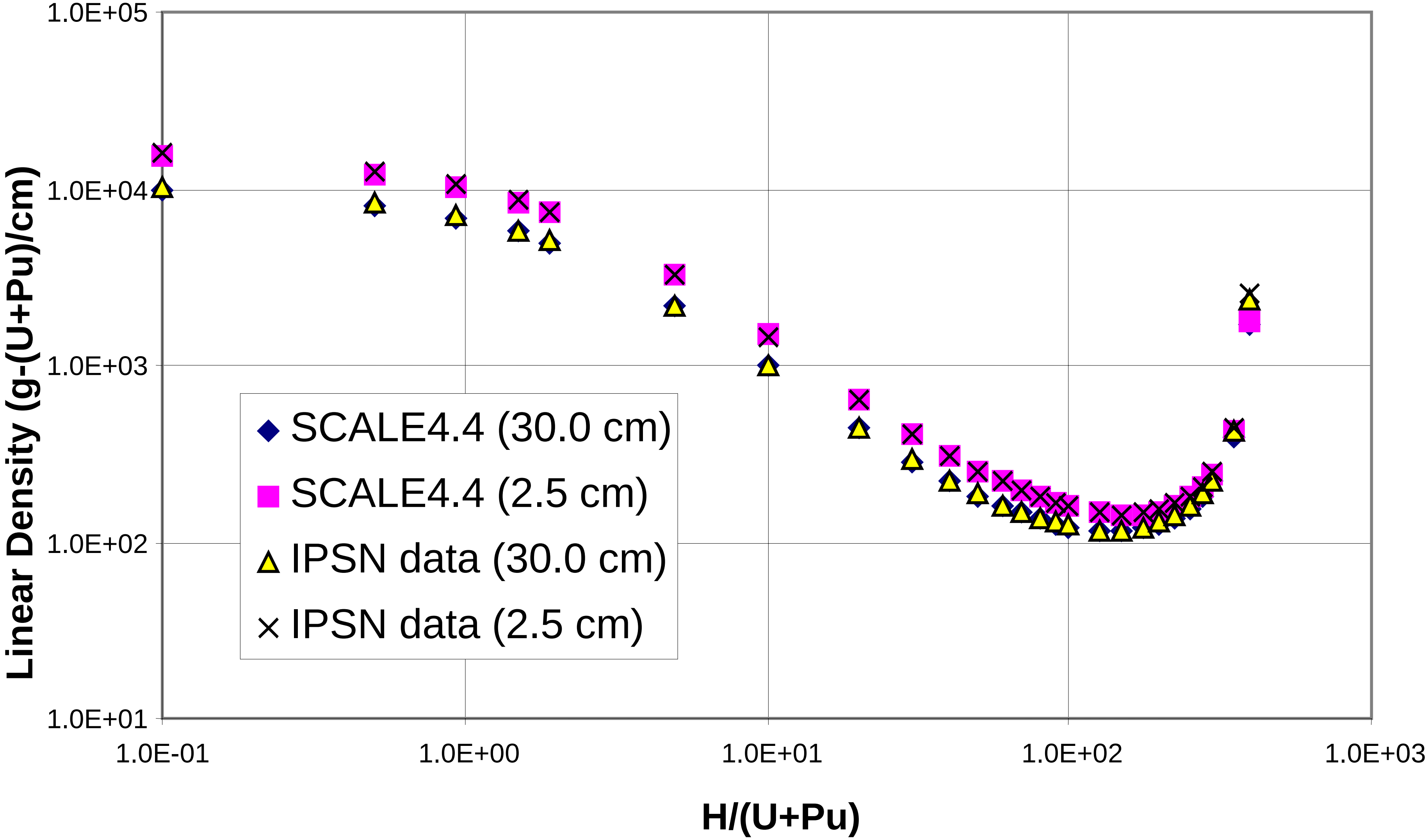

Fig. A.5.b.8. Linear density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

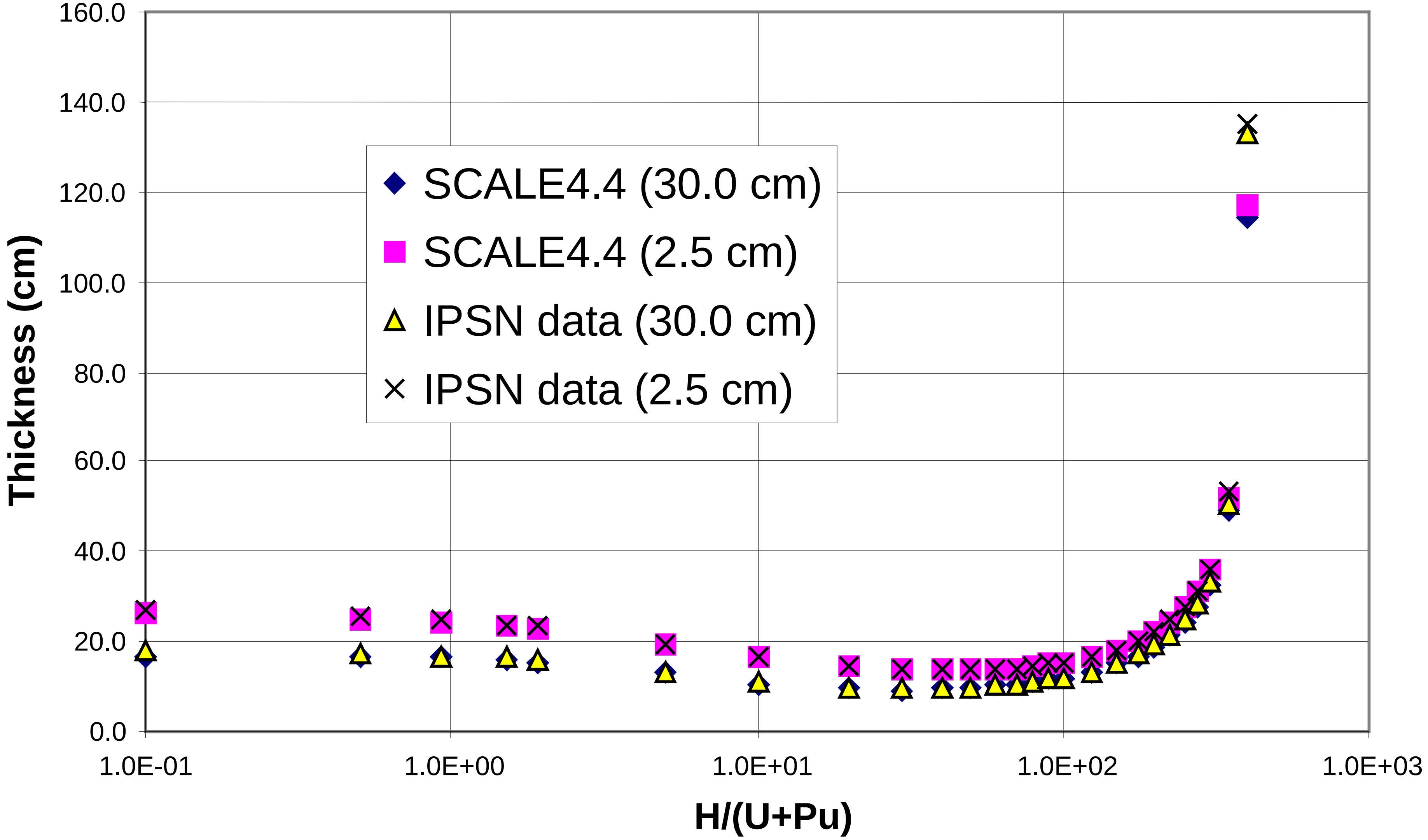

Fig. A.5.b.9-1. Slab thickness [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

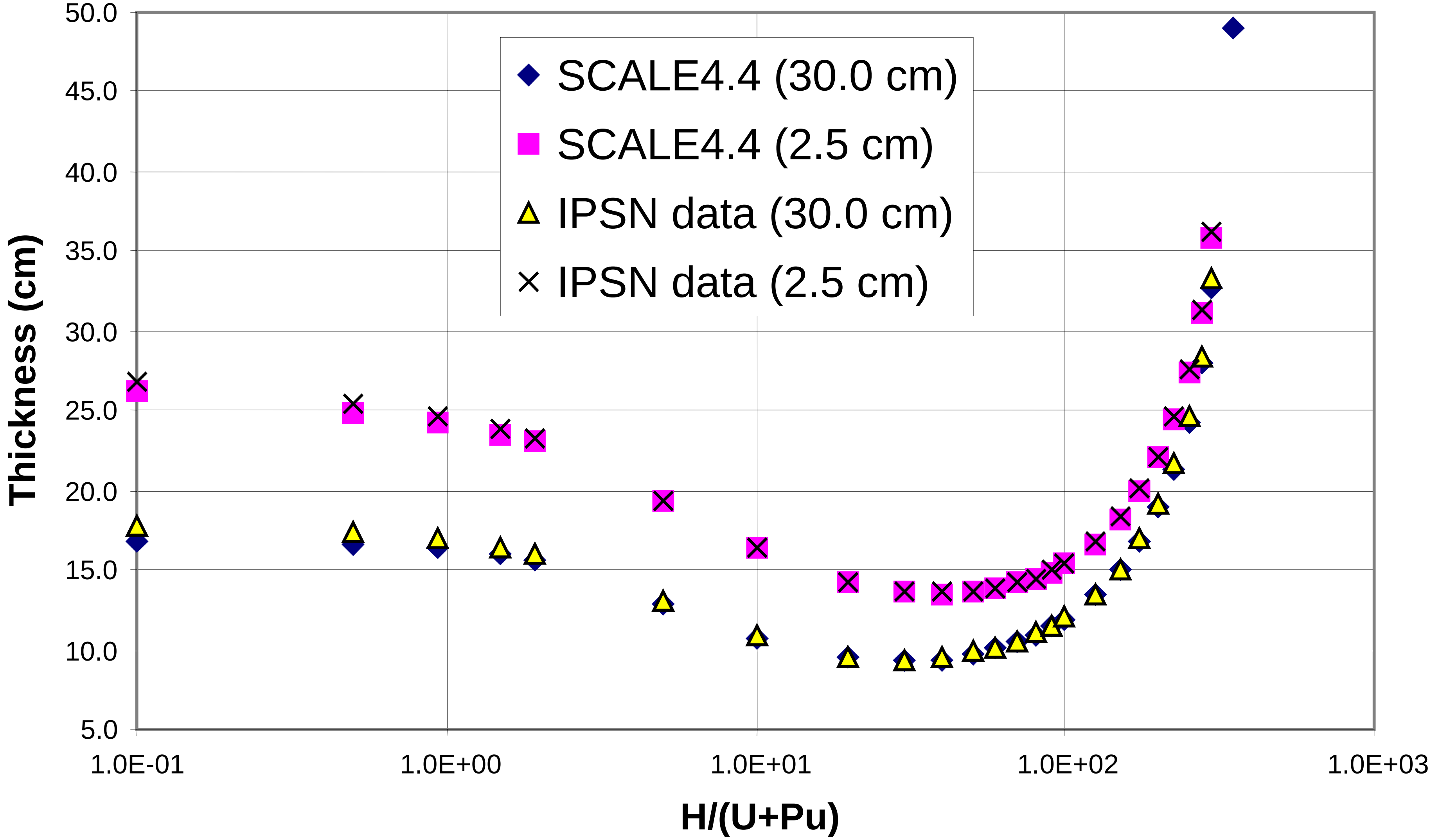

Fig. A.5.b.9-2. Slab thickness [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

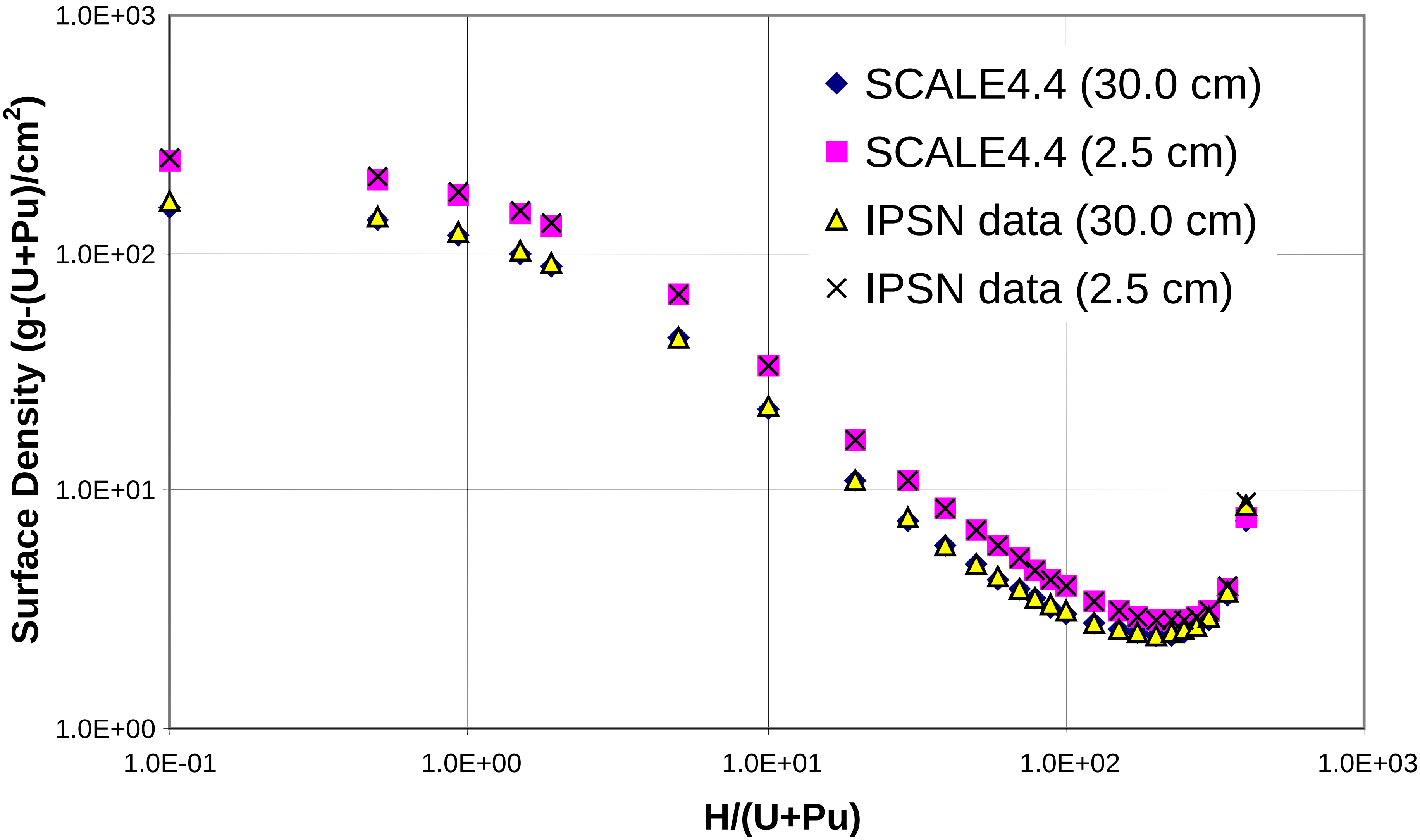

Fig. A.5.b.10. Surface density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free].

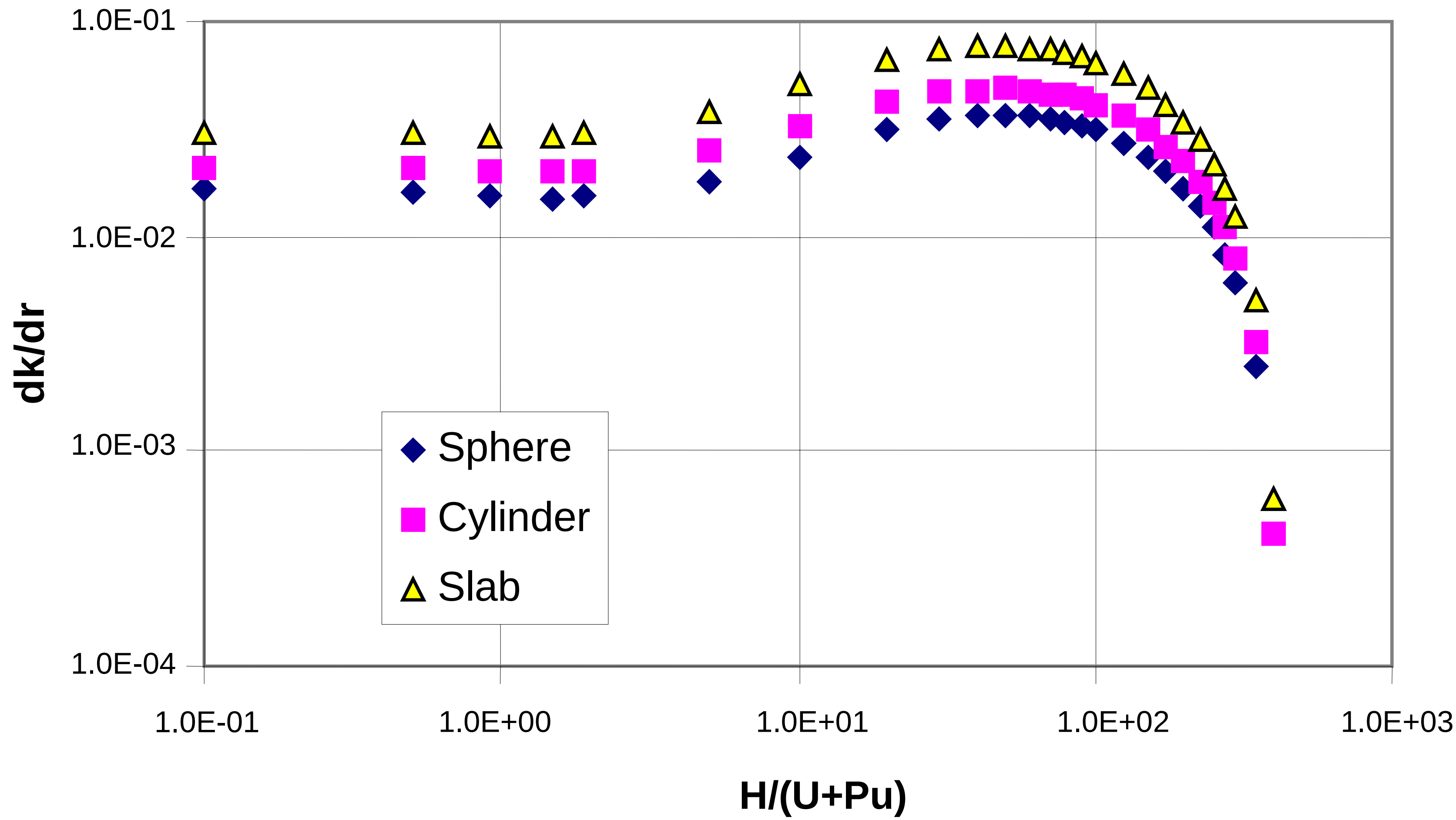

Fig. A.5.b.11. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 30.0 cm].

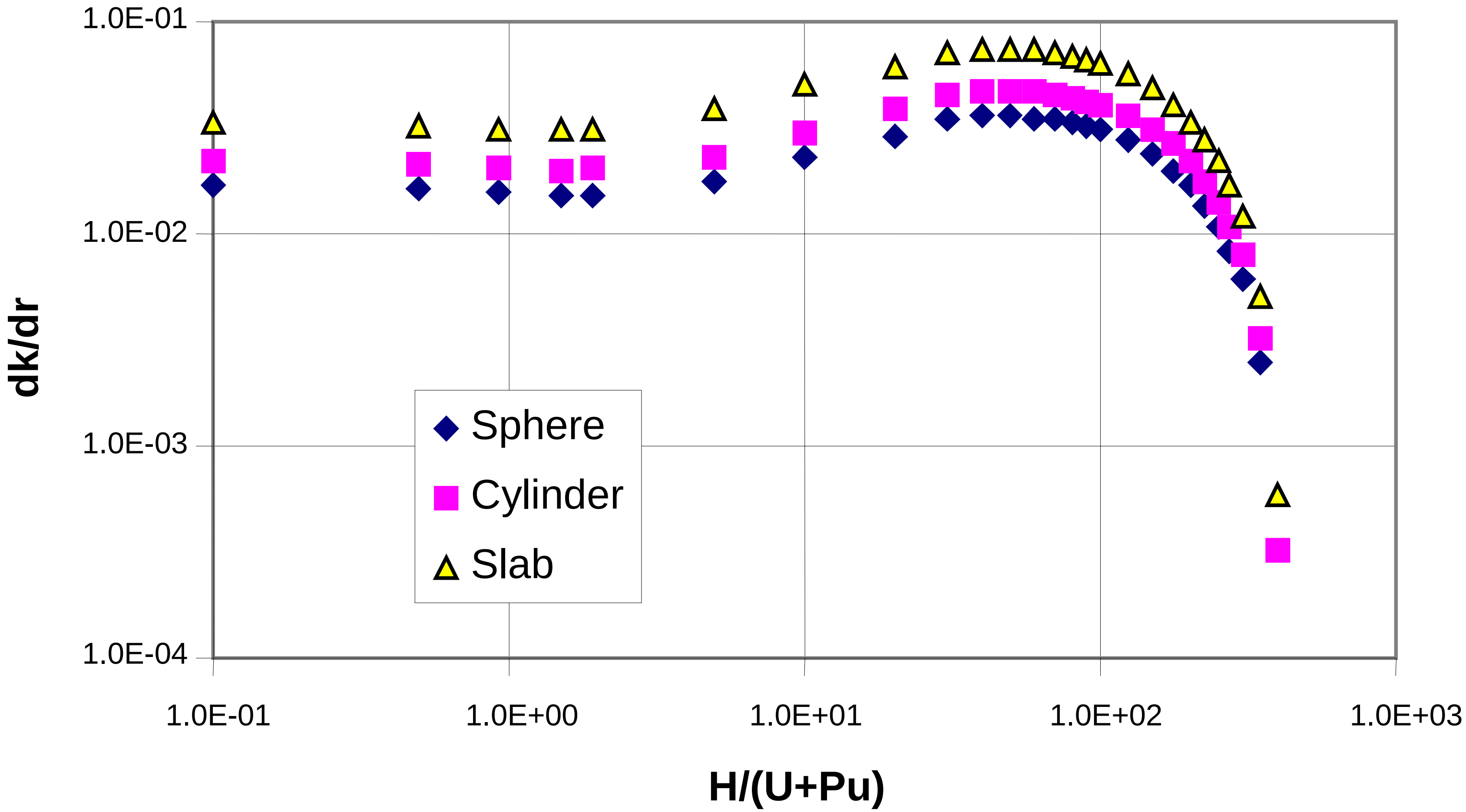

Fig. A.5.b.12. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 2.5 cm].

Table A.5.c.1. MOX data [$^{235}U/U$ = 0.718%, $^{239}Pu/Pu$ = 95%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5 % and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**95.000**	**5.000**	**0.000**	**0.000**

Fissile material oxide density
3.5 g ($UO_2 + PuO_2$)/cm^3

Water reflector
30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08545	3.50000	1.42508	8.316E-04	75.434	4.943E-03	1798.016	5547.690	6293.055	103.392	6.454E-03	25904.932	51.011	1.021E-02	157.393
0.5	1.64	3.08545	3.50000	1.36467	1.179E-03	64.766	5.489E-03	1137.967	3511.143	3982.886	89.051	7.263E-03	19217.199	44.228	1.128E-02	136.465
0.928	3.00	3.08545	3.50000	1.33291	1.572E-03	56.474	6.144E-03	754.465	2327.864	2640.626	77.636	8.002E-03	14606.271	38.412	1.250E-02	118.520
1.5	4.76	3.08545	3.50000	1.31481	2.187E-03	48.079	6.940E-03	465.535	1436.385	1629.372	65.955	9.416E-03	10541.412	32.304	1.440E-02	99.672
1.916	6.00	3.08545	3.50000	1.31100	2.723E-03	43.147	7.889E-03	336.475	1038.177	1177.662	59.074	1.022E-02	8456.765	28.686	1.592E-02	88.508
5.84	16.30	3.08545	3.50000	1.36083	1.233E-02	20.490	1.980E-02	36.035	111.183	126.121	27.586	2.607E-02	1844.080	12.308	4.053E-02	37.977
10	25.00	2.07873	2.35802	1.41973	1.483E-02	18.397	2.337E-02	26.080	54.213	61.497	24.579	3.307E-02	986.333	10.713	5.138E-02	22.270
20	40.01	1.16377	1.32013	1.50435	1.808E-02	16.493	3.198E-02	18.792	21.870	24.808	21.940	4.237E-02	439.961	9.468	6.639E-02	11.018
30	50.01	0.80809	0.91666	1.54326	1.944E-02	15.955	3.508E-02	17.013	13.748	15.595	21.264	4.652E-02	286.967	**9.269**	7.323E-02	7.490
40	57.15	0.61893	0.70209	1.55916	1.991E-02	**15.875**	3.628E-02	**16.758**	10.372	11.766	**21.235**	4.814E-02	219.202	9.404	7.589E-02	5.820
50	62.51	0.50153	0.56891	1.56202	1.989E-02	16.010	3.644E-02	17.190	8.621	9.780	21.508	4.834E-02	182.209	9.689	7.621E-02	4.860
60	66.67	0.42156	0.47820	1.55693	1.960E-02	16.268	3.597E-02	18.034	7.603	8.624	21.950	4.769E-02	159.527	10.058	7.514E-02	4.240
70	70.01	0.36359	0.41244	1.54676	1.915E-02	16.606	3.508E-02	19.181	6.974	7.911	22.504	4.650E-02	144.618	10.481	7.318E-02	3.811
80	72.73	0.31964	0.36259	1.53324	1.858E-02	17.002	3.394E-02	20.586	6.580	7.464	23.139	4.496E-02	134.410	10.945	7.065E-02	3.498
90	75.00	0.28516	0.32347	1.51751	1.795E-02	17.445	3.263E-02	22.238	6.341	7.193	23.839	4.320E-02	127.280	11.442	6.777E-02	3.263
100	76.93	0.25740	0.29198	1.50030	1.729E-02	17.927	3.122E-02	24.133	**6.212**	**7.046**	24.595	4.130E-02	122.294	11.969	6.471E-02	3.081
125	80.65	0.20702	0.23483	1.45389	1.554E-02	19.287	2.749E-02	30.051	6.221	7.057	26.708	3.632E-02	115.982	13.411	5.666E-02	2.776
150	83.34	0.17313	0.19639	1.40588	1.379E-02	20.863	2.375E-02	38.036	6.585	7.470	29.138	3.132E-02	**115.450**	14.997	4.886E-02	2.596
175	85.37	0.14877	0.16876	1.35842	1.210E-02	22.679	2.015E-02	48.863	7.269	8.246	31.928	2.654E-02	119.110	16.842	4.124E-02	2.506
200	86.96	0.13043	0.14795	1.31250	1.049E-02	24.786	1.678E-02	63.780	8.319	9.437	35.155	2.207E-02	126.599	18.934	3.425E-02	**2.470**
225	88.24	0.11611	0.13171	1.26858	8.975E-03	27.267	1.368E-02	84.915	9.860	11.184	38.950	1.797E-02	138.351	21.397	2.783E-02	2.484
250	89.29	0.10462	0.11868	1.22679	7.544E-03	30.254	1.086E-02	115.993	12.135	13.766	43.517	1.425E-02	155.606	24.351	2.203E-02	2.548
275	90.17	0.09520	0.10799	1.18719	6.201E-03	33.953	8.330E-03	163.952	15.608	17.705	49.170	1.092E-02	180.770	28.024	1.684E-02	2.668
300	90.91	0.08734	0.09907	1.14972	4.940E-03	38.721	6.091E-03	243.178	21.239	24.093	56.457	7.979E-03	218.648	32.756	1.227E-02	2.861
350	92.11	0.07496	0.08503	1.08074	2.644E-03	55.039	2.499E-03	698.401	52.352	59.386	81.407	3.270E-03	390.164	48.982	5.023E-03	3.672
400	93.02	0.06565	0.07447	1.01901	6.179E-04						181.174	4.064E-04	1692.456	114.069	5.973E-04	**7.489**
415	93.260	0.06319	0.07168	1.00177												
416	93.275	0.06304	0.07151	1.00066												
417	**93.290**	**0.06289**	**0.07134**	**0.99952**												
418	93.305	0.06274	0.07117	0.99839												
419	93.320	0.06259	0.07100	0.99727												
420	93.335	0.06244	0.07083	0.99614												
425	93.408	0.06171	0.07000	0.99058												
430	93.480	0.06100	0.06920	0.98506												
450	93.751	0.05840	0.06625	0.96360												

* [grey shading] means the data are the same as the data of Table A.5.b.1.

Table A.5.c.2. MOX data [$^{235}U/U$ = 0.718%, $^{239}Pu/Pu$ = 95%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**95.000**	**5.000**	**0.000**	**0.000**

Fissile material oxide density
5.5 g ($UO_2 + PuO_2$)/cm^3

Water reflector
30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	4.84857	5.50000	1.42511	2.054E-03	49.197	7.968E-03	498.781	2418.372	2743.295	67.271	1.039E-02	17232.823	32.437	1.574E-02	157.272
0.5	1.64	4.84857	5.50000	1.36469	2.913E-03	42.239	8.781E-03	315.676	1530.577	1736.219	57.928	1.175E-02	12778.513	28.121	1.771E-02	136.347
0.928	3.00	4.84857	5.50000	1.33294	3.882E-03	36.886	9.826E-03	210.223	1019.280	1156.227	50.579	1.293E-02	9742.055	24.411	1.944E-02	118.358
1.5	4.76	4.84857	5.50000	1.31483	5.402E-03	31.472	1.126E-02	130.571	633.080	718.138	43.051	1.489E-02	7057.675	20.547	2.242E-02	99.623
1.916	6.00	4.84857	5.50000	1.31102	6.724E-03	28.288	1.257E-02	94.822	459.751	521.521	38.638	1.668E-02	5684.968	18.247	2.535E-02	88.470
2.73	8.34	4.84857	5.50000	1.31441	9.917E-03	23.400	1.561E-02	53.672	260.232	295.196	31.827	2.049E-02	3857.400	14.712	3.181E-02	71.331
5	14.29	3.42516	3.88535	1.34723	1.174E-02	21.128	1.774E-02	39.507	135.317	153.497	28.506	2.507E-02	2186.027	12.838	3.841E-02	43.971
10	25.00	2.07873	2.35802	1.41973	1.483E-02	18.397	2.337E-02	26.080	54.213	61.497	24.579	3.307E-02	986.333	10.713	5.138E-02	22.270
20	40.01	1.16377	1.32013	1.50435	1.808E-02	16.493	3.198E-02	18.792	21.870	24.808	21.940	4.237E-02	439.961	9.468	6.639E-02	11.018
30	50.01	0.80809	0.91666	1.54326	1.944E-02	15.955	3.508E-02	17.013	13.748	15.595	21.264	4.652E-02	286.967	**9.269**	7.323E-02	7.490
40	57.15	0.61893	0.70209	1.55916	1.991E-02	**15.875**	3.628E-02	**16.758**	10.372	11.766	**21.235**	4.814E-02	219.202	9.404	7.589E-02	5.820
50	62.51	0.50153	0.56891	1.56202	1.989E-02	16.010	3.644E-02	17.190	8.621	9.780	21.508	4.834E-02	182.209	9.689	7.621E-02	4.860
60	66.67	0.42156	0.47820	1.55693	1.960E-02	16.268	3.597E-02	18.034	7.603	8.624	21.950	4.769E-02	159.527	10.058	7.514E-02	4.240
70	70.01	0.36359	0.41244	1.54676	1.915E-02	16.606	3.508E-02	19.181	6.974	7.911	22.504	4.650E-02	144.618	10.481	7.318E-02	3.811
80	72.73	0.31964	0.36259	1.53324	1.858E-02	17.002	3.394E-02	20.586	6.580	7.464	23.139	4.496E-02	134.410	10.945	7.065E-02	3.498
90	75.00	0.28516	0.32347	1.51751	1.795E-02	17.445	3.263E-02	22.238	6.341	7.193	23.839	4.320E-02	127.280	11.442	6.777E-02	3.263
100	76.93	0.25740	0.29198	1.50030	1.729E-02	17.927	3.122E-02	24.133	**6.212**	**7.046**	24.595	4.130E-02	122.294	11.969	6.471E-02	3.081
125	80.65	0.20702	0.23483	1.45389	1.554E-02	19.287	2.749E-02	30.051	6.221	7.057	26.708	3.632E-02	115.982	13.411	5.666E-02	2.776
150	83.34	0.17313	0.19639	1.40588	1.379E-02	20.863	2.375E-02	38.036	6.585	7.470	29.138	3.132E-02	**115.450**	14.997	4.886E-02	2.596
175	85.37	0.14877	0.16876	1.35842	1.210E-02	22.679	2.015E-02	48.863	7.269	8.246	31.928	2.654E-02	119.110	16.842	4.124E-02	2.506
200	86.96	0.13043	0.14795	1.31250	1.049E-02	24.786	1.678E-02	63.780	8.319	9.437	35.155	2.207E-02	126.599	18.934	3.425E-02	**2.470**
225	88.24	0.11611	0.13171	1.26858	8.975E-03	27.267	1.368E-02	84.915	9.860	11.184	38.950	1.797E-02	138.351	21.397	2.783E-02	2.484
250	89.29	0.10462	0.11868	1.22679	7.544E-03	30.254	1.086E-02	115.993	12.135	13.766	43.517	1.425E-02	155.606	24.351	2.203E-02	2.548
275	90.17	0.09520	0.10799	1.18719	6.201E-03	33.953	8.330E-03	163.952	15.608	17.705	49.170	1.092E-02	180.770	28.024	1.684E-02	2.668
300	90.91	0.08734	0.09907	1.14972	4.940E-03	38.721	6.091E-03	243.178	21.239	24.093	56.457	7.979E-03	218.648	32.756	1.227E-02	2.861
350	92.11	0.07496	0.08503	1.08074	2.644E-03	55.039	2.499E-03	698.401	52.352	59.386	81.407	3.270E-03	390.164	48.982	5.023E-03	3.672
400	93.02	0.06565	0.07447	1.01901	6.179E-04						181.174	4.064E-04	1692.456	114.069	5.973E-04	**7.489**
415	93.260	0.06319	0.07168	1.00177												
416	93.275	0.06304	0.07151	1.00066												
417	**93.290**	**0.06289**	**0.07134**	**0.99952**												
418	93.305	0.06274	0.07117	0.99839												
419	93.320	0.06259	0.07100	0.99727												
420	93.335	0.06244	0.07083	0.99614												
425	93.408	0.06171	0.07000	0.99058												
430	93.480	0.06100	0.06920	0.98506												
450	93.751	0.05840	0.06625	0.96360												

* [grey shading] means the data are the same as the data of Table A.5.b.1.

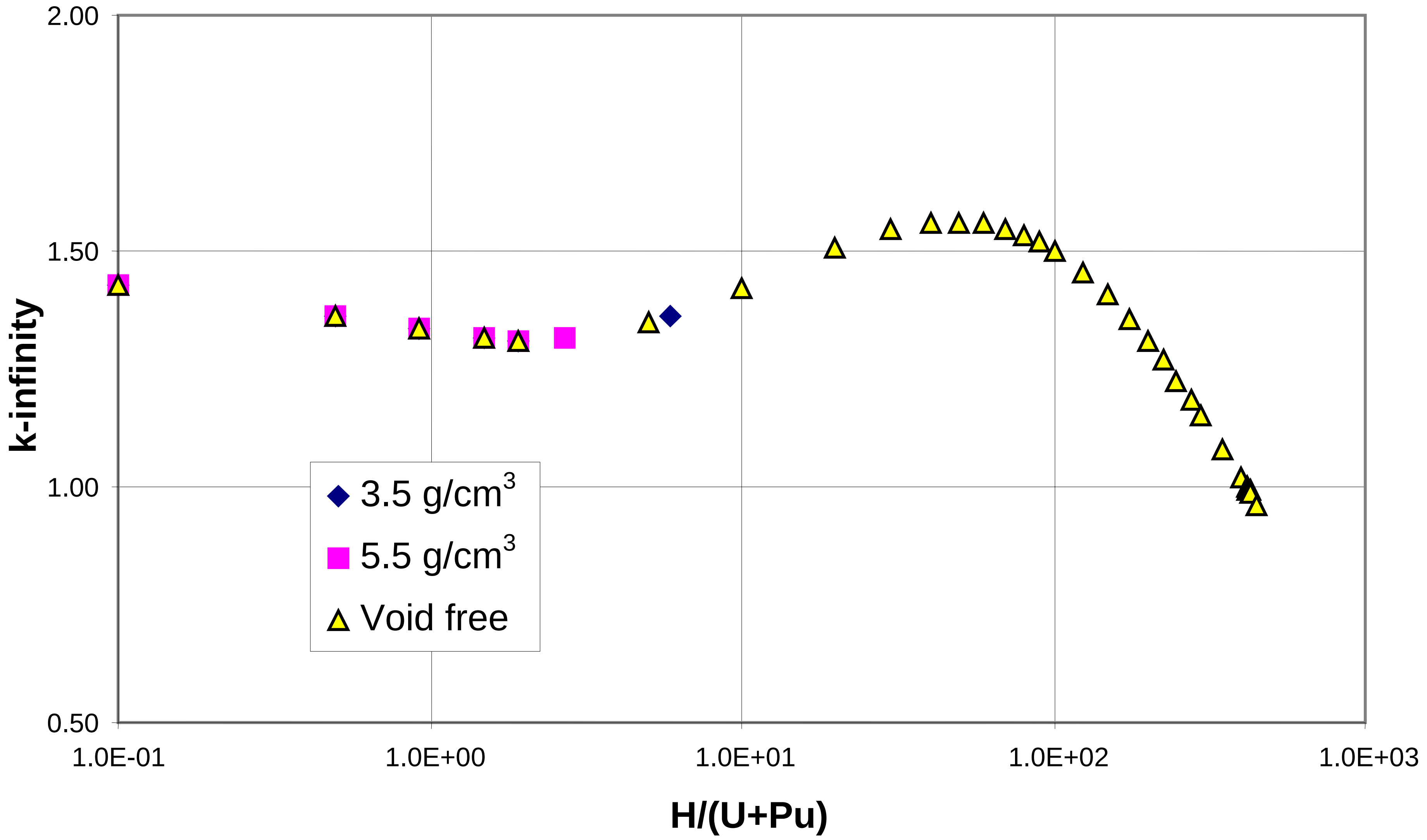

Fig. A.5.c.1. *k*-infinity [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%].

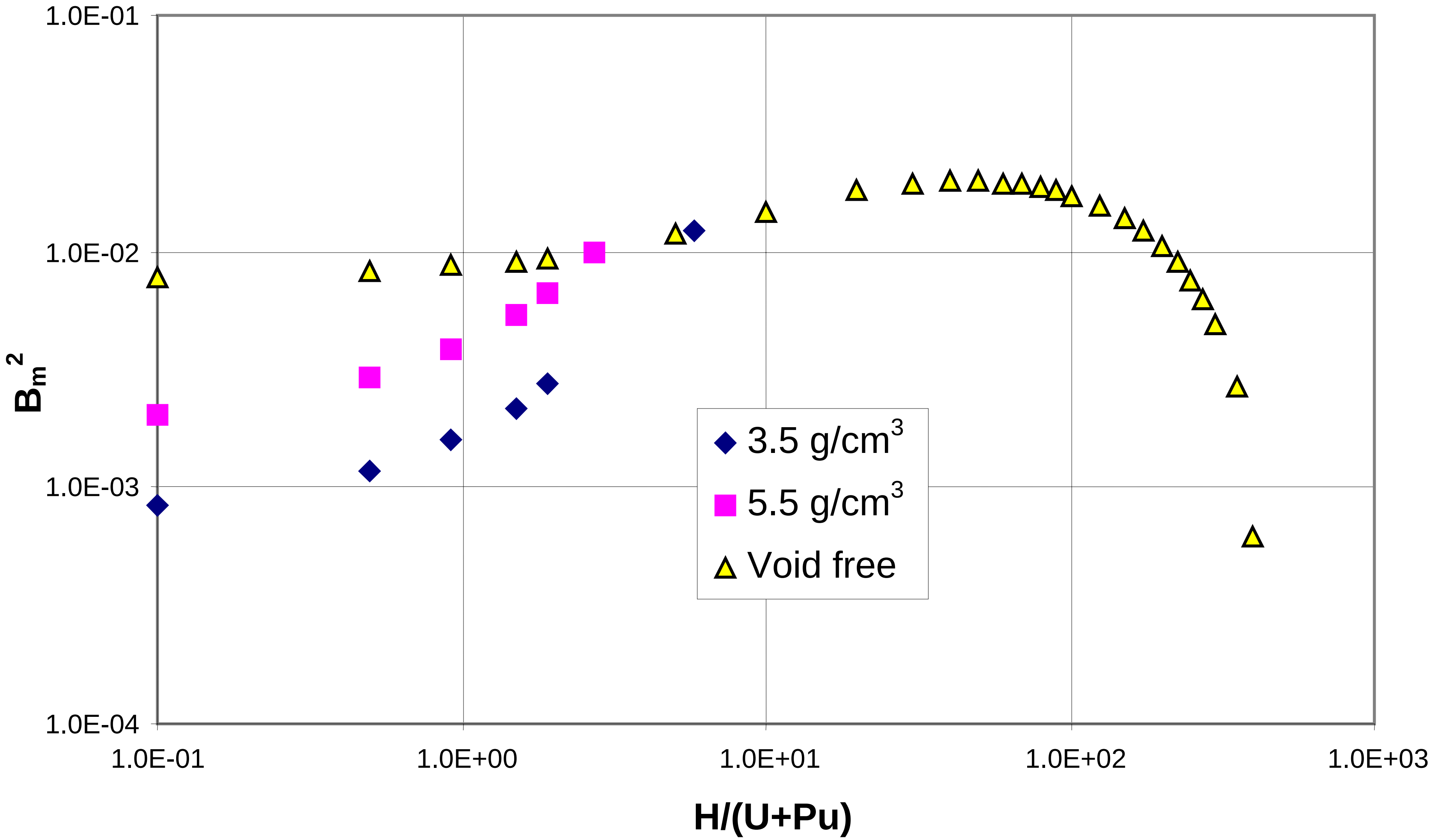

Fig. A.5.c.2. B_m^2 [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%].

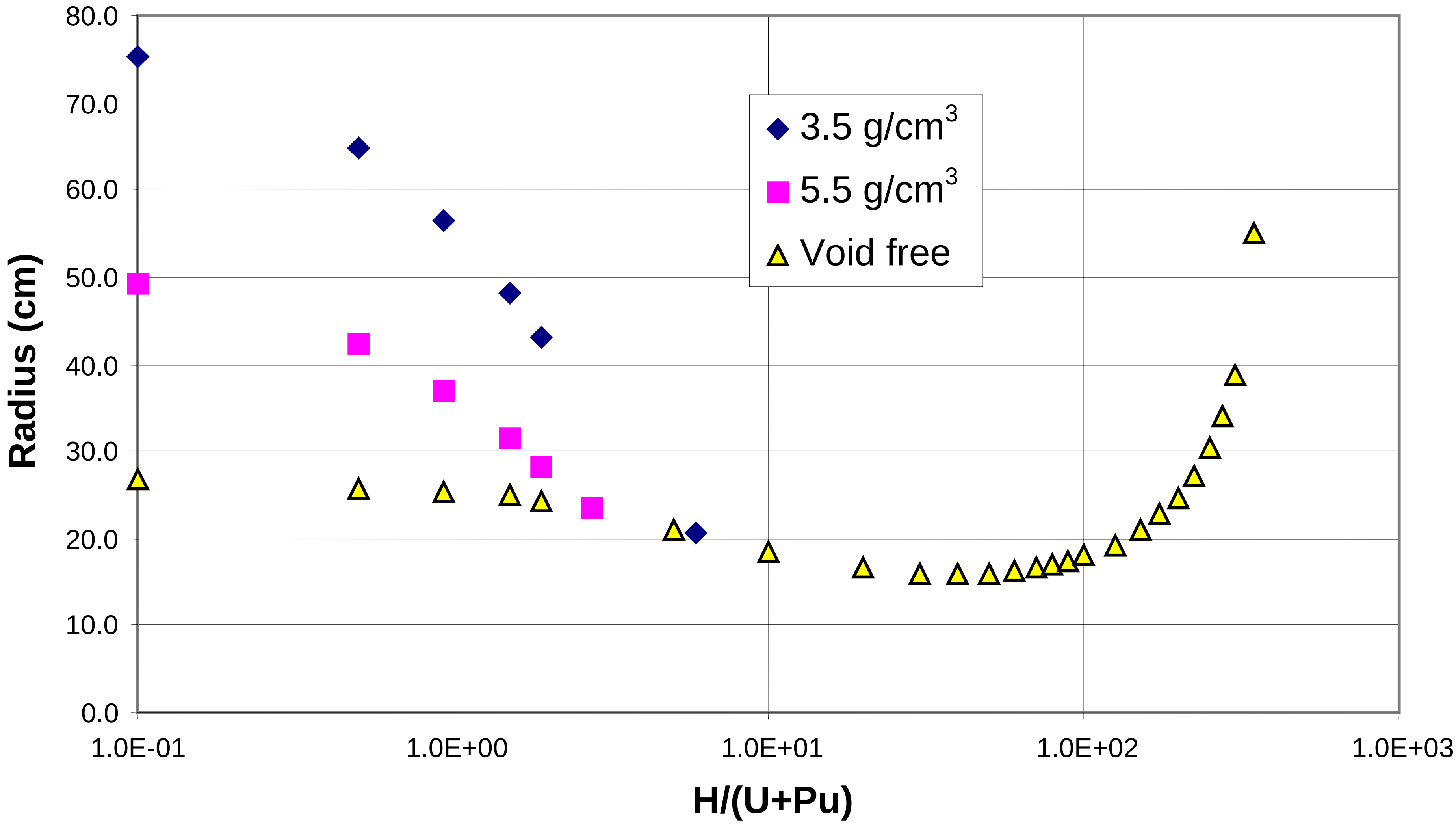

Fig. A.5.c.3. Sphere radius [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

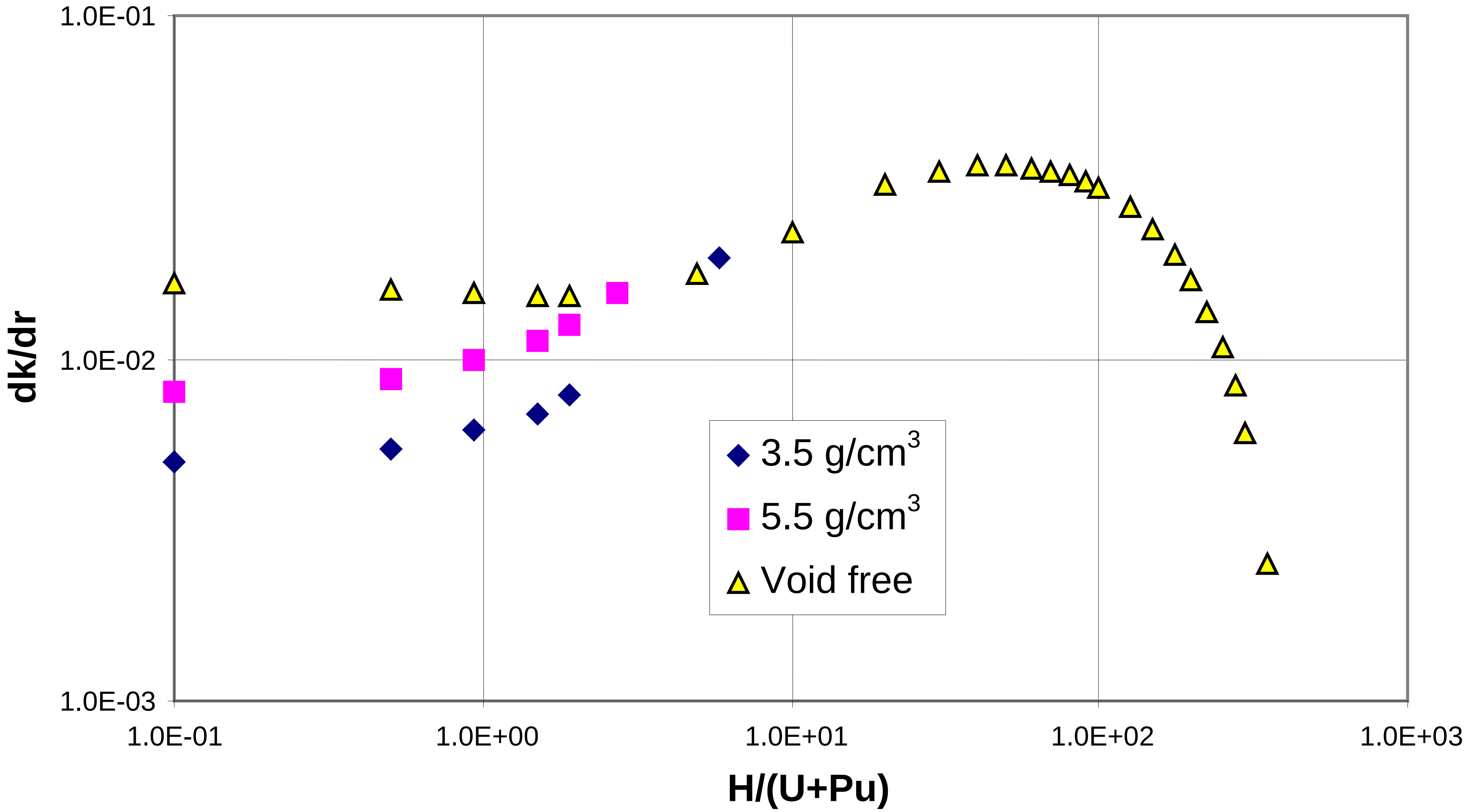

Fig. A.5.c.4. Delta lambda divided by delta dimension [sphere, ^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

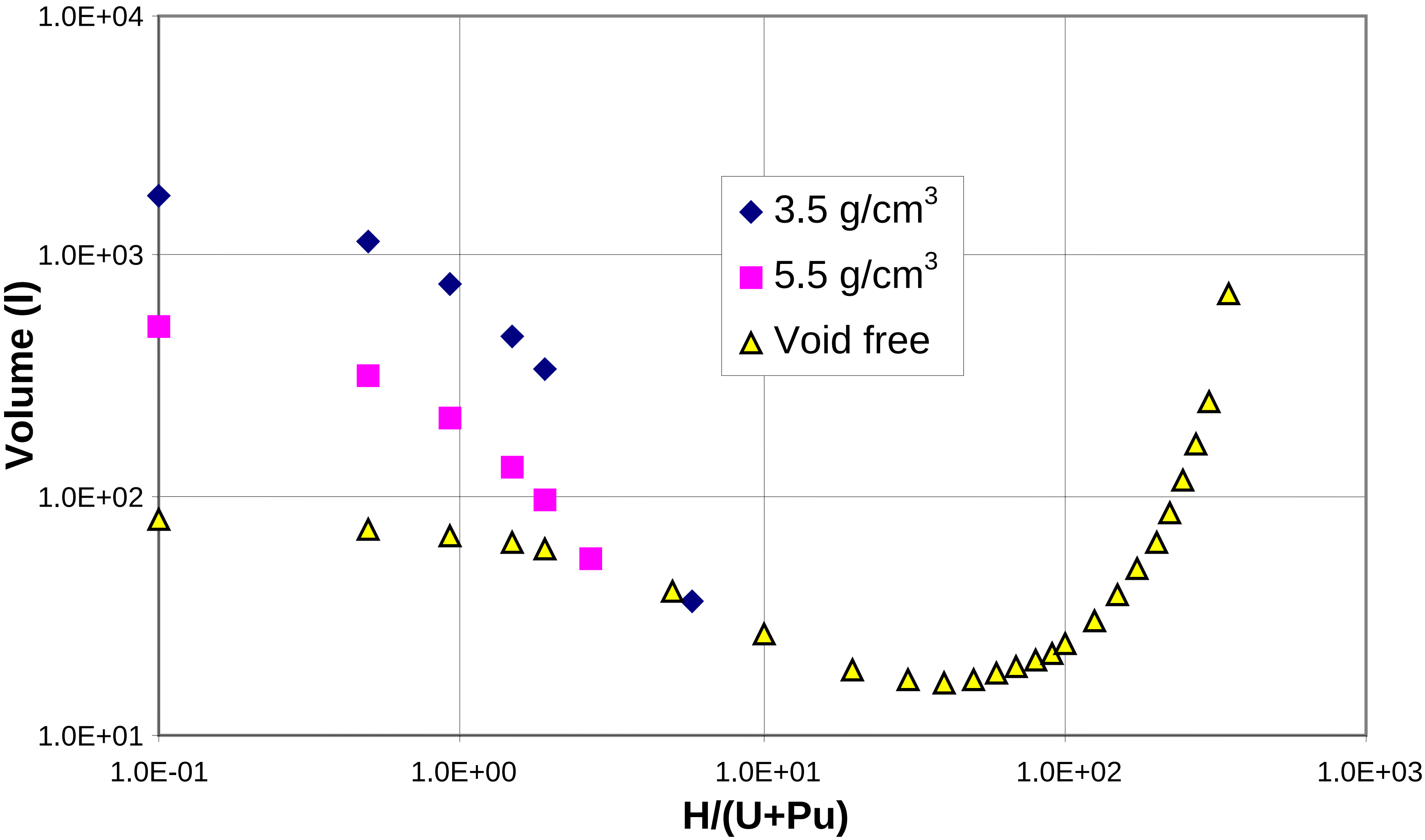

Fig. A.5.c.5. Sphere volume [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

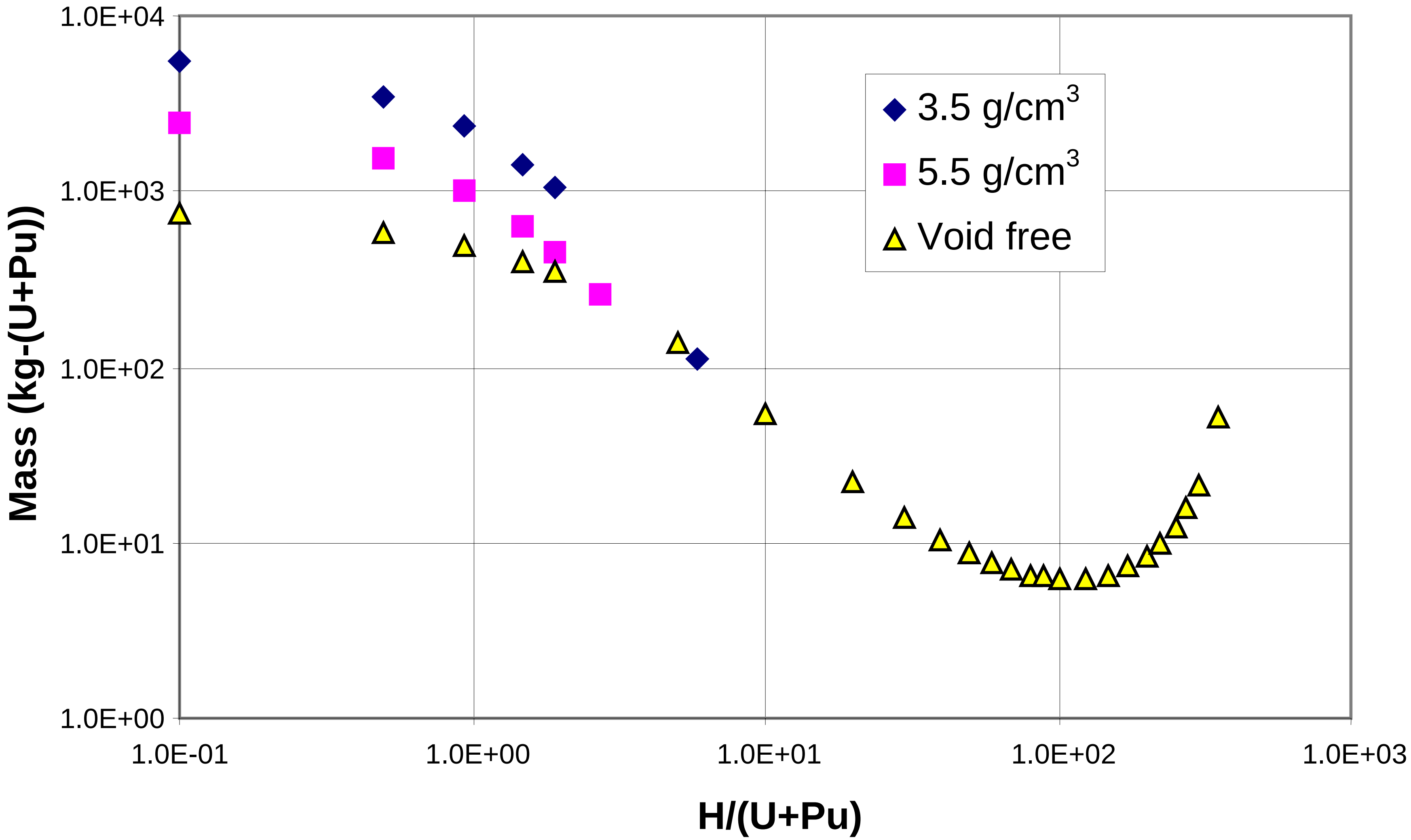

Fig. A.5.c.6. U + Pu mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

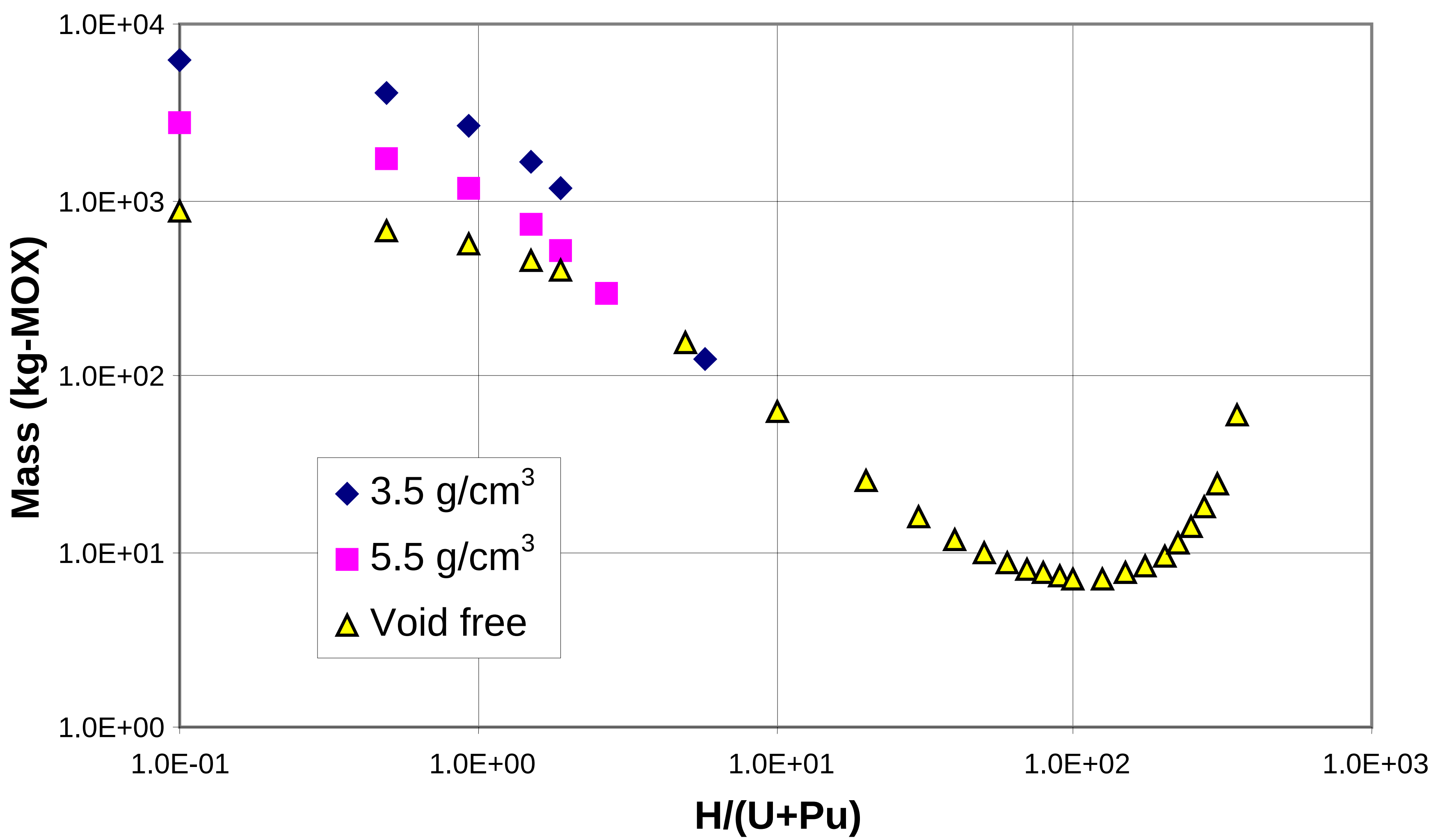

Fig. A.5.c.7. MOX mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

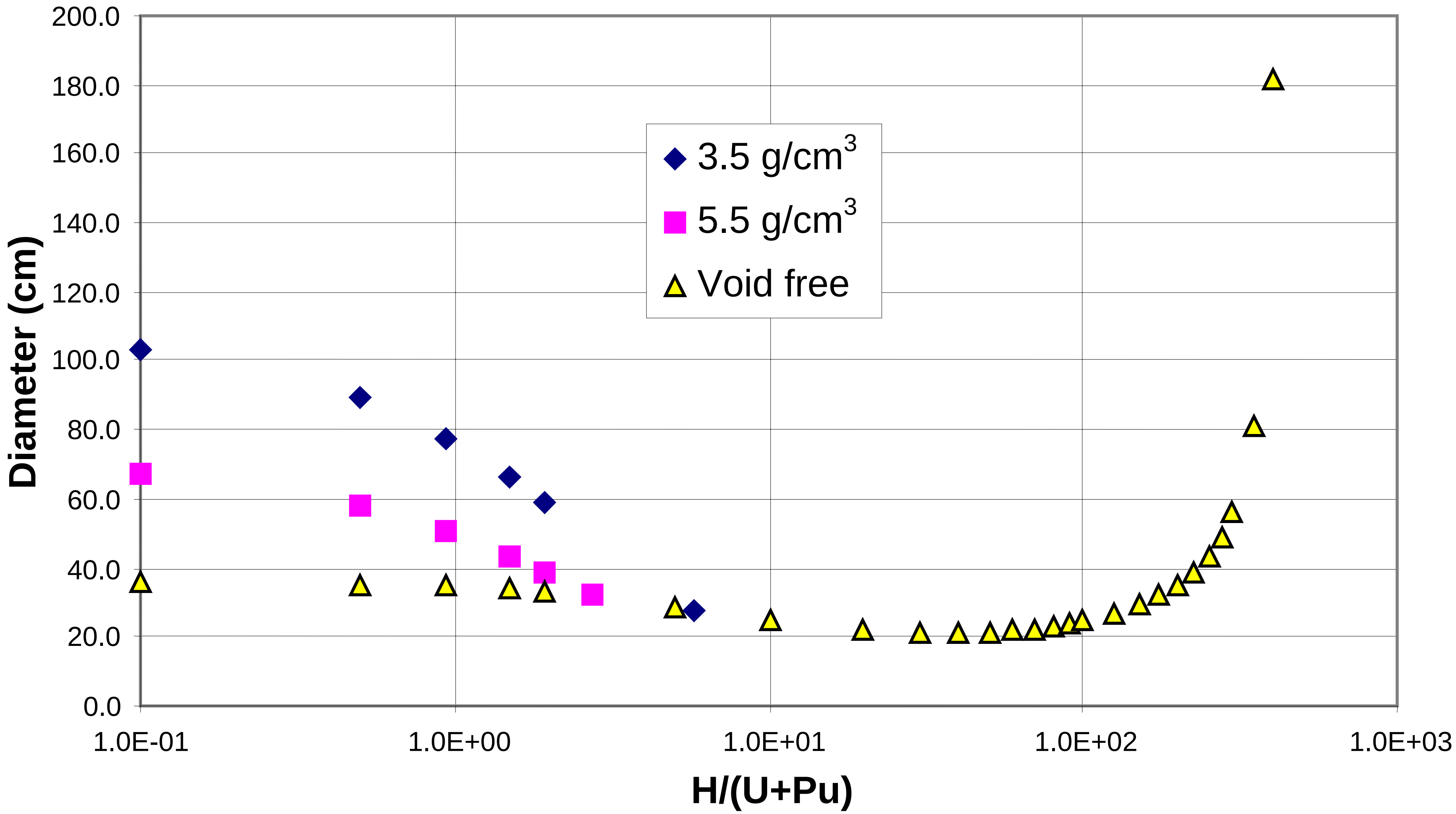

Fig. A.5.c.8. Cylinder diameter [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

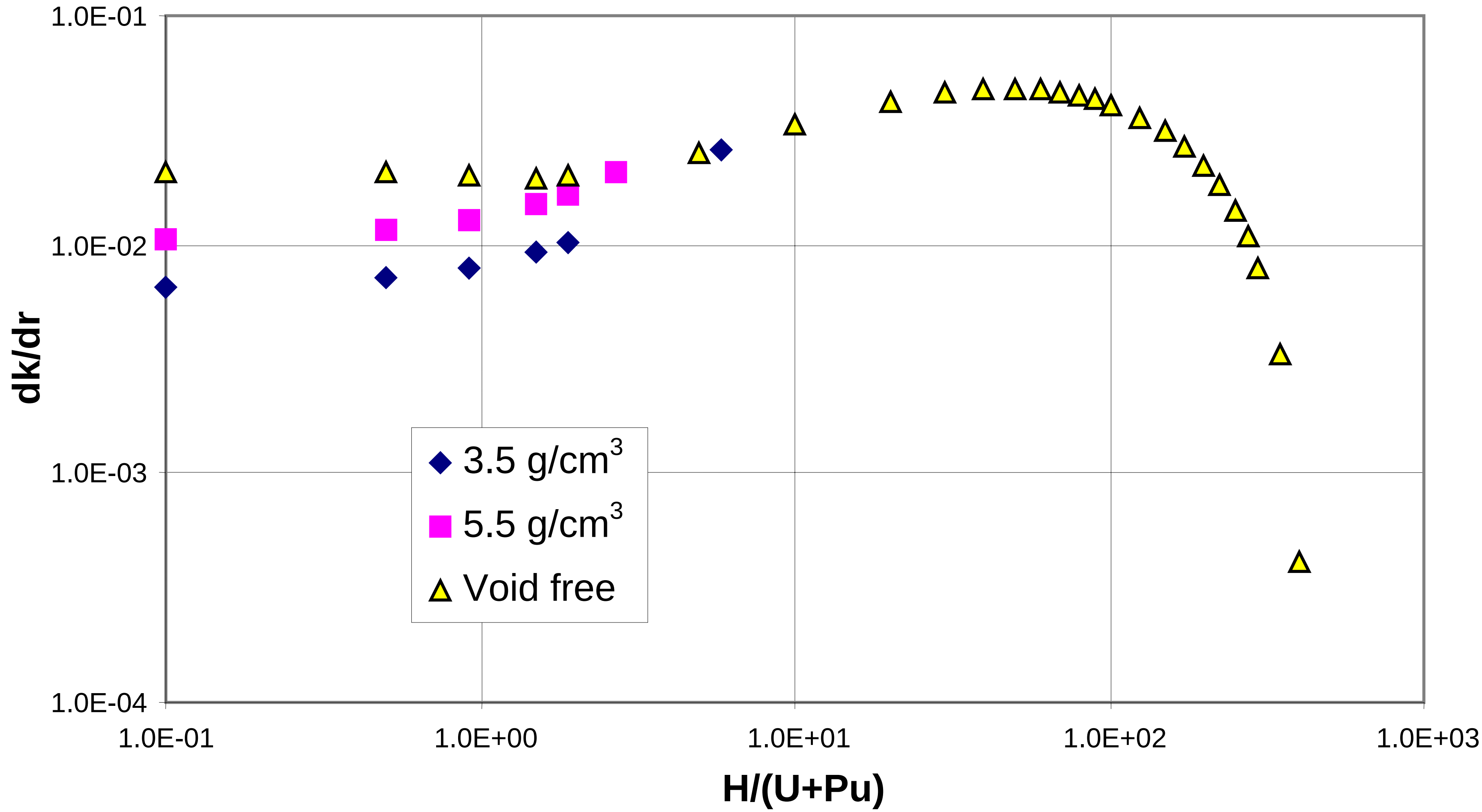

Fig. A.5.c.9. Delta lambda divided by delta dimension [cylinder, ^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

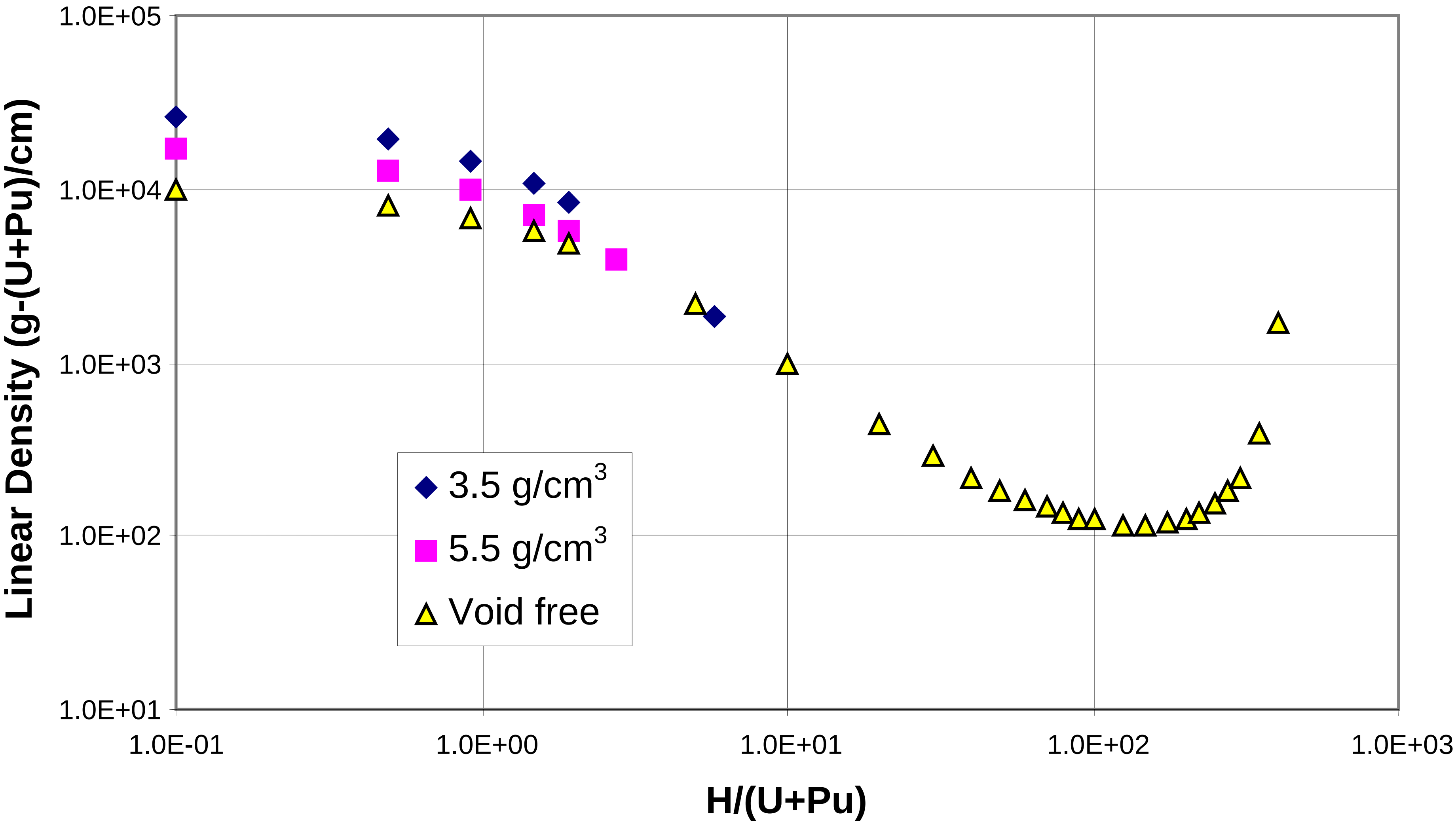

Fig. A.5.c.10. Linear density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

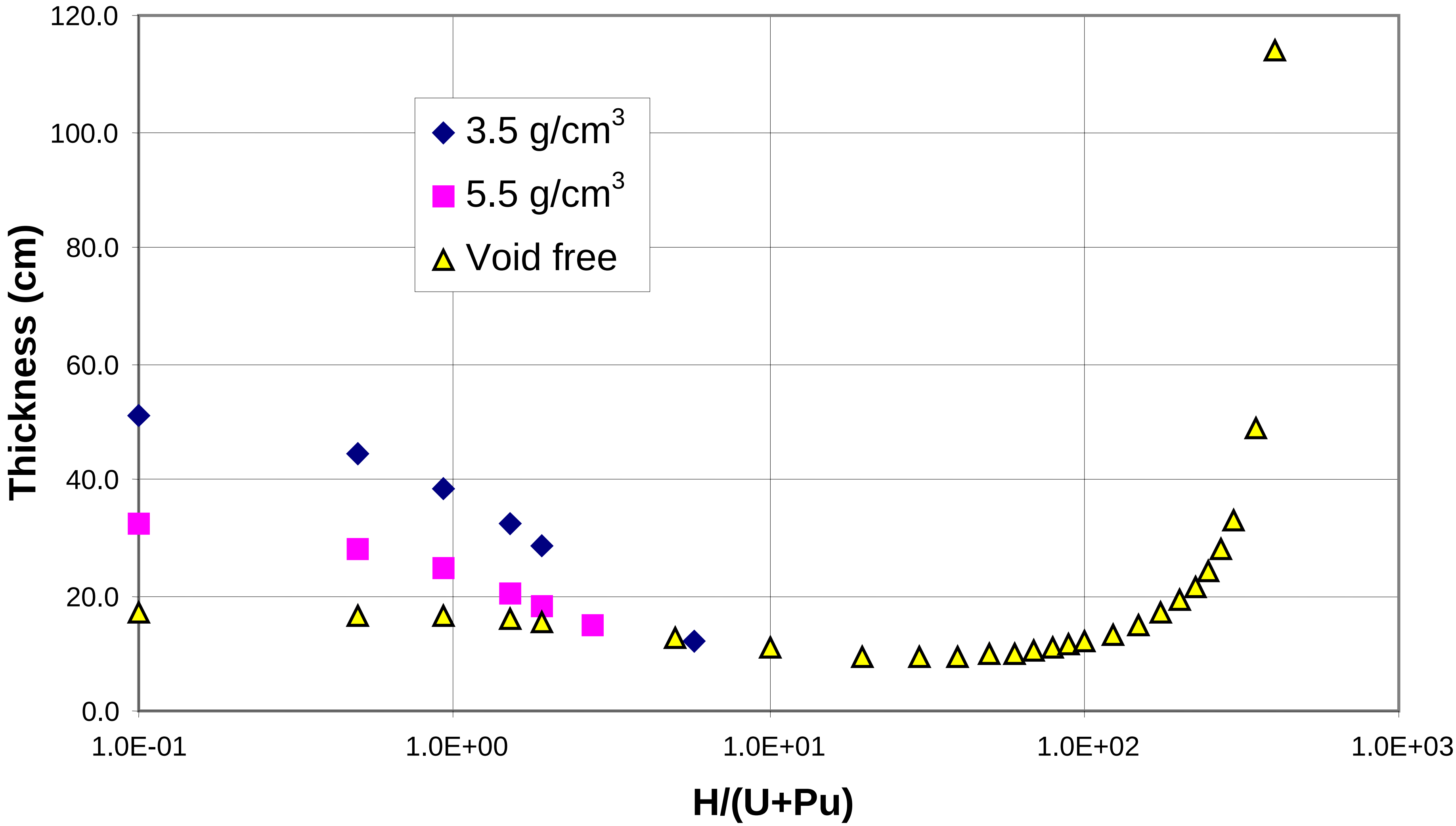

Fig. A.5.c.11. Slab thickness [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

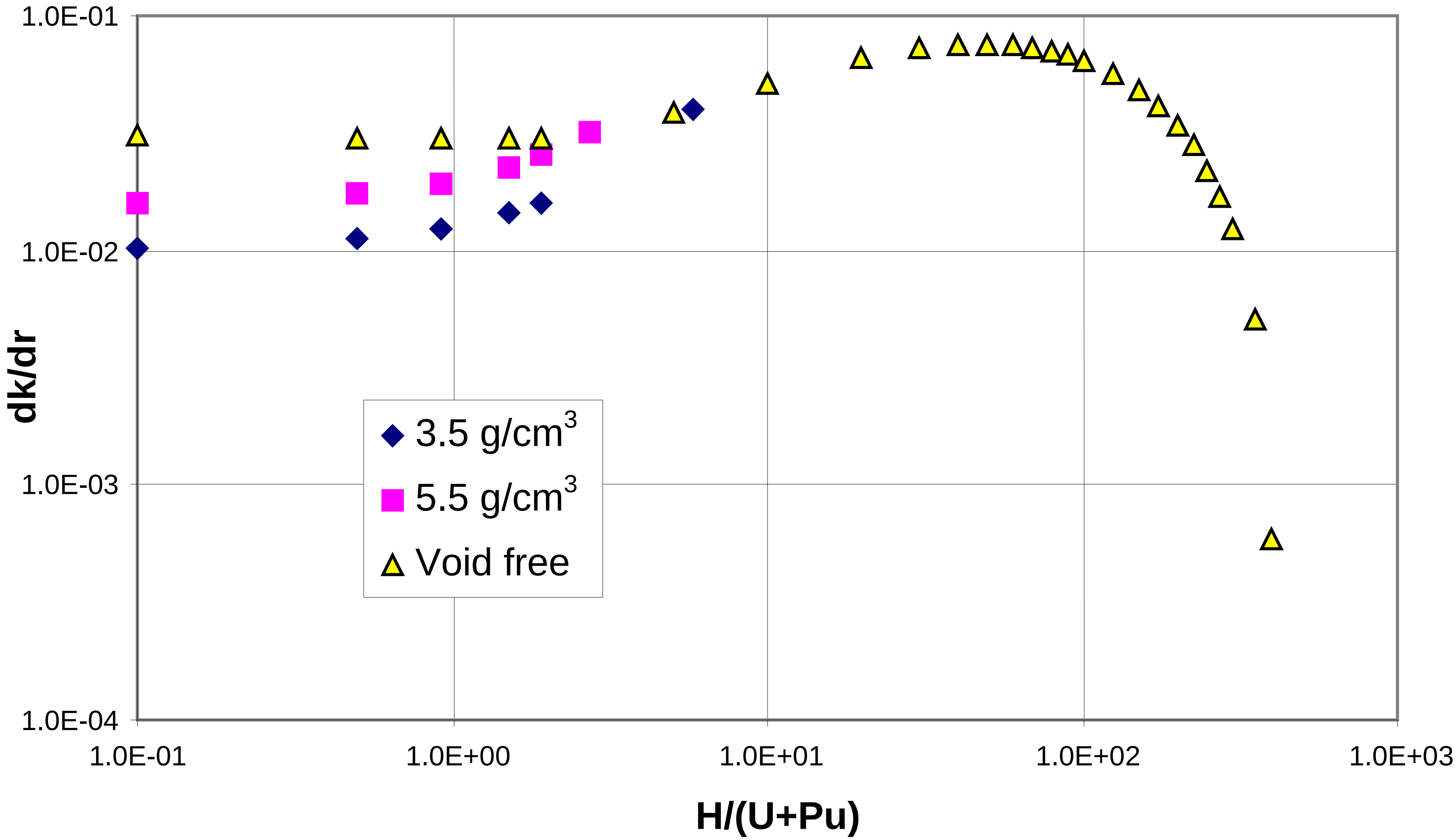

Fig. A.5.c.12. Delta lambda divided by delta dimension [slab, ^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

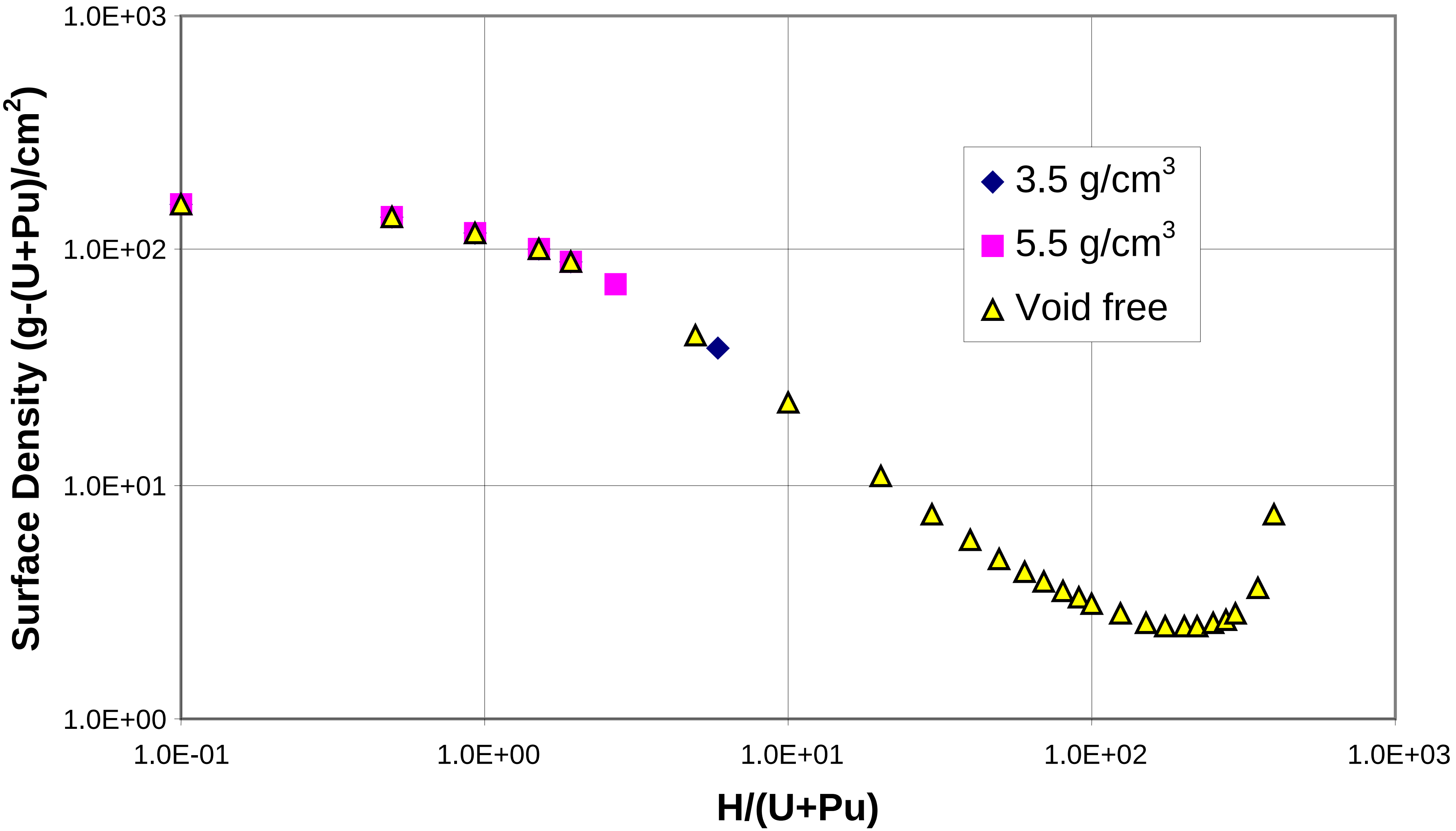

Fig. A.5.c.13. Surface density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

Table A.5.d.1. MOX data [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**95.000**	**5.000**	**0.000**	**0.000**

Fissile material oxide density
3.5 g (UO_2 + PuO_2)/cm^3

Water reflector
2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08545	3.50000	1.42508	8.316E-04	93.669	5.480E-03	3442.562	10621.859	12048.968	136.664	7.141E-03	45260.372	79.617	1.097E-02	245.655
0.5	1.64	3.08545	3.50000	1.36467	1.179E-03	78.523	5.958E-03	2028.053	6257.458	7098.185	114.410	7.770E-03	31720.247	66.408	1.199E-02	204.900
0.928	3.00	3.08545	3.50000	1.33291	1.572E-03	67.784	6.492E-03	1304.596	4025.267	4566.085	98.651	8.439E-03	23583.680	57.039	1.314E-02	175.990
1.5	4.76	3.08545	3.50000	1.31481	2.187E-03	57.235	7.057E-03	785.356	2423.179	2748.748	83.147	9.767E-03	16753.192	47.850	1.453E-02	147.639
1.916	6.00	3.08545	3.50000	1.31100	2.723E-03	51.150	7.726E-03	560.564	1729.594	1961.975	74.205	1.068E-02	13343.659	42.538	1.638E-02	131.248
5.84	16.30	3.08545	3.50000	1.36083	1.233E-02	23.518	1.958E-02	54.486	168.114	190.701	33.736	2.599E-02	2758.010	18.685	3.998E-02	57.650
10	25.00	2.07873	2.35802	1.41973	1.483E-02	21.094	2.287E-02	39.315	81.725	92.706	30.061	3.021E-02	1475.330	16.367	5.044E-02	34.022
20	40.01	1.16377	1.32013	1.50435	1.808E-02	18.783	2.921E-02	27.756	32.302	36.641	26.590	3.868E-02	646.250	14.242	6.090E-02	16.574
30	50.01	0.80809	0.91666	1.54326	1.944E-02	18.037	3.442E-02	24.580	19.863	22.531	25.493	4.545E-02	412.463	13.614	7.095E-02	11.001
40	57.15	0.61893	0.70209	1.55916	1.991E-02	**17.828**	3.562E-02	**23.734**	14.690	16.663	**25.202**	4.707E-02	308.741	**13.517**	7.322E-02	8.366
50	62.51	0.50153	0.56891	1.56202	1.989E-02	17.874	3.581E-02	23.918	11.996	13.607	25.292	4.733E-02	251.980	13.610	7.366E-02	6.826
60	66.67	0.42156	0.47820	1.55693	1.960E-02	18.066	3.539E-02	24.698	10.412	11.811	25.601	4.675E-02	217.005	13.837	7.276E-02	5.833
70	70.01	0.36359	0.41244	1.54676	1.915E-02	18.353	1.807E+01	25.895	9.415	10.680	26.051	4.565E-02	193.802	14.152	7.101E-02	5.145
80	72.73	0.31964	0.36259	1.53324	1.858E-02	18.709	3.346E-02	27.430	8.768	9.946	26.603	4.419E-02	177.675	14.529	6.871E-02	4.644
90	75.00	0.28516	0.32347	1.51751	1.795E-02	19.119	3.221E-02	29.274	8.348	9.469	27.236	4.252E-02	166.141	14.899	6.636E-02	4.249
100	76.93	0.25740	0.29198	1.50030	1.729E-02	19.574	3.084E-02	31.414	8.086	9.172	27.936	4.070E-02	157.775	15.365	6.346E-02	3.955
125	80.65	0.20702	0.23483	1.45389	1.554E-02	20.883	2.722E-02	38.145	**7.897**	**8.958**	29.942	3.588E-02	145.772	16.691	5.583E-02	3.455
150	83.34	0.17313	0.19639	1.40588	1.379E-02	22.423	2.354E-02	47.227	8.176	9.275	32.298	3.102E-02	**141.848**	18.201	4.825E-02	3.151
175	85.37	0.14877	0.16876	1.35842	1.210E-02	24.215	2.002E-02	59.478	8.848	10.037	35.034	2.634E-02	143.415	19.963	4.091E-02	2.970
200	86.96	0.13043	0.14795	1.31250	1.049E-02	26.303	1.669E-02	76.226	9.942	11.278	38.221	2.195E-02	149.650	22.020	3.403E-02	2.872
225	88.24	0.11611	0.13171	1.26858	8.975E-03	28.771	1.362E-02	99.757	11.583	13.139	41.987	1.789E-02	160.764	24.455	2.769E-02	**2.839**
250	89.29	0.10462	0.11868	1.22679	7.544E-03	31.748	1.083E-02	134.035	14.023	15.907	46.531	1.421E-02	177.905	27.396	2.195E-02	2.866
275	90.17	0.09520	0.10799	1.18719	6.201E-03	35.439	8.317E-03	186.442	17.749	20.134	52.167	1.090E-02	203.480	31.049	1.680E-02	2.956
300	90.91	0.08734	0.09907	1.14972	4.940E-03	40.203	6.091E-03	272.177	23.772	26.966	59.442	7.962E-03	242.378	35.761	1.227E-02	3.123
350	92.11	0.07496	0.08503	1.08074	2.644E-03	56.517	2.507E-03	756.189	56.684	64.300	84.379	3.280E-03	419.164	51.973	5.030E-03	3.896
400	93.02	0.06565	0.07447	1.01901	6.179E-04						184.143	3.230E-04	1748.381	117.051	5.954E-04	7.684
415	93.260	0.06319	0.07168	1.00177												
416	93.275	0.06304	0.07151	1.00066												
417	**93.290**	**0.06289**	**0.07134**	**0.99952**												
418	93.305	0.06274	0.07117	0.99839												
419	93.320	0.06259	0.07100	0.99727												
420	93.335	0.06244	0.07083	0.99614												
425	93.408	0.06171	0.07000	0.99058												
430	93.480	0.06100	0.06920	0.98506												
450	93.751	0.05840	0.06625	0.96360												

* [grey shading] means the data are the same as the data of Table A.5.b.2.

Table A.5.d.2. MOX data [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5 % and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	99.282	95.000	5.000	0.000	0.000

Fissile material oxide density
5.5 g (UO_2 + PuO_2)/cm^3

Water reflector
2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	4.84857	5.50000	1.42511	2.054E-03	59.757	8.831E-03	893.821	4333.751	4916.016	87.168	1.127E-02	28934.594	50.629	1.733E-02	245.479
0.5	1.64	4.84857	5.50000	1.36469	2.913E-03	50.111	9.430E-03	527.097	2555.664	2899.033	72.980	1.222E-02	20282.008	42.225	1.851E-02	204.730
0.928	3.00	4.84857	5.50000	1.33294	3.882E-03	43.282	1.025E-02	339.636	1646.747	1867.997	62.963	1.345E-02	15096.327	36.273	2.037E-02	175.873
1.5	4.76	4.84857	5.50000	1.31483	5.402E-03	36.574	1.145E-02	204.923	993.585	1127.079	53.106	1.478E-02	10739.495	30.434	2.300E-02	147.561
1.916	6.00	4.84857	5.50000	1.31102	6.724E-03	32.695	1.267E-02	146.398	709.823	805.192	47.408	1.674E-02	8558.747	27.057	2.572E-02	131.187
2.73	8.34	4.84857	5.50000	1.31441	9.917E-03	26.797	1.561E-02	80.603	390.810	443.317	38.749	2.026E-02	5717.620	21.924	3.172E-02	106.302
5	14.29	3.42516	3.88535	1.34723	1.174E-02	24.234	1.746E-02	59.616	204.195	231.630	34.826	2.300E-02	3262.781	19.397	3.837E-02	66.437
10	25.00	2.07873	2.35802	1.41973	1.483E-02	21.094	2.287E-02	39.315	81.725	92.706	30.061	3.021E-02	1475.330	16.367	5.044E-02	34.022
20	40.01	1.16377	1.32013	1.50435	1.808E-02	18.783	2.921E-02	27.756	32.302	36.641	26.590	3.868E-02	646.250	14.242	6.090E-02	16.574
30	50.01	0.80809	0.91666	1.54326	1.944E-02	18.037	3.442E-02	24.580	19.863	22.531	25.493	4.545E-02	412.463	13.614	7.095E-02	11.001
40	57.15	0.61893	0.70209	1.55916	1.991E-02	17.828	3.562E-02	23.734	14.690	16.663	25.202	4.707E-02	308.741	13.517	7.322E-02	8.366
50	62.51	0.50153	0.56891	1.56202	1.989E-02	17.874	3.581E-02	23.918	11.996	13.607	25.292	4.733E-02	251.980	13.610	7.366E-02	6.826
60	66.67	0.42156	0.47820	1.55693	1.960E-02	18.066	3.539E-02	24.698	10.412	11.811	25.601	4.675E-02	217.005	13.837	7.276E-02	5.833
70	70.01	0.36359	0.41244	1.54676	1.915E-02	18.353	1.807E+01	25.895	9.415	10.680	26.051	4.565E-02	193.802	14.152	7.101E-02	5.145
80	72.73	0.31964	0.36259	1.53324	1.858E-02	18.709	3.346E-02	27.430	8.768	9.946	26.603	4.419E-02	177.675	14.529	6.871E-02	4.644
90	75.00	0.28516	0.32347	1.51751	1.795E-02	19.119	3.221E-02	29.274	8.348	9.469	27.236	4.252E-02	166.141	14.899	6.636E-02	4.249
100	76.93	0.25740	0.29198	1.50030	1.729E-02	19.574	3.084E-02	31.414	8.086	9.172	27.936	4.070E-02	157.775	15.365	6.346E-02	3.955
125	80.65	0.20702	0.23483	1.45389	1.554E-02	20.883	2.722E-02	38.145	7.897	8.958	29.942	3.588E-02	145.772	16.691	5.583E-02	3.455
150	83.34	0.17313	0.19639	1.40588	1.379E-02	22.423	2.354E-02	47.227	8.176	9.275	32.298	3.102E-02	141.848	18.201	4.825E-02	3.151
175	85.37	0.14877	0.16876	1.35842	1.210E-02	24.215	2.002E-02	59.478	8.848	10.037	35.034	2.634E-02	143.415	19.963	4.091E-02	2.970
200	86.96	0.13043	0.14795	1.31250	1.049E-02	26.303	1.669E-02	76.226	9.942	11.278	38.221	2.195E-02	149.650	22.020	3.403E-02	2.872
225	88.24	0.11611	0.13171	1.26858	8.975E-03	28.771	1.362E-02	99.757	11.583	13.139	41.987	1.789E-02	160.764	24.455	2.769E-02	2.839
250	89.29	0.10462	0.11868	1.22679	7.544E-03	31.748	1.083E-02	134.035	14.023	15.907	46.531	1.421E-02	177.905	27.396	2.195E-02	2.866
275	90.17	0.09520	0.10799	1.18719	6.201E-03	35.439	8.317E-03	186.442	17.749	20.134	52.167	1.090E-02	203.480	31.049	1.680E-02	2.956
300	90.91	0.08734	0.09907	1.14972	4.940E-03	40.203	6.091E-03	272.177	23.772	26.966	59.442	7.962E-03	242.378	35.761	1.227E-02	3.123
350	92.11	0.07496	0.08503	1.08074	2.644E-03	56.517	2.507E-03	756.189	56.684	64.300	84.379	3.280E-03	419.164	51.973	5.030E-03	3.896
400	93.02	0.06565	0.07447	1.01901	6.179E-04						184.143	3.230E-04	1748.381	117.051	5.954E-04	7.684
415	93.260	0.06319	0.07168	1.00177												
416	93.275	0.06304	0.07151	1.00066												
417	93.290	0.06289	0.07134	0.99952												
418	93.305	0.06274	0.07117	0.99839												
419	93.320	0.06259	0.07100	0.99727												
420	93.335	0.06244	0.07083	0.99614												
425	93.408	0.06171	0.07000	0.99058												
430	93.480	0.06100	0.06920	0.98506												
450	93.751	0.05840	0.06625	0.96360												

* [grey shading] means the data are the same as the data of Table A.5.b.2.

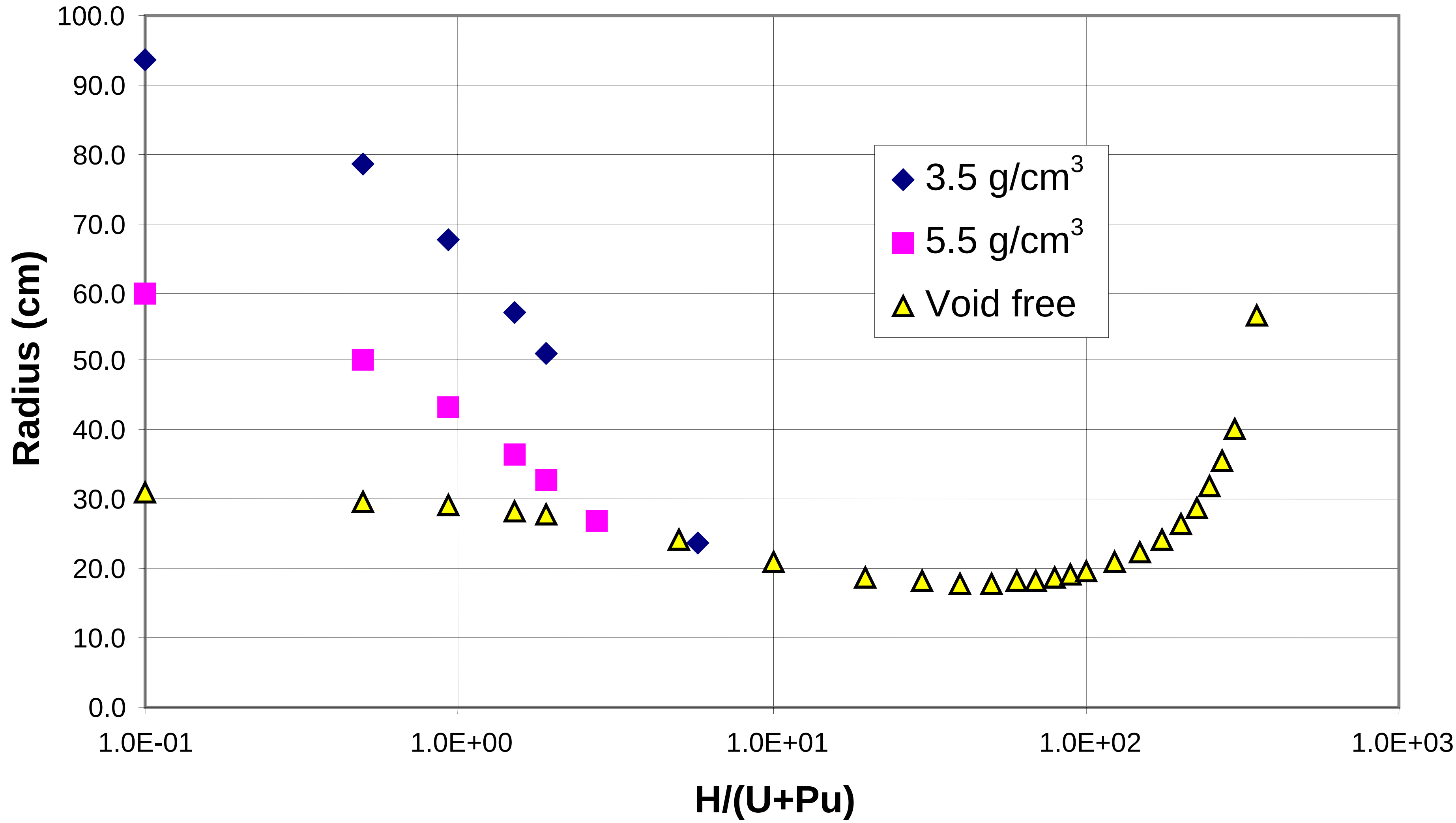

Fig. A.5.d.1. Sphere radius [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

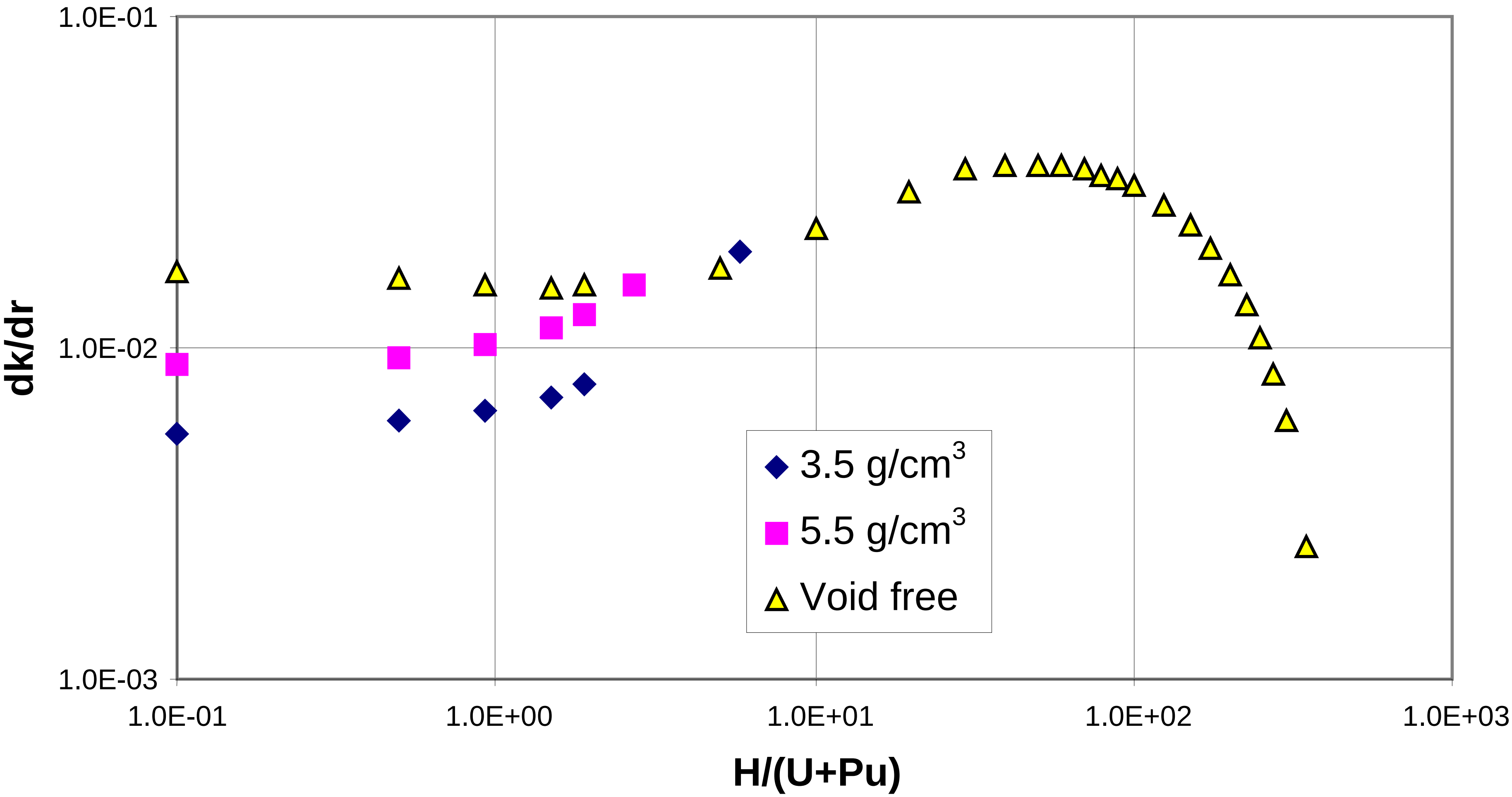

Fig. A.5.d.2. Delta lambda divided by delta dimension [sphere, ^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

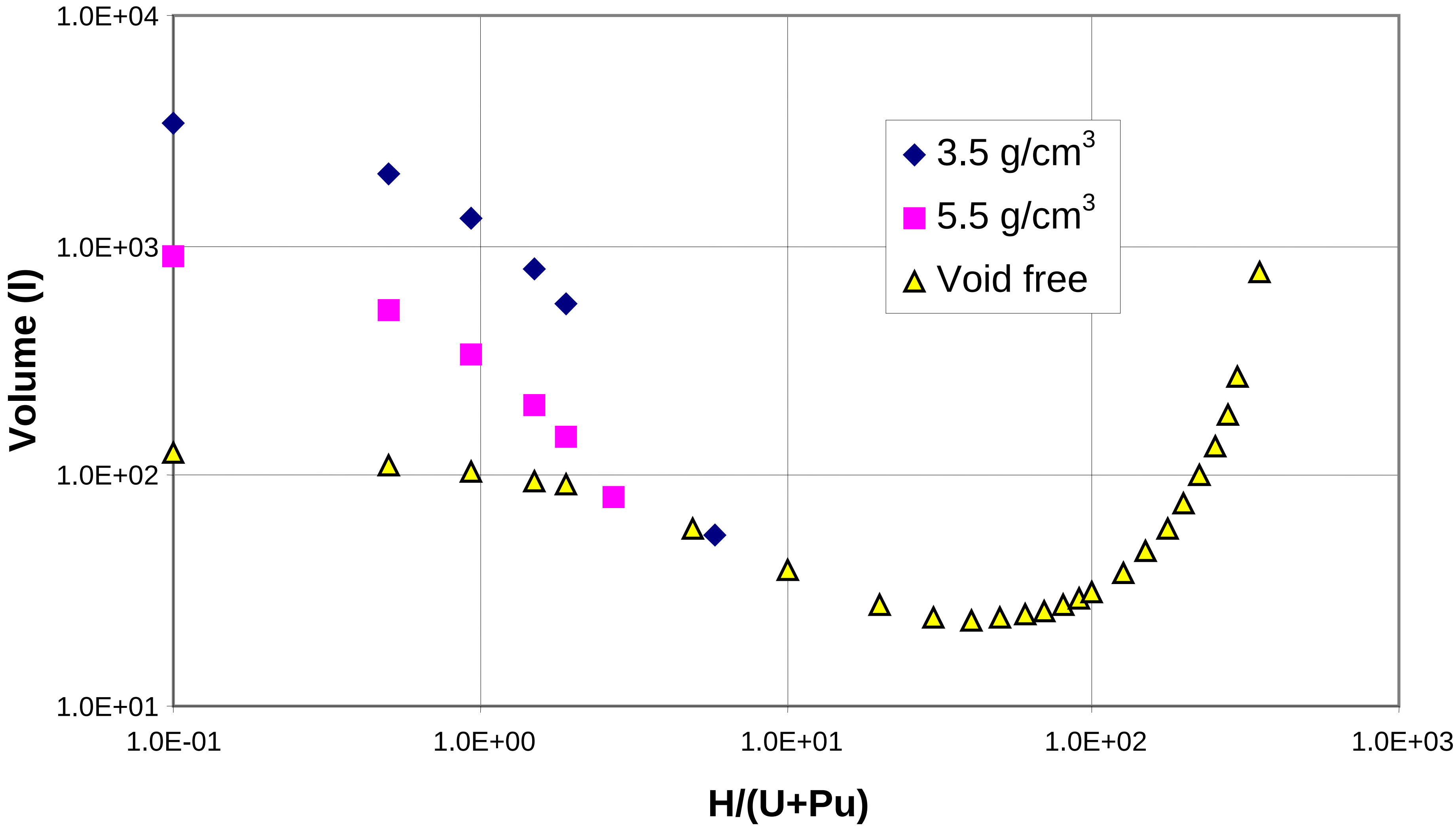

Fig. A.5.d.3. Sphere volume [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

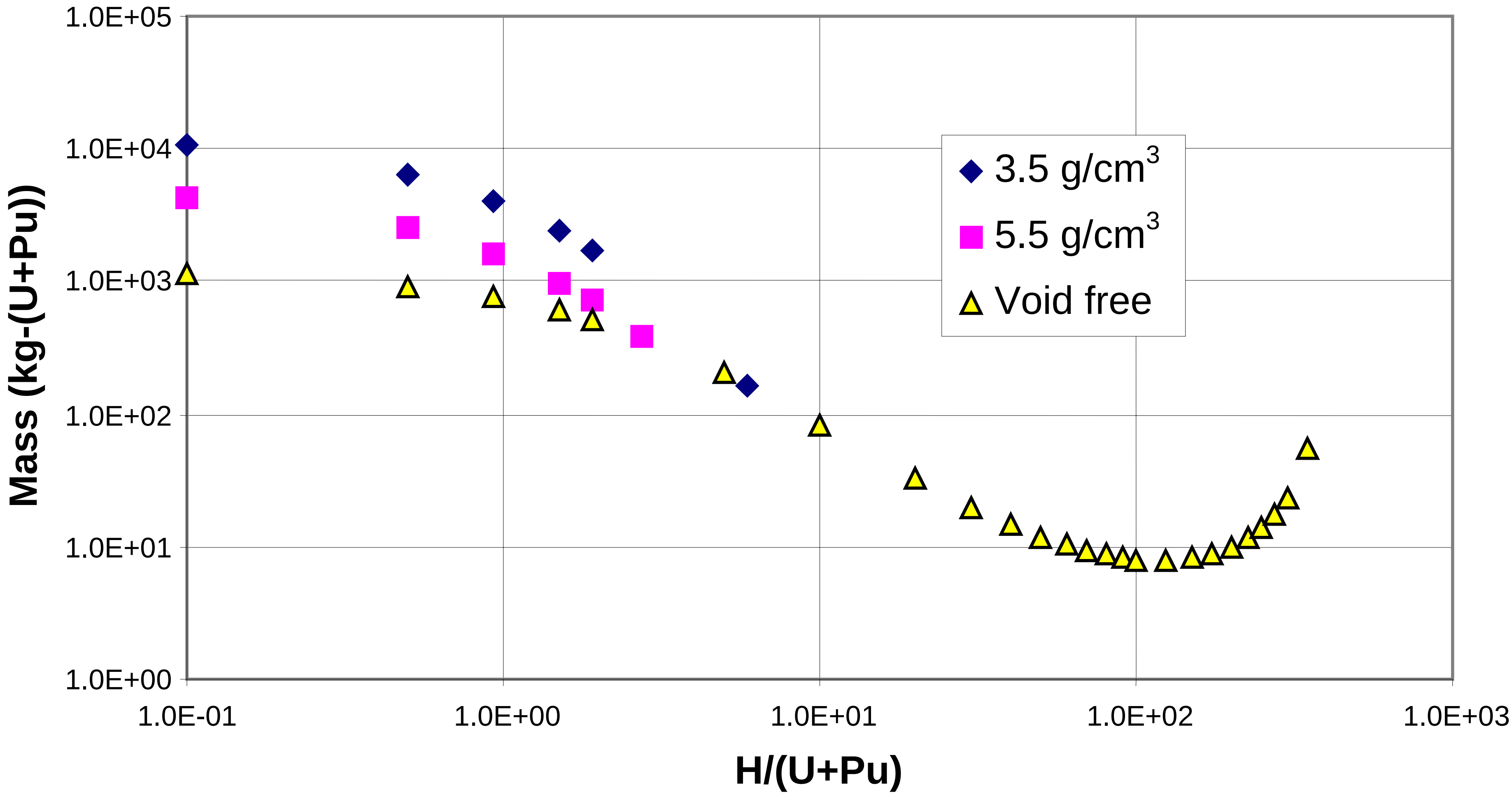

Fig. A.5.d.4. U + Pu mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

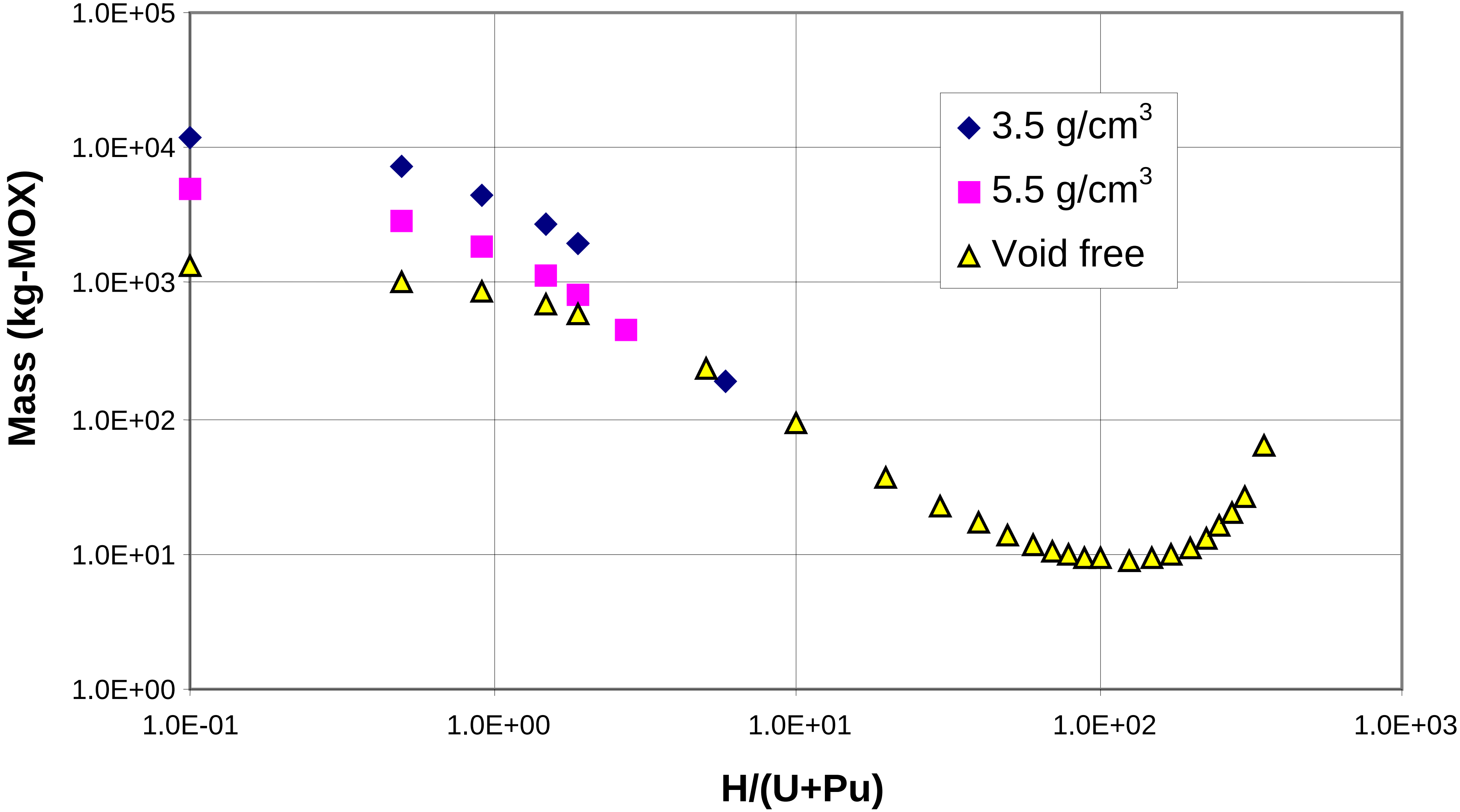

Fig. A.5.d.5. MOX mass [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

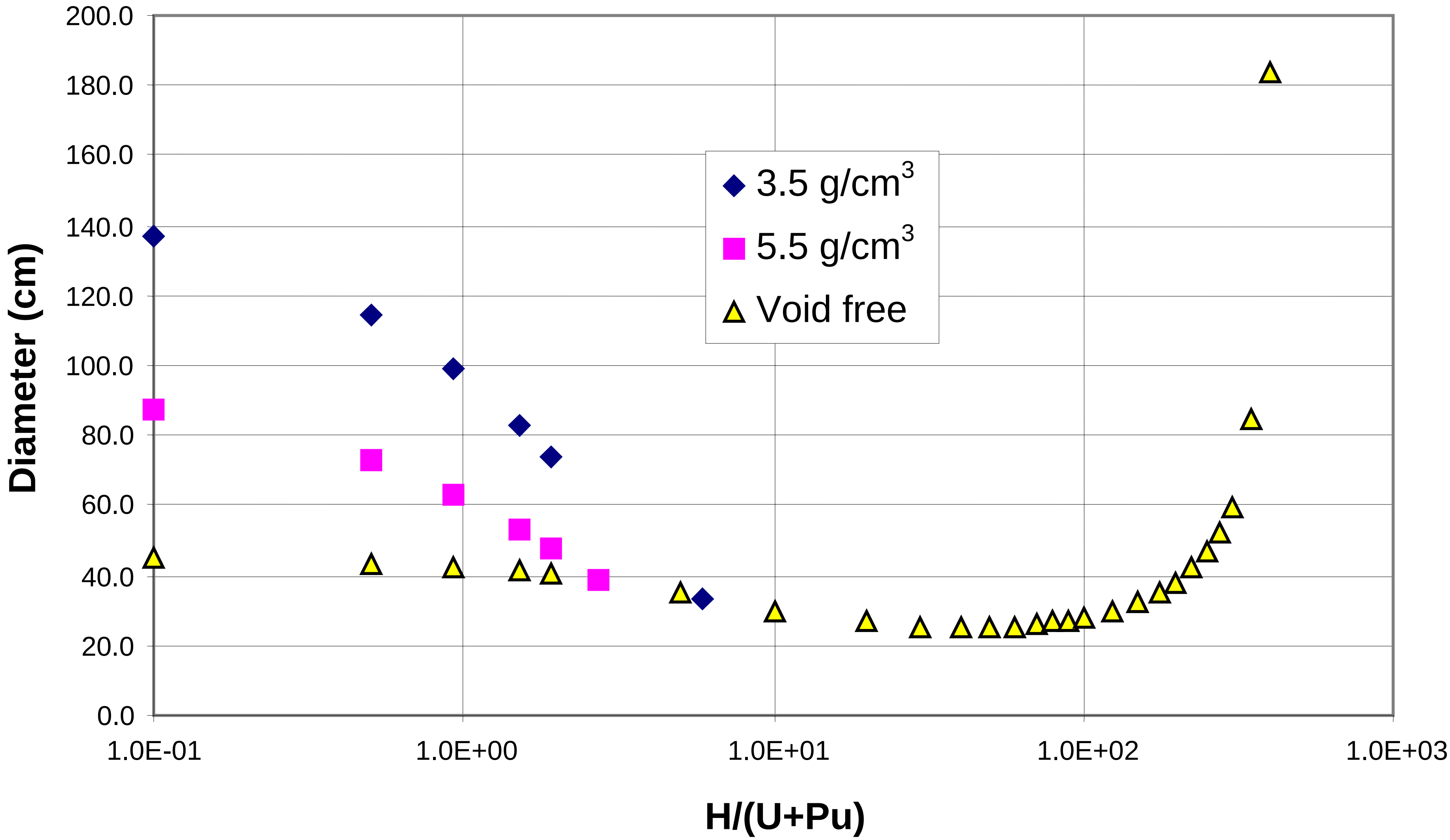

Fig. A.5.d.6. Cylinder diameter [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

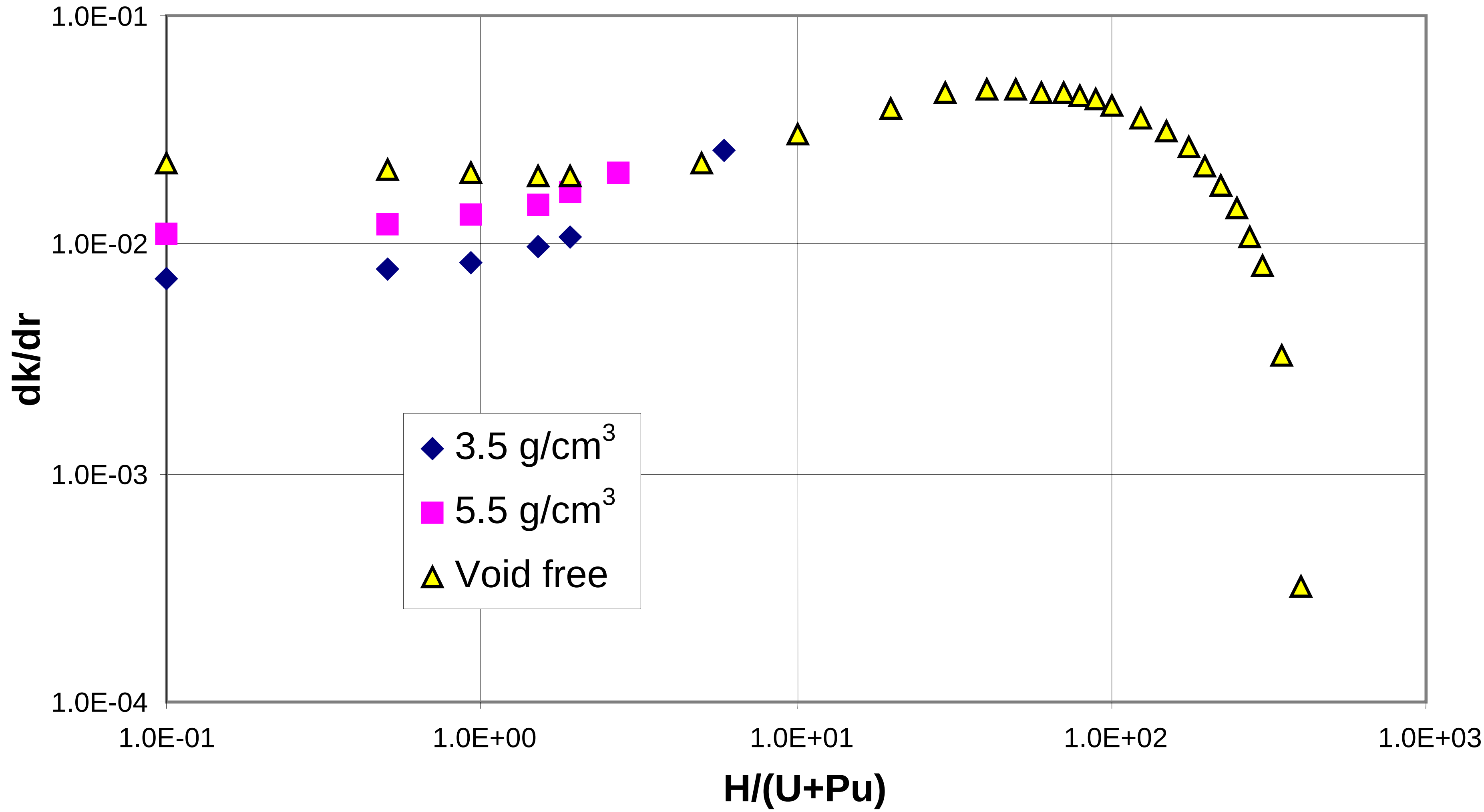

Fig. A.5.d.7. Delta lambda divided by delta dimension [cylinder, ^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

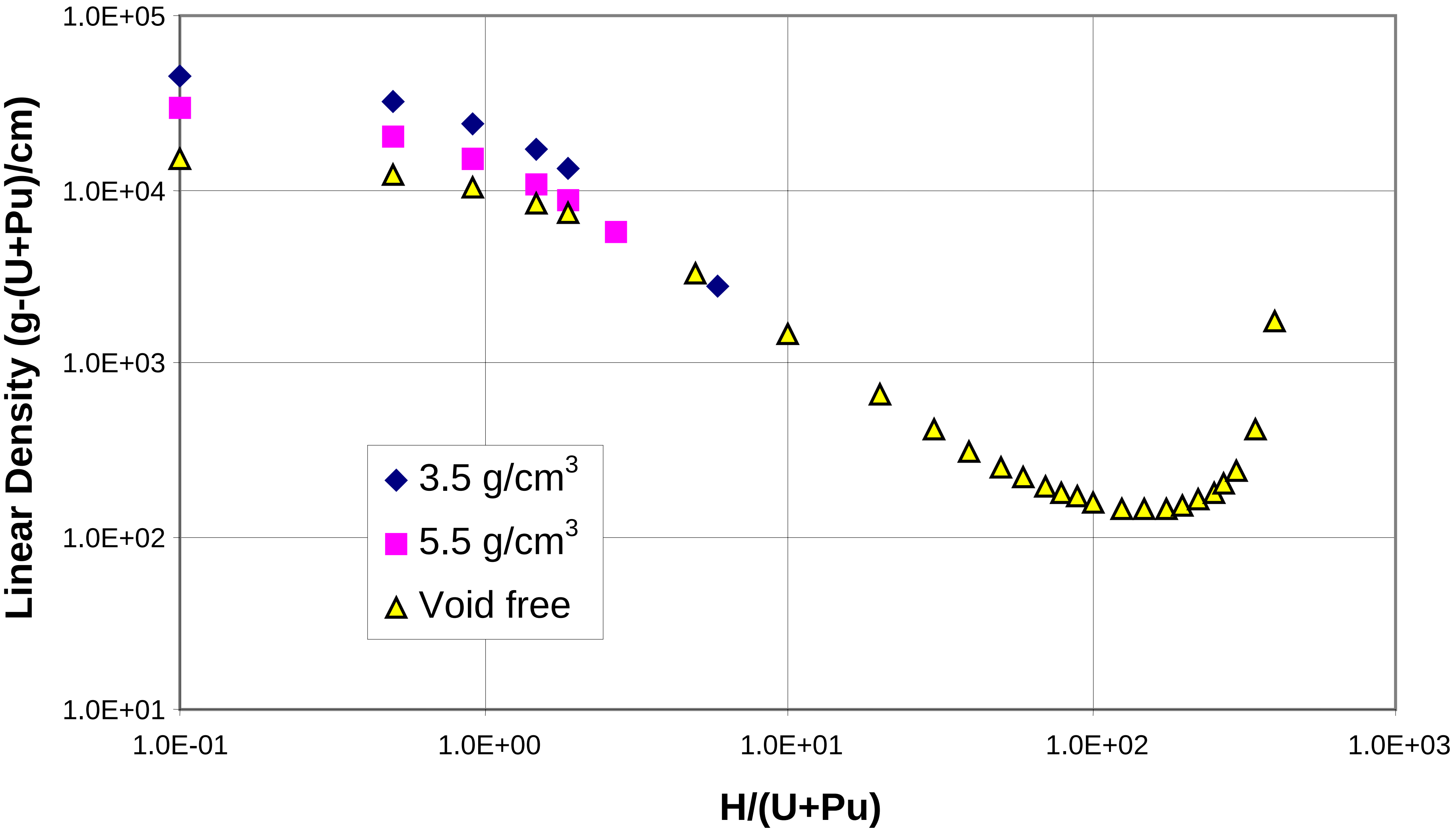

Fig. A.5.d.8. Linear density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

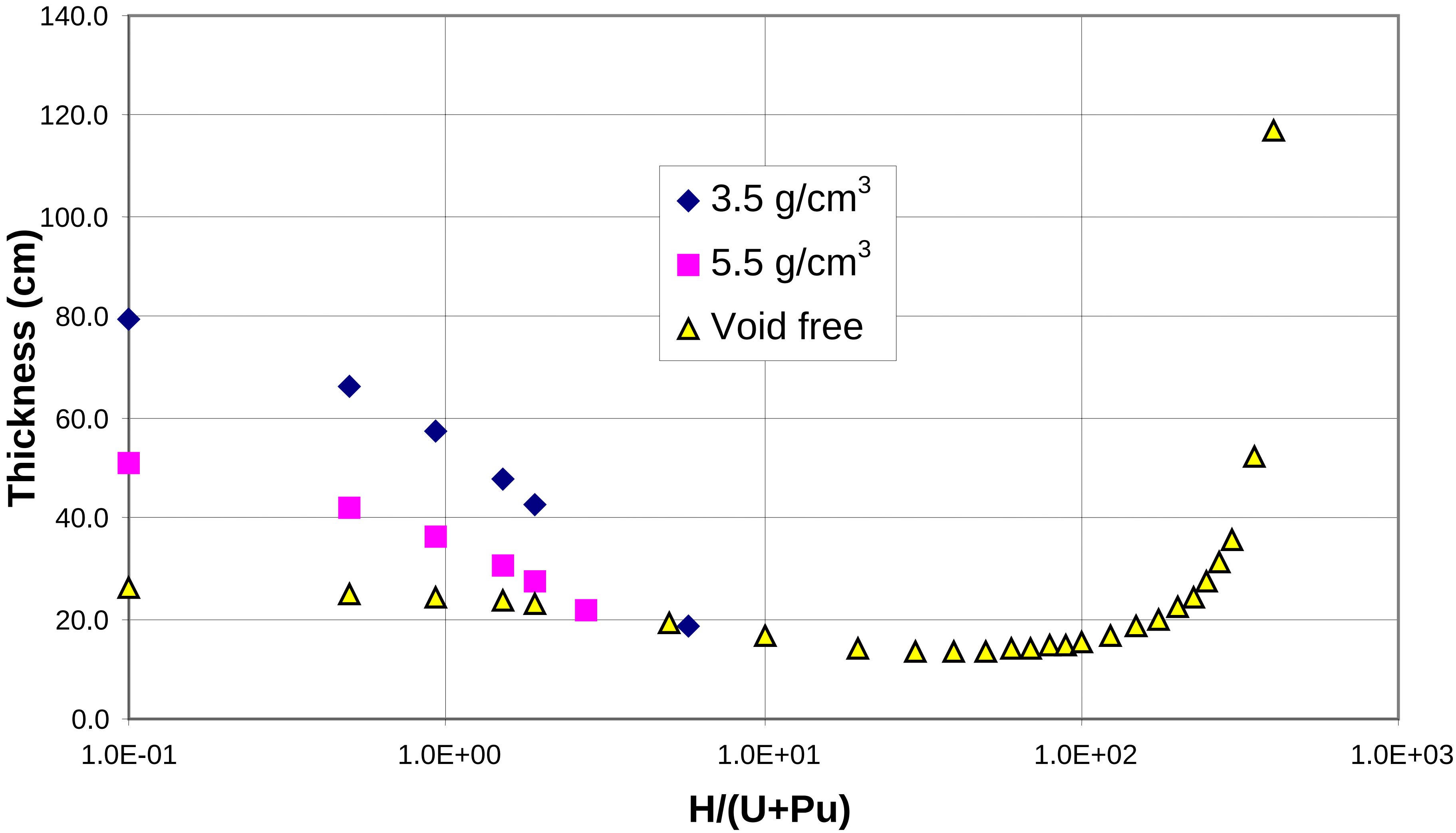

Fig. A.5.d.9. Slab thickness [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

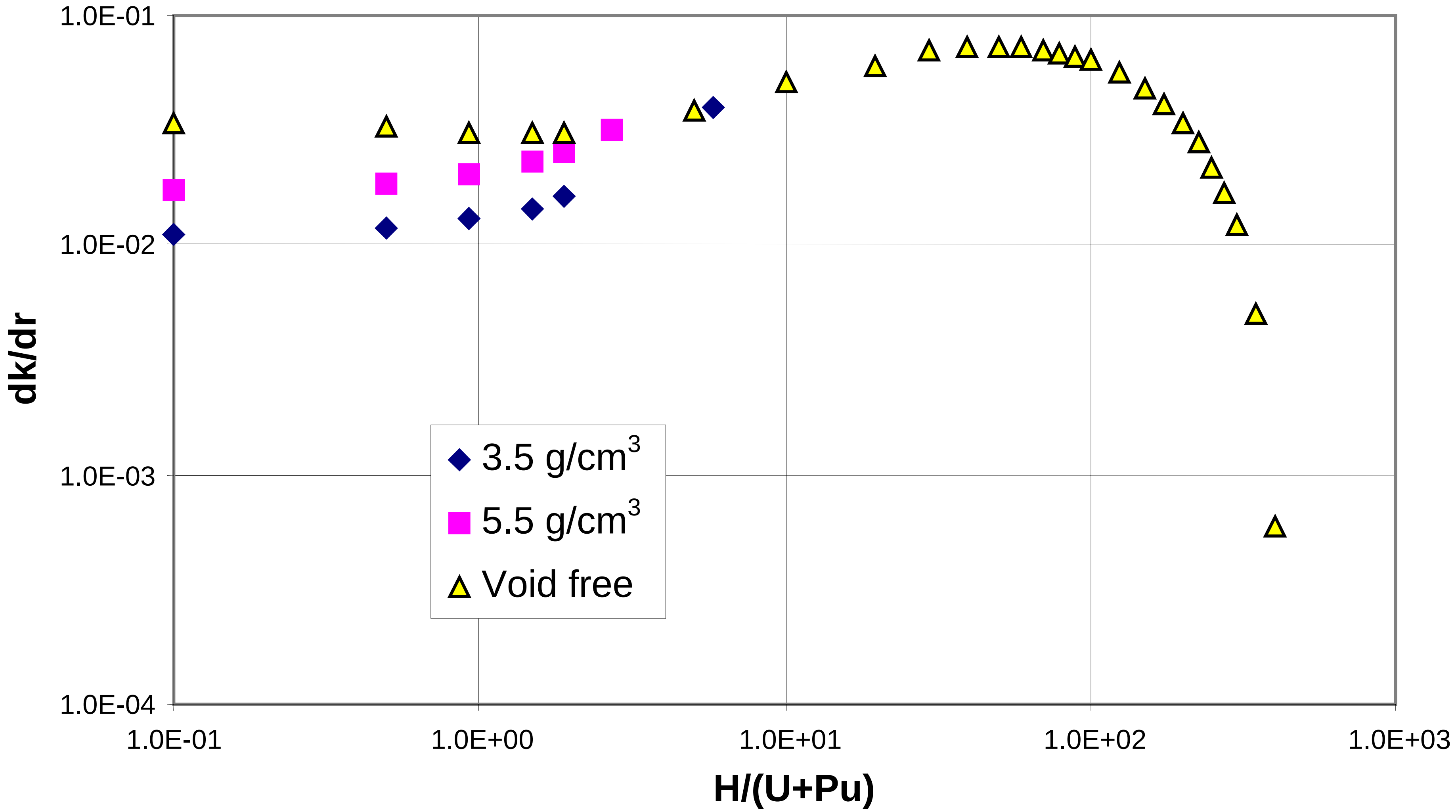

Fig. A.5.d.10. Delta lambda divided by delta dimension [slab, $^{235}U/U = 0.718\%$, $^{239}Pu/Pu = 95\%$, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

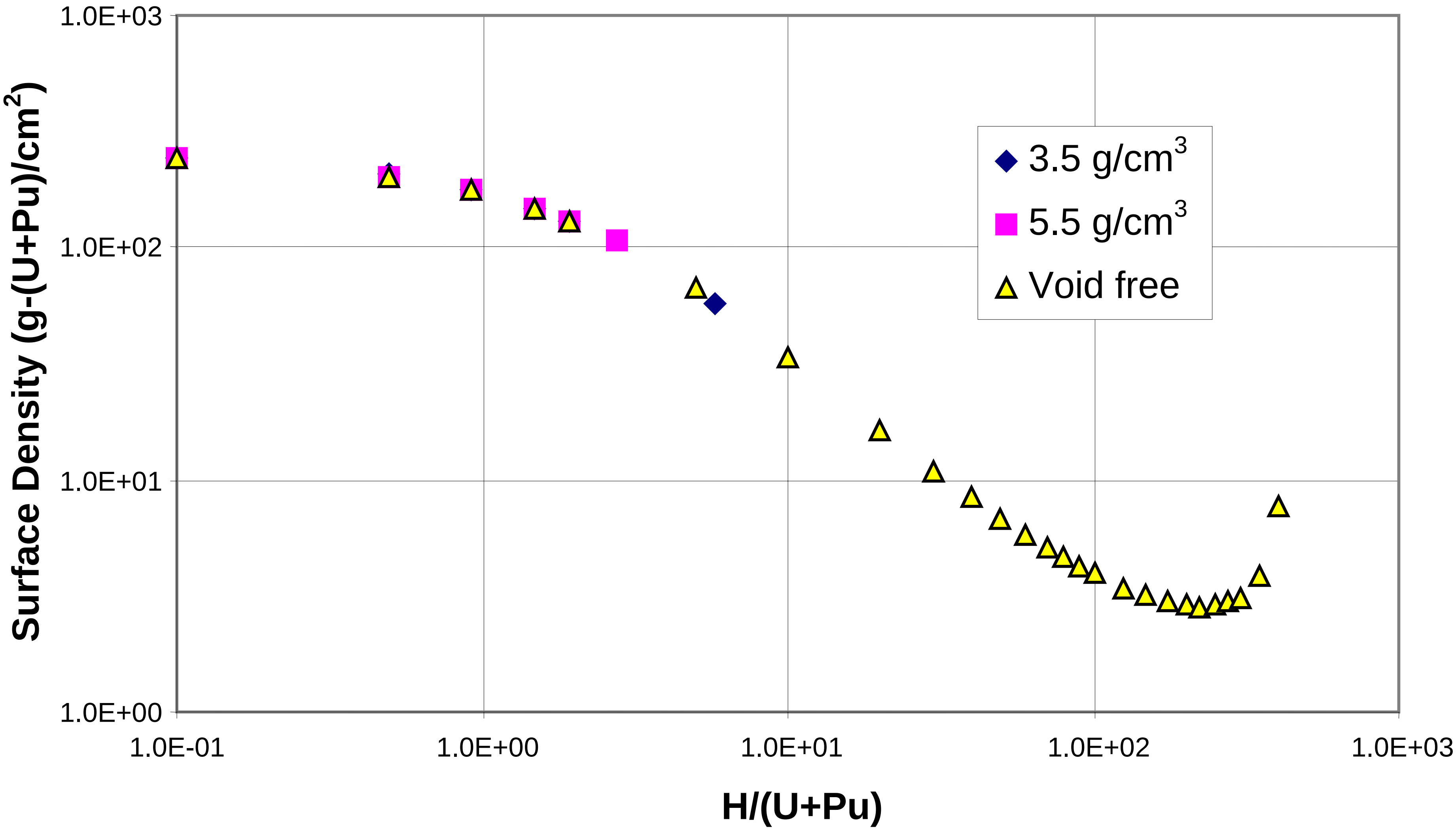

Fig. A.5.d.11. Surface density [^{235}U/U = 0.718%, ^{239}Pu/Pu = 95%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

APPENDIX A.6

DATA PLOTS

(^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%)

APPENDIX A.6

DATA PLOTS (^{235}U/U = <u>0.718%</u>, ^{240}Pu/Pu = <u>20%</u>)

(a) Plutonium weight percentages: <u>35%</u> and density: <u>3.5 g/cm^3</u>

(b) Plutonium weight percentages: <u>12.5%</u> and density: <u>void-free</u>

(c) Plutonium weight percentages: 12.5%, density: 3.5 and 5.5 g/cm^3 and water reflector: 30 cm

Figure A.6.c.11.	Slab thickness [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]
Figure A.6.c.12.	Delta lambda divided by delta dimension [slab, $^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu)= 12.5%, water reflector: 30.0 cm]
Figure A.6.c.13.	Surface density [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

(d) Plutonium weight percentages: 12.5%, density: 3.5 and 5.5 g/cm^3 and water reflector 2.5 cm

Table A.6.d.1.	MOX data [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5 % and water reflector: 2.5 cm]
Table A.6.d.2.	MOX data [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$=20%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]
Figure A.6.d.1.	Sphere radius [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.6.d.2.	Delta lambda divided by delta dimension [sphere, $^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.6.d.3.	Sphere volume [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.6.d.4.	U + Pu mass [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.6.d.5.	MOX mass [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.6.d.6.	Cylinder diameter [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.6.d.7.	Delta lambda divided by delta dimension [cylinder, $^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.6.d.8.	Linear density [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.6.d.9.	Slab thickness [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]
Figure A.6.d.10.	Delta lambda divided by delta dimension [slab, $^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Figure A.6.d.11. Surface density [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm]

Table A.6.a.1. MOX data [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**65.883**	**20.000**	**12.941**	**1.176**

Maximum fissile material oxide density = 3.5 g (UO_2 + PuO_2)/cm^3

Water reflector 30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 35 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08605	3.49999	2.03679	2.493E-03	37.646	1.449E-02	223.482	689.675	782.183	49.114	1.920E-02	5846.553	20.626	3.049E-02	63.654
0.5	1.64	3.08605	3.49999	1.85050	2.998E-03	34.561	1.572E-02	172.915	533.624	605.200	45.337	2.074E-02	4981.895	19.287	3.248E-02	59.522
0.928	3.00	3.08605	3.49999	1.74768	3.587E-03	31.691	1.696E-02	133.320	411.433	466.620	41.732	2.236E-02	4221.073	17.920	3.486E-02	55.301
1.5	4.76	3.08605	3.49999	1.65260	4.350E-03	28.837	1.810E-02	100.452	309.999	351.580	38.106	2.387E-02	3519.489	16.480	3.719E-02	50.859
1.916	6.00	3.08605	3.49999	1.60025	4.898E-03	27.336	1.862E-02	85.563	264.050	299.468	36.209	2.454E-02	3177.795	15.736	3.822E-02	48.561
5.88	16.37	3.08605	3.49999	1.38737	1.133E-02	18.712	2.296E-02	27.443	84.691	96.051	25.054	3.021E-02	1521.388	10.955	4.663E-02	33.807
10	24.98	2.08611	2.36592	1.34189	1.039E-02	19.856	1.848E-02	32.793	68.409	77.585	26.698	2.454E-02	1167.843	11.889	4.075E-02	24.801
20	39.97	1.16693	1.32345	1.35111	1.137E-02	19.501	1.930E-02	31.065	36.250	41.113	26.198	2.570E-02	629.049	11.670	4.089E-02	13.618
40	57.11	0.62030	0.70350	1.41100	1.382E-02	18.000	2.366E-02	24.429	15.153	17.186	24.111	3.156E-02	283.228	10.682	5.041E-02	6.626
50	62.47	0.50259	0.57000	1.43341	1.464E-02	17.576	2.528E-02	22.743	11.430	12.964	23.544	3.373E-02	218.805	10.447	5.391E-02	5.251
60	66.64	0.42242	0.47908	1.45065	1.523E-02	17.303	2.651E-02	21.701	9.167	10.397	23.193	3.538E-02	178.466	10.326	5.660E-02	4.362
70	69.97	0.36432	0.41319	1.46368	1.566E-02	17.135	2.743E-02	21.075	7.678	8.708	22.992	3.662E-02	151.256	**10.285**	5.859E-02	3.747
80	72.70	0.32026	0.36322	1.47329	1.596E-02	17.072	2.804E-02	20.842	6.675	7.570	22.898	3.750E-02	131.887	10.327	5.987E-02	3.307
90	74.98	0.28571	0.32403	1.48014	1.615E-02	**17.009**	2.856E-02	**20.612**	5.889	6.679	**22.884**	3.810E-02	117.513	10.355	6.394E-02	2.958
100	76.90	0.25789	0.29248	1.48474	1.625E-02	17.017	2.885E-02	20.640	5.323	6.037	22.930	3.848E-02	106.500	10.441	6.457E-02	2.693
125	80.63	0.20740	0.23522	1.48878	1.626E-02	17.170	2.901E-02	21.204	4.398	4.988	23.234	3.868E-02	87.932	10.751	6.488E-02	2.230
150	83.32	0.17344	0.19670	1.48534	1.601E-02	17.455	2.862E-02	22.275	3.863	4.382	23.720	4.068E-02	76.641	11.152	6.394E-02	1.934
200	86.94	0.13066	0.14819	1.46536	1.508E-02	18.264	2.893E-02	25.521	3.335	3.782	25.029	3.827E-02	64.285	12.125	5.998E-02	1.584
225	88.22	0.11631	0.13191	1.45147	1.450E-02	18.757	2.776E-02	27.644	3.215	3.647	25.808	3.670E-02	60.842	12.676	5.742E-02	1.474
250	89.27	0.10481	0.11887	1.43605	1.389E-02	19.296	2.649E-02	30.094	3.154	3.577	26.652	3.500E-02	58.471	13.264	5.466E-02	1.390
275	90.15	0.09537	0.10816	1.41957	1.325E-02	19.881	2.516E-02	32.917	**3.139**	**3.560**	27.563	3.322E-02	56.907	13.889	5.178E-02	1.325
300	90.90	0.08749	0.09923	1.40244	1.260E-02	20.509	2.378E-02	36.135	3.161	3.586	28.537	3.139E-02	55.958	14.510	4.904E-02	1.269
350	92.10	0.07509	0.08516	1.36712	1.128E-02	21.895	2.099E-02	43.965	3.301	3.744	30.677	2.766E-02	**55.499**	15.943	4.308E-02	1.197
400	93.02	0.06577	0.07459	1.33142	9.992E-03	23.472	1.827E-02	54.168	3.563	4.041	33.102	2.406E-02	56.602	17.526	3.742E-02	1.153
450	93.74	0.05850	0.06635	1.29613	8.736E-03	25.278	1.569E-02	67.654	3.958	4.489	35.871	2.063E-02	59.121	19.331	3.203E-02	1.131
500	94.33	0.05268	0.05975	1.26168	7.530E-03	27.356	1.325E-02	85.753	4.517	5.123	39.055	1.741E-02	63.108	21.417	2.696E-02	**1.128**
550	94.82	0.04792	0.05435	1.22830	6.382E-03	29.782	1.099E-02	110.649	5.302	6.013	42.767	1.442E-02	68.837	23.829	2.229E-02	1.142
600	95.23	0.04394	0.04983	1.19612	5.286E-03	32.678	8.897E-03	146.170	6.423	7.284	47.196	1.167E-02	76.869	26.699	1.801E-02	1.173
700	95.89	0.03769	0.04275	1.13550	3.246E-03	40.673	5.272E-03	281.845	10.623	12.048	59.419	6.912E-03	104.513	34.646	1.063E-02	1.306
800	96.38	0.03299	0.03742	1.07981	1.410E-03	55.000	2.465E-03	696.921	22.991	26.075	81.328	3.199E-03	171.378	48.901	4.912E-03	1.613
900	96.77	0.02934	0.03328	1.02877		95.954	5.643E-04	3700.602	108.576	123.139	144.000	7.200E-04	477.830			
940	96.904	0.02805	0.03181	1.00953												
950	96.935	0.02775	0.03147	1.00485												
960	96.966	0.02747	0.03115	1.00017												
961	**96.969**	**0.02744**	**0.03112**	**0.99972**												
962	96.972	0.02741	0.03109	0.99924												
963	96.975	0.02738	0.03105	0.99879												

Table A.6.a.2. MOX data [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	99.282	65.883	20.000	12.941	1.176

Maximum fissile material oxide density = 3.5 g ($UO_2 + PuO_2$)/cm^3

Water reflector 2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 35 wt %

						Sphere					Cylinder			Slab		
H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Radius (cm)	dk/dr	Volume (l)	Mass U + Pu (kg)	Mass MOX (kg)	Diameter (cm)	dk/dr	Linear den. Pu + U (g/cm)	Thickness (cm)	dk/dr	Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08605	3.49999	2.03679	2.493E-03	48.330	1.603E-02	472.864	1459.282	1655.019	68.104	2.100E-02	11241.792	36.256	3.255E-02	111.888
0.5	1.64	3.08605	3.49999	1.85050	2.998E-03	43.317	1.708E-02	340.465	1050.693	1191.624	61.160	2.240E-02	9066.193	32.711	3.478E-02	100.948
0.928	3.00	3.08605	3.49999	1.74768	3.587E-03	39.020	1.807E-02	248.850	767.962	870.971	55.164	2.372E-02	7375.826	29.590	3.692E-02	91.317
1.5	4.76	3.08605	3.49999	1.65260	4.350E-03	34.931	1.889E-02	178.533	550.961	624.863	49.464	2.484E-02	5930.323	26.624	3.872E-02	82.163
1.916	6.00	3.08605	3.49999	1.60025	4.898E-03	32.803	1.922E-02	147.857	456.293	517.497	46.515	2.528E-02	5244.286	25.113	3.940E-02	77.499
5.88	16.37	3.08605	3.49999	1.38737	1.133E-02	21.386	2.268E-02	40.973	126.444	143.404	30.541	2.982E-02	2260.815	16.705	4.623E-02	51.553
10	24.98	2.08611	2.36592	1.34189	1.039E-02	22.677	1.807E-02	48.849	101.905	115.573	32.454	2.386E-02	1725.693	17.871	3.738E-02	37.280
20	39.97	1.16693	1.32345	1.35111	1.137E-02	22.250	1.883E-02	46.141	53.844	61.066	31.784	2.489E-02	925.874	17.429	3.908E-02	20.338
40	57.11	0.62030	0.70350	1.41100	1.382E-02	20.445	2.306E-02	35.798	22.206	25.184	29.074	3.054E-02	411.825	15.777	4.803E-02	9.786
60	66.64	0.42242	0.47908	1.45065	1.523E-02	19.543	2.587E-02	31.266	13.207	14.979	27.737	3.427E-02	255.235	14.997	5.393E-02	6.335
70	69.97	0.36432	0.41319	1.46368	1.566E-02	19.299	2.678E-02	30.110	10.970	12.441	27.381	3.549E-02	214.525	14.846	5.562E-02	5.409
80	72.70	0.32026	0.36322	1.47329	1.596E-02	19.172	2.738E-02	29.518	9.454	10.722	27.160	3.637E-02	185.543	14.751	5.691E-02	4.724
90	74.98	0.28571	0.32403	1.48014	1.615E-02	19.056	2.790E-02	28.984	8.281	9.392	27.036	3.699E-02	164.026	14.663	5.801E-02	4.189
100	76.90	0.25789	0.29248	1.48474	1.625E-02	**19.017**	2.820E-02	**28.808**	7.429	8.426	**26.989**	3.738E-02	147.532	**14.649**	5.863E-02	3.778
125	80.63	0.20740	0.23522	1.48878	1.626E-02	19.079	2.840E-02	29.088	6.033	6.842	27.105	3.764E-02	119.675	14.762	5.905E-02	3.062
150	83.32	0.17344	0.19670	1.48534	1.601E-02	19.294	2.806E-02	30.085	5.218	5.918	27.451	3.718E-02	102.651	14.959	5.855E-02	2.594
200	86.94	0.13066	0.14819	1.46536	1.508E-02	20.008	2.644E-02	33.549	4.383	4.971	28.564	3.767E-02	83.726	15.722	5.506E-02	2.054
225	88.22	0.11631	0.13191	1.45147	1.450E-02	20.466	2.537E-02	35.907	4.176	4.736	29.271	3.617E-02	78.265	16.197	5.277E-02	1.884
250	89.27	0.10481	0.11887	1.43605	1.389E-02	20.975	2.421E-02	38.655	4.051	4.595	30.054	3.455E-02	74.355	16.719	5.028E-02	1.752
275	90.15	0.09537	0.10816	1.41957	1.325E-02	21.536	2.490E-02	41.840	3.990	4.526	30.916	3.282E-02	71.591	17.256	5.113E-02	1.646
300	90.90	0.08749	0.09923	1.40244	1.260E-02	22.143	2.356E-02	45.479	**3.979**	**4.513**	31.846	3.104E-02	69.688	17.868	4.832E-02	1.563
350	92.10	0.07509	0.08516	1.36712	1.128E-02	23.495	2.083E-02	54.329	4.080	4.627	33.915	2.741E-02	**67.836**	19.225	4.258E-02	1.444
400	93.02	0.06577	0.07459	1.33142	9.992E-03	25.047	1.815E-02	65.821	4.329	4.910	36.287	2.388E-02	68.017	20.751	3.706E-02	1.365
450	93.74	0.05850	0.06635	1.29613	8.736E-03	26.833	1.561E-02	80.929	4.734	5.369	39.015	2.050E-02	69.936	22.512	3.178E-02	1.317
500	94.33	0.05268	0.05975	1.26168	7.530E-03	28.897	1.319E-02	101.072	5.324	6.039	42.165	1.733E-02	73.559	24.549	2.682E-02	1.293
550	94.82	0.04792	0.05435	1.22830	6.382E-03	31.310	1.094E-02	128.565	6.161	6.987	45.850	1.436E-02	79.121	26.935	2.220E-02	**1.291**
600	95.23	0.04394	0.04983	1.19612	5.286E-03	34.197	8.883E-03	167.510	7.360	8.348	50.258	1.164E-02	87.169	29.792	1.795E-02	1.309
700	95.89	0.03769	0.04275	1.13550	3.246E-03	42.179	5.277E-03	314.328	11.847	13.436	62.452	6.901E-03	115.455	37.700	1.062E-02	1.421
800	96.38	0.03299	0.03742	1.07981	1.410E-03	56.501	2.461E-03	755.535	24.925	28.268	84.345	3.213E-03	184.327	51.936	4.922E-03	1.713
900	96.77	0.02934	0.03328	1.02877		97.453	5.587E-04	3876.808	113.746	129.002	147.010	7.204E-04	498.014	92.797	1.095E-03	2.723
940	96.904	0.02805	0.03181	1.00953												
950	96.935	0.02775	0.03147	1.00485												
960	96.966	0.02747	0.03115	1.00017												
961	**96.969**	**0.02744**	**0.03112**	**0.99972**												
962	96.972	0.02741	0.03109	0.99924												
963	96.975	0.02738	0.03105	0.99879												

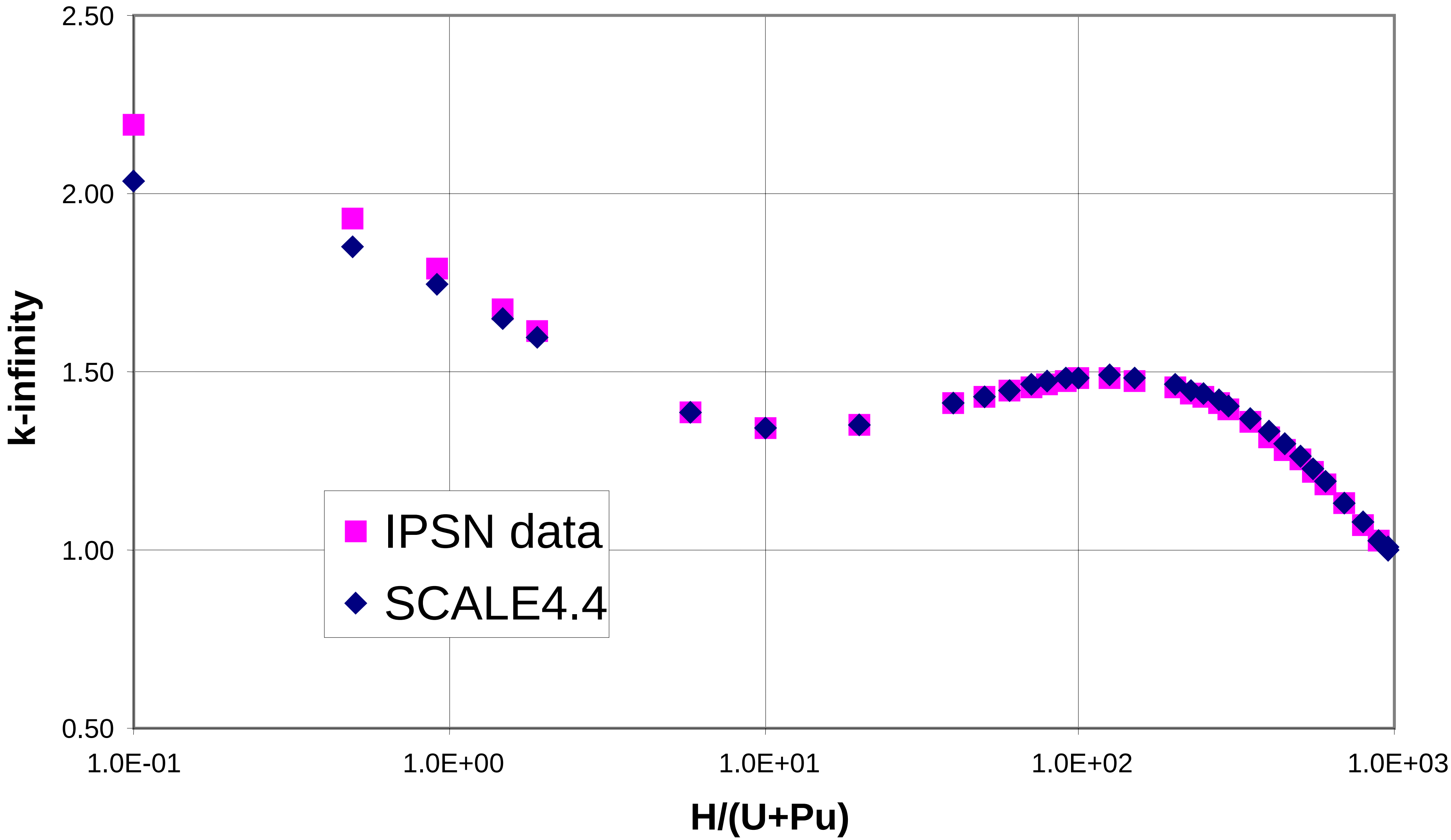

Fig. A.6.a.1. *k*-infinity [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

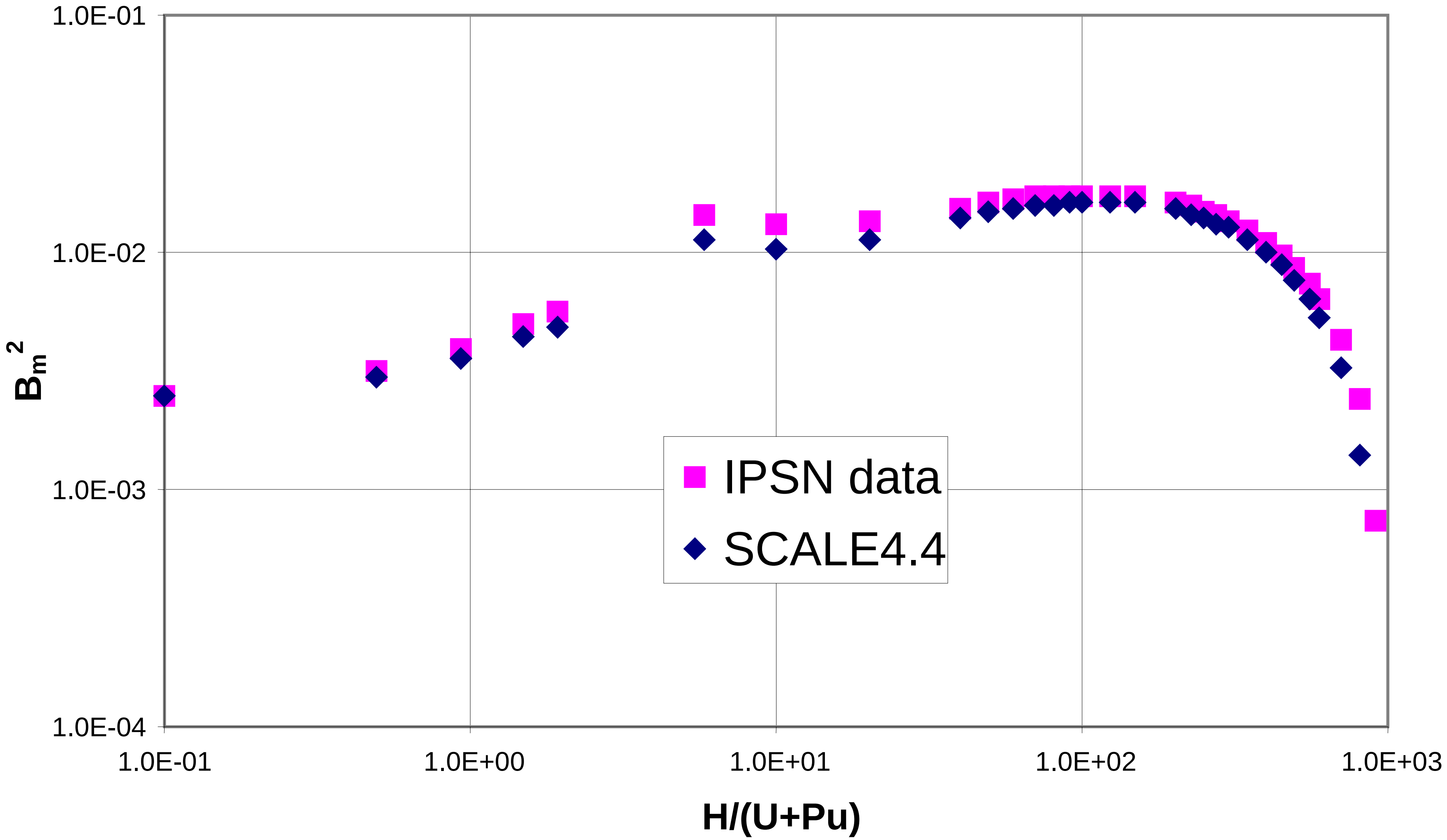

Fig. A.6.a.2. B_m^2 [^{235}U/U = 0.3 %, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

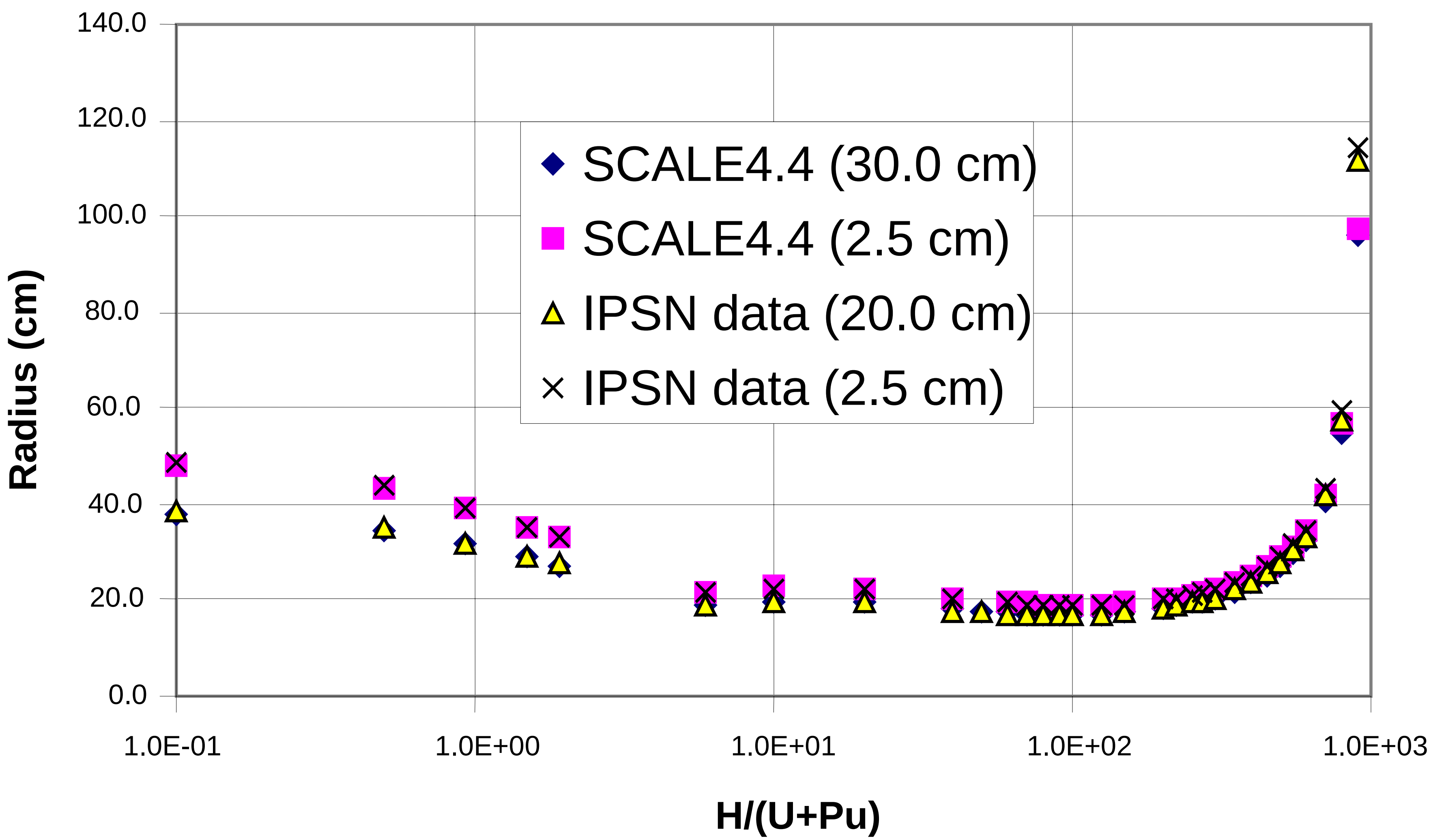

Fig. A.6.a.3-1. Sphere radius [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

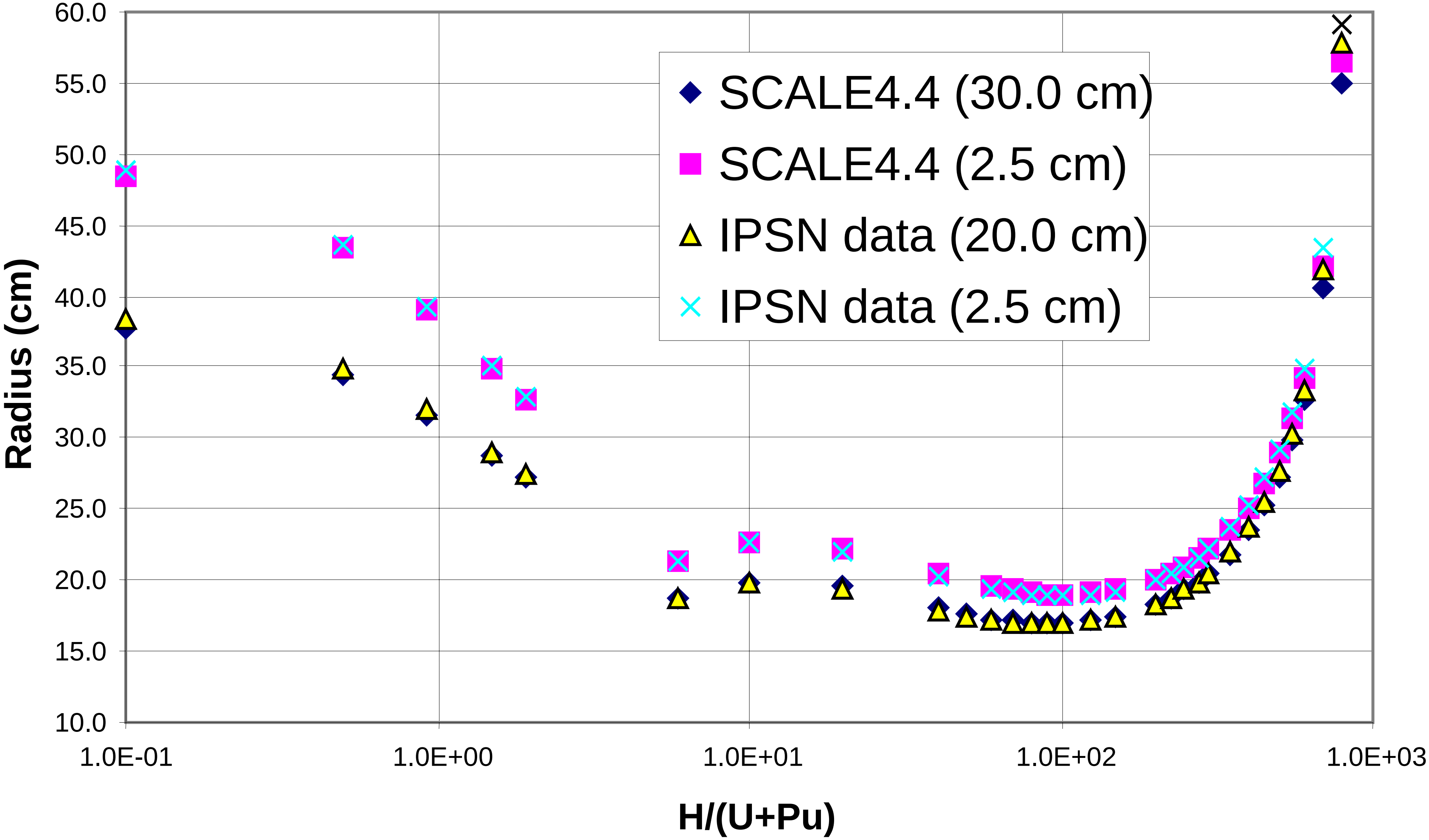

Fig. A.6.a.3-2. Sphere radius [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

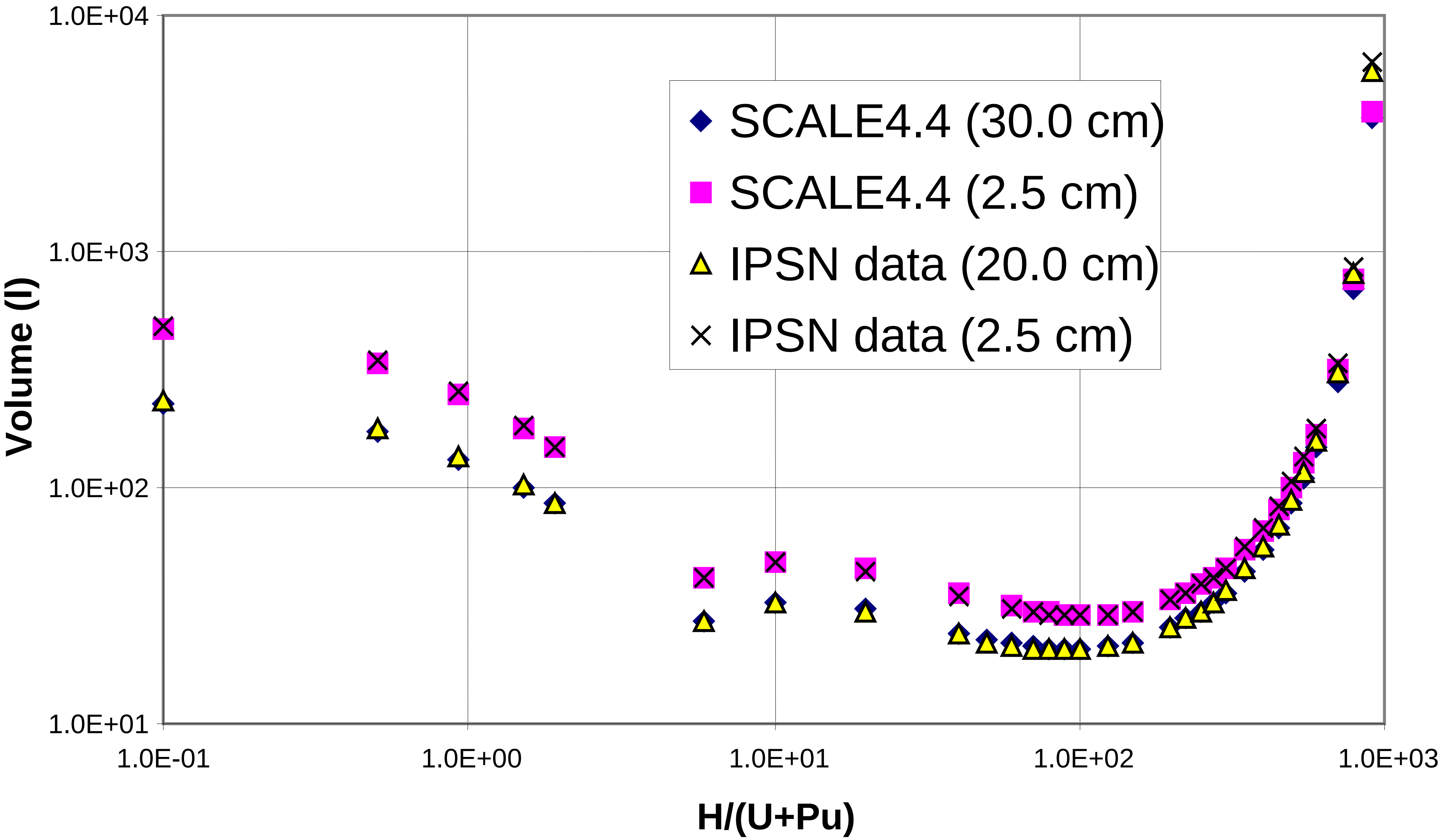

Fig. A.6.a.4. Sphere volume [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^{3}].

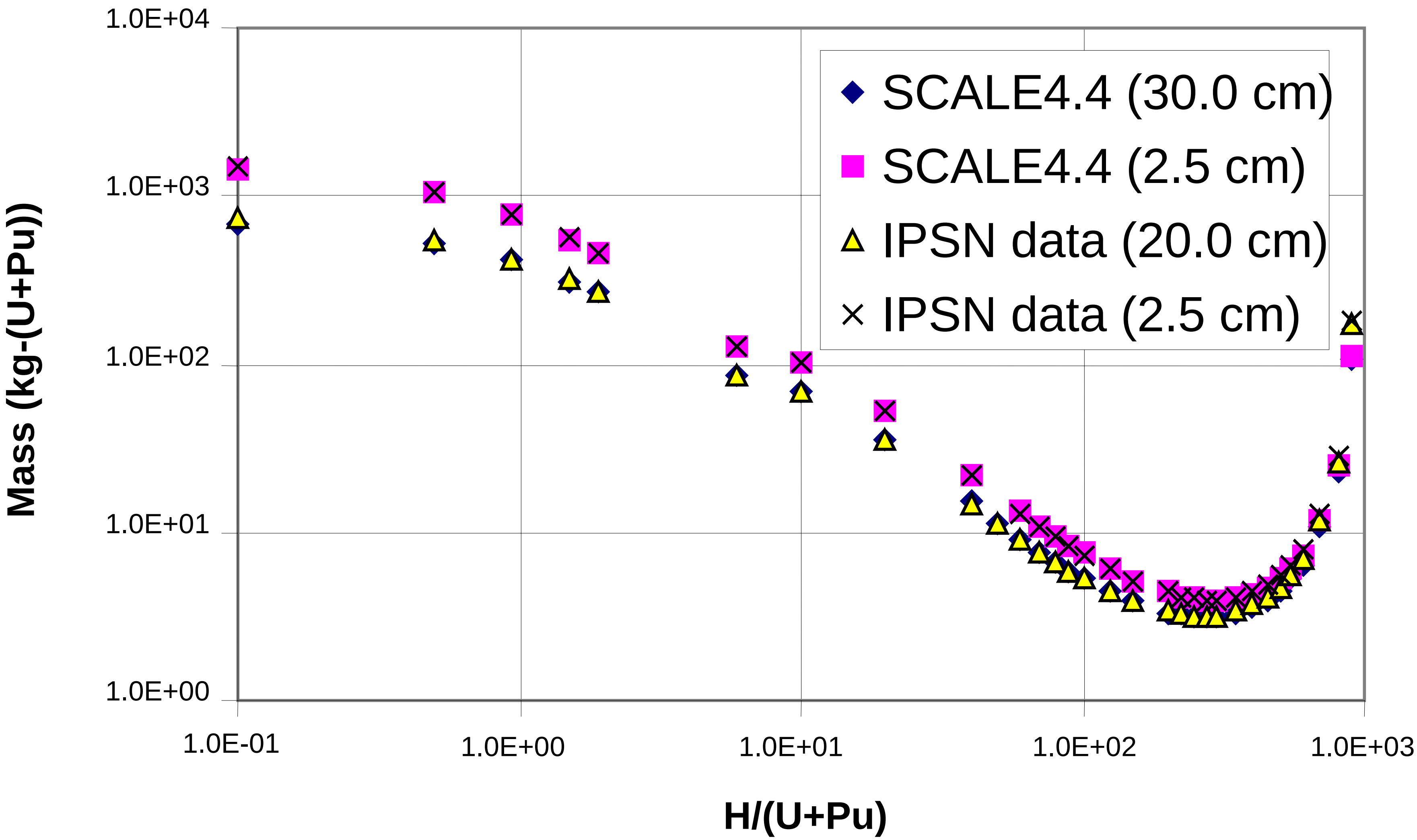

Fig. A.6.a.5. U + Pu mass [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

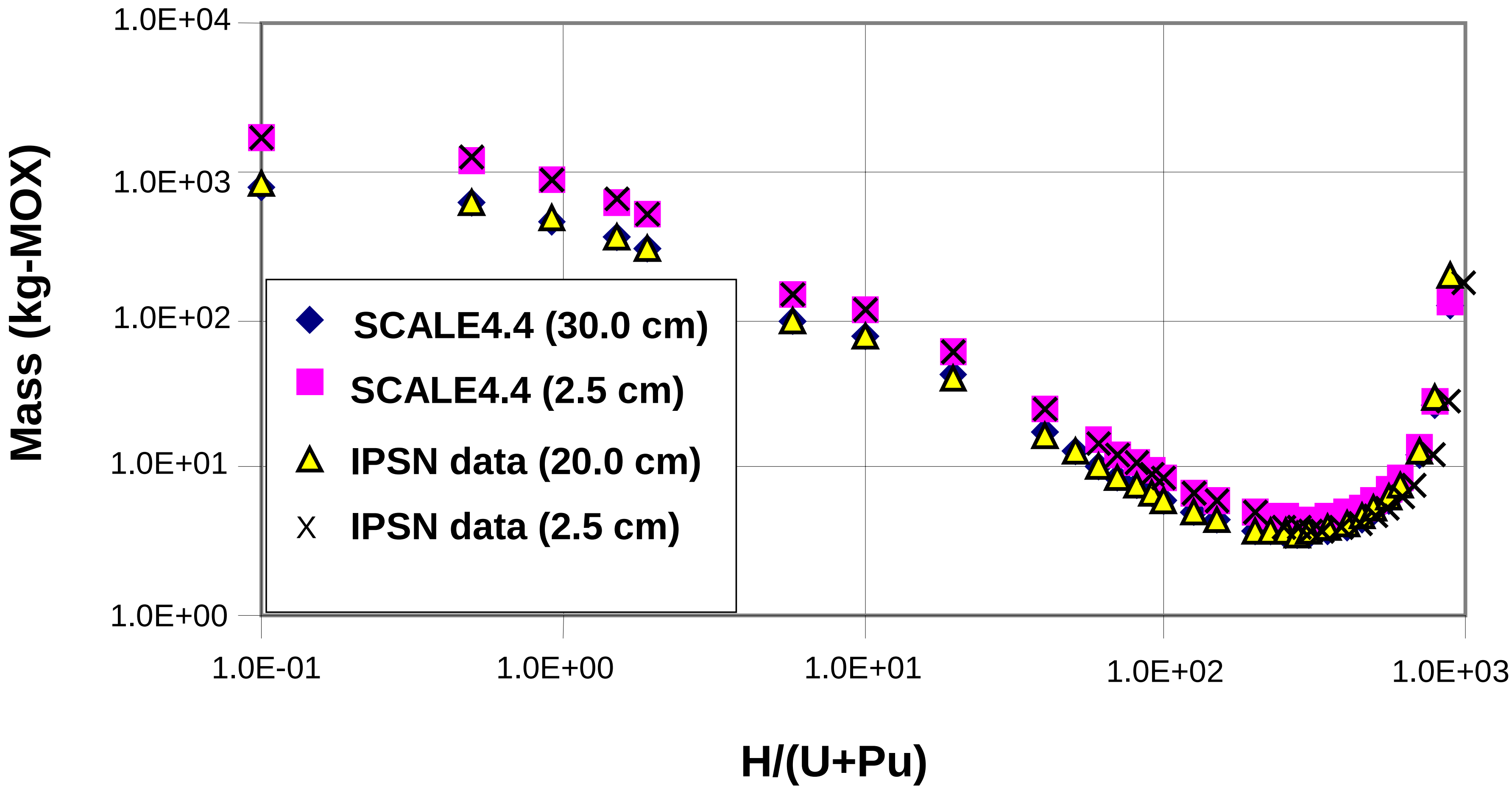

Fig. A.6.a.6. MOX mass [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

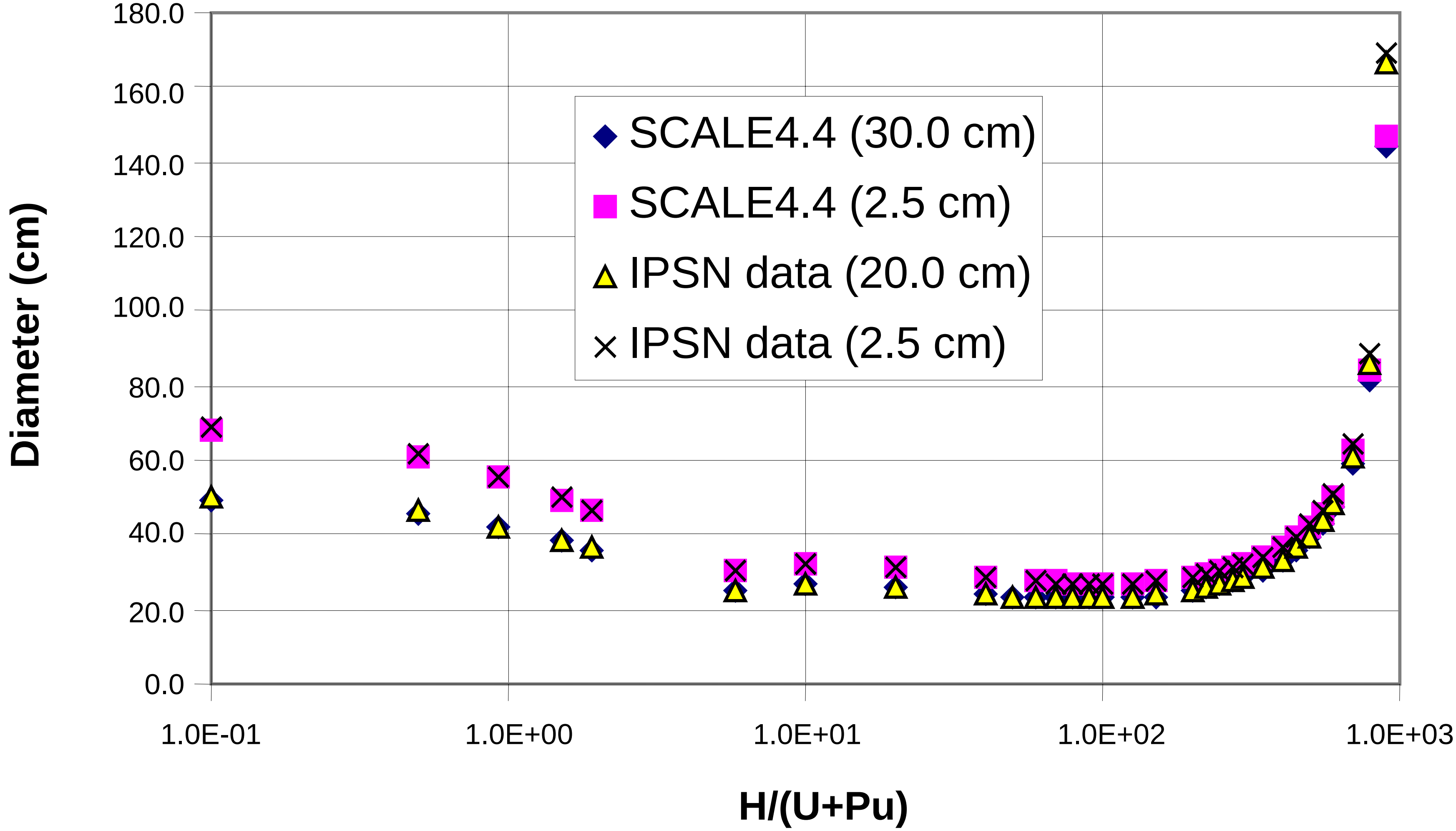

Fig. A.6.a.7-1. Cylinder diameter [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

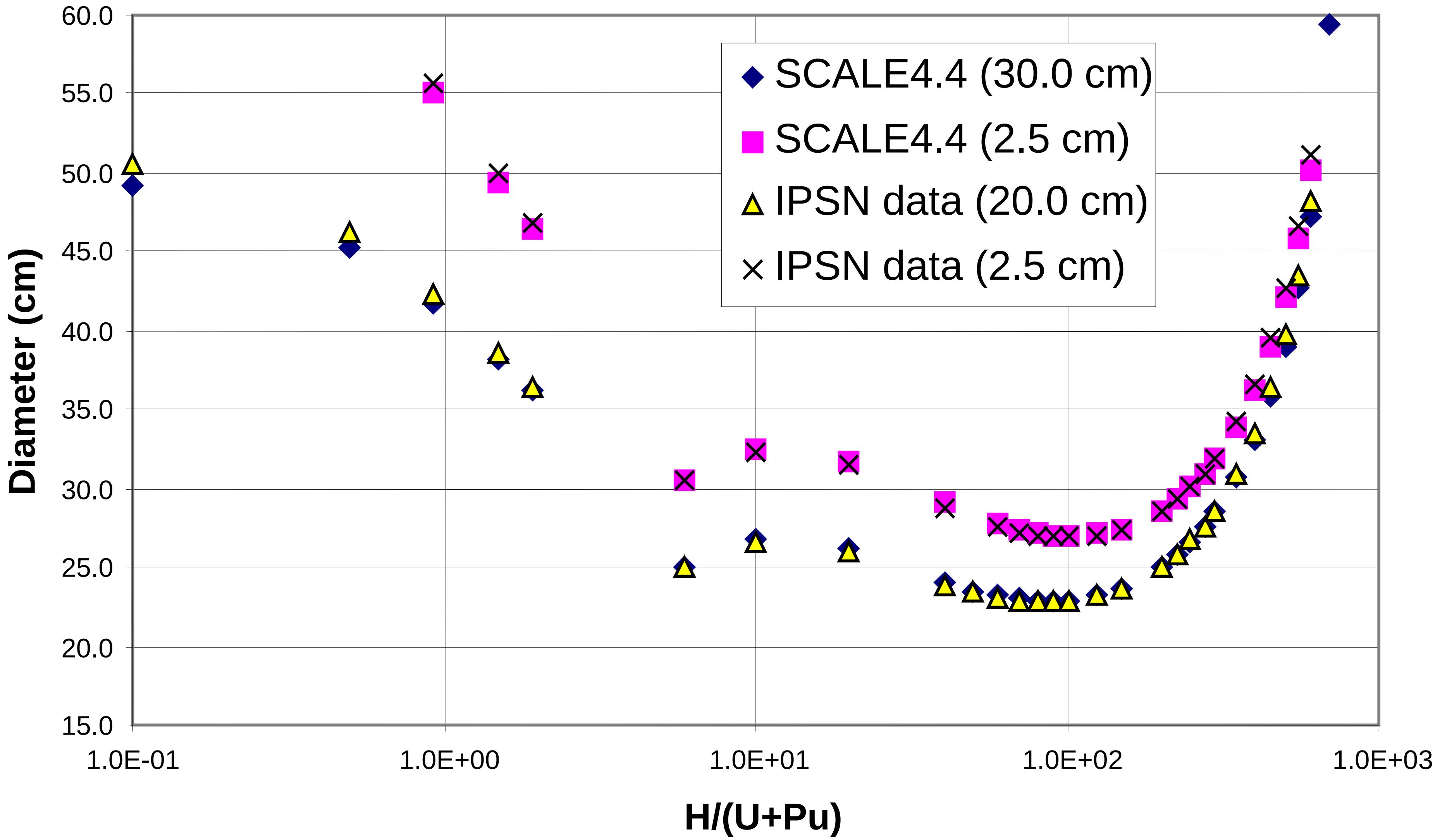

Fig. A.6.a.7-2. Cylinder diameter infinity [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

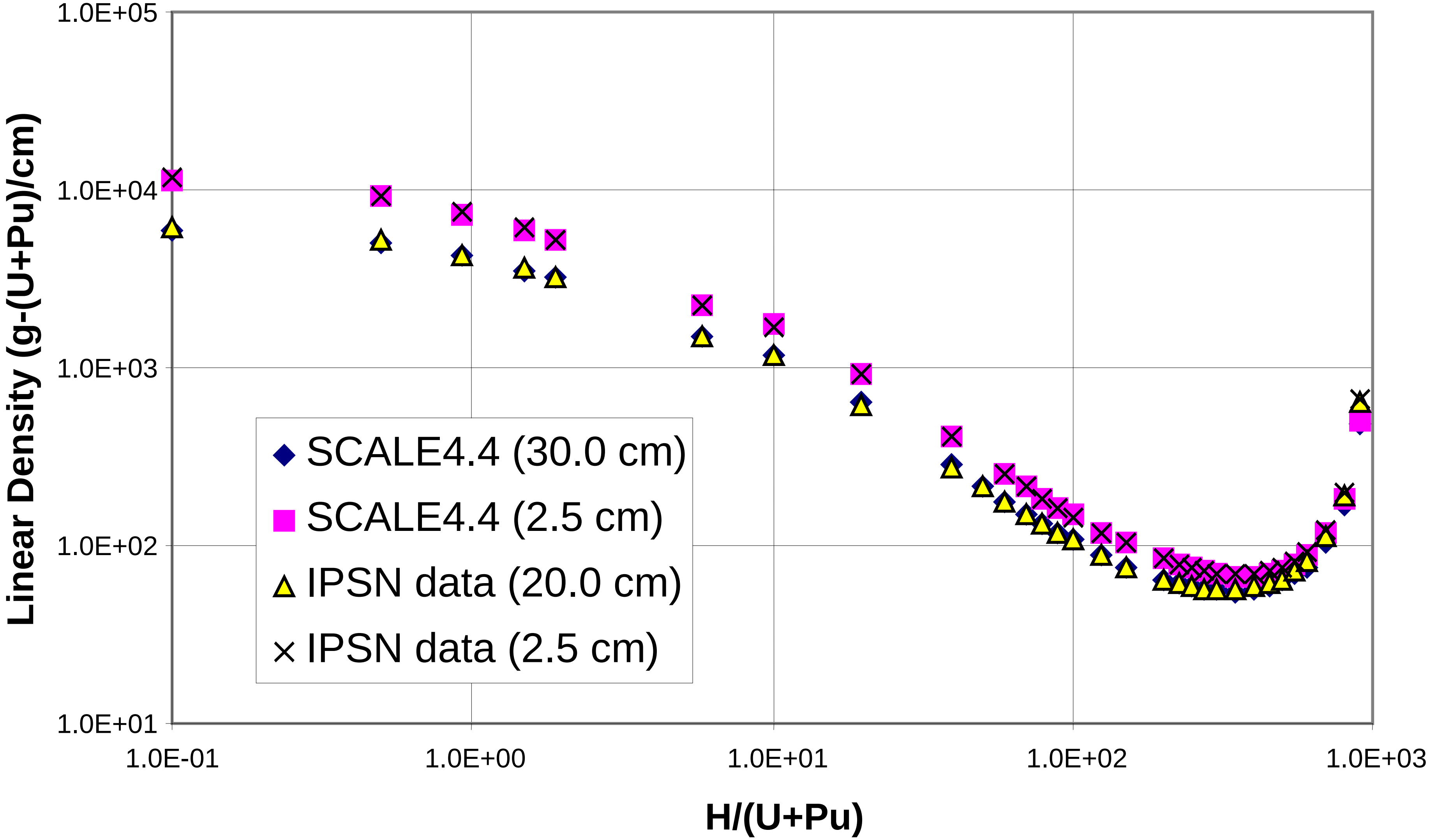

Fig. A.6.a.8. Linear density [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

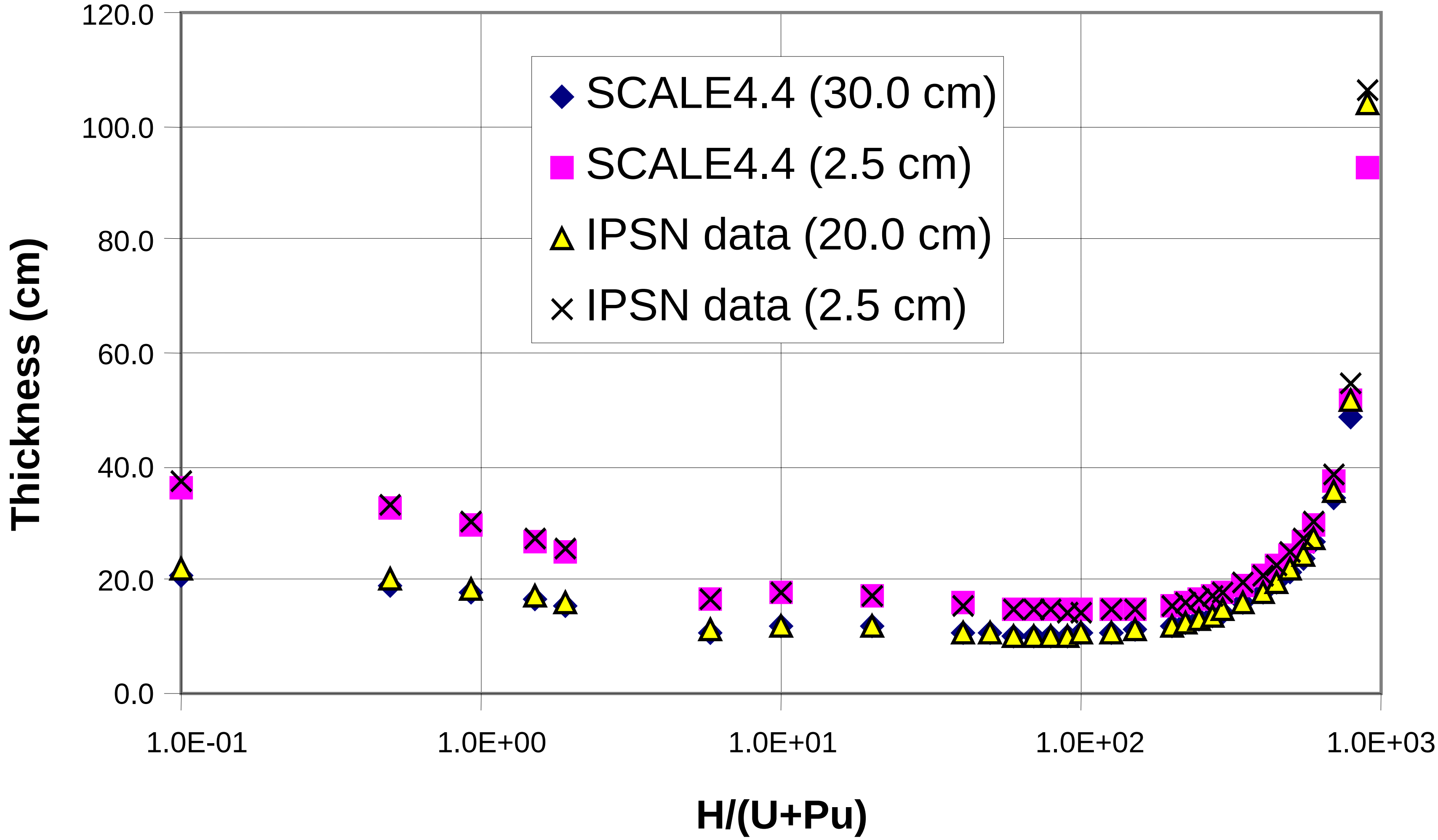

Fig. A.6.a.9-1. Slab thickness [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

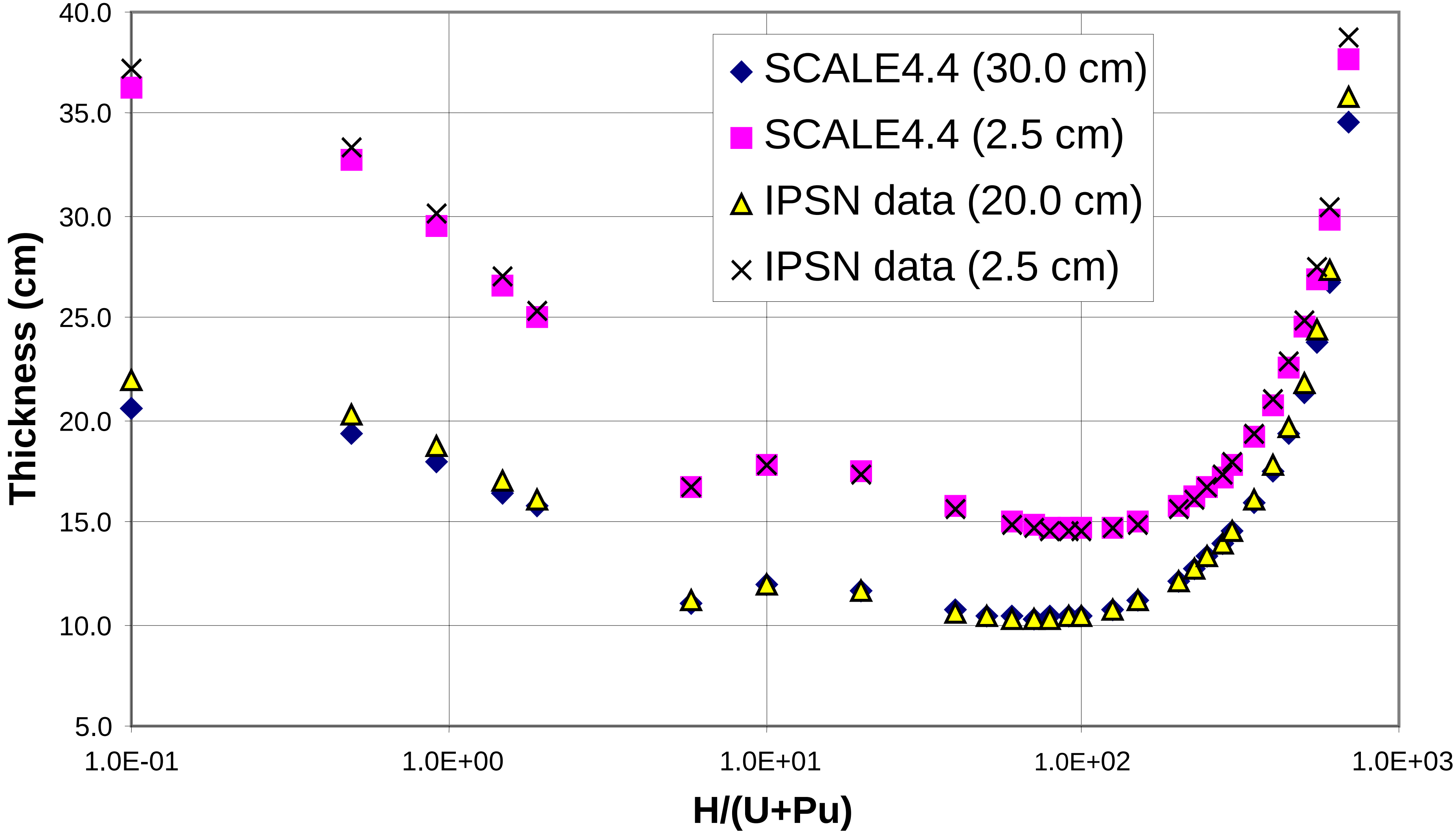

Fig. A.6.a.9-2. Slab thickness [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

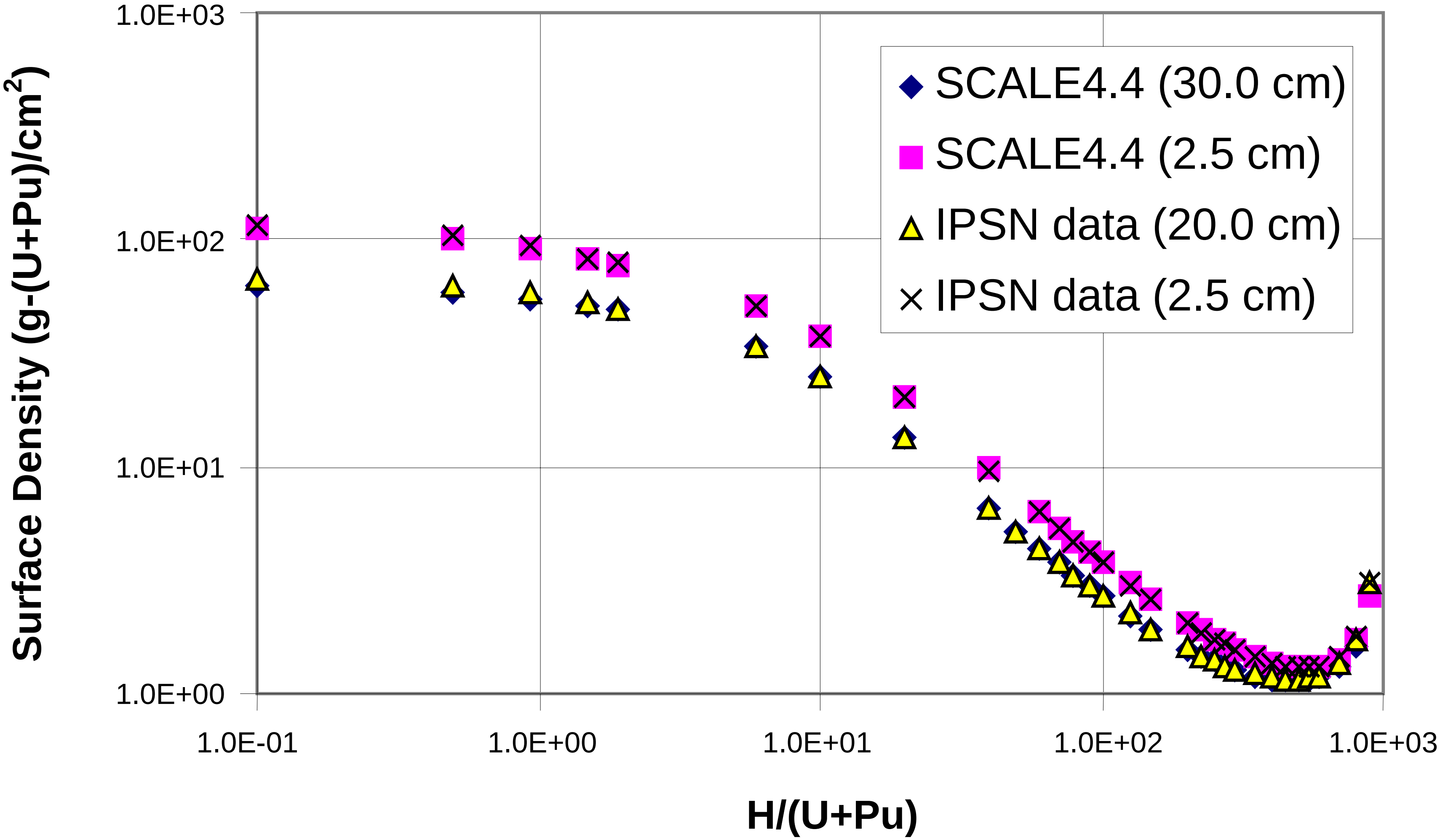

Fig. A.6.a.10. Surface density [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3].

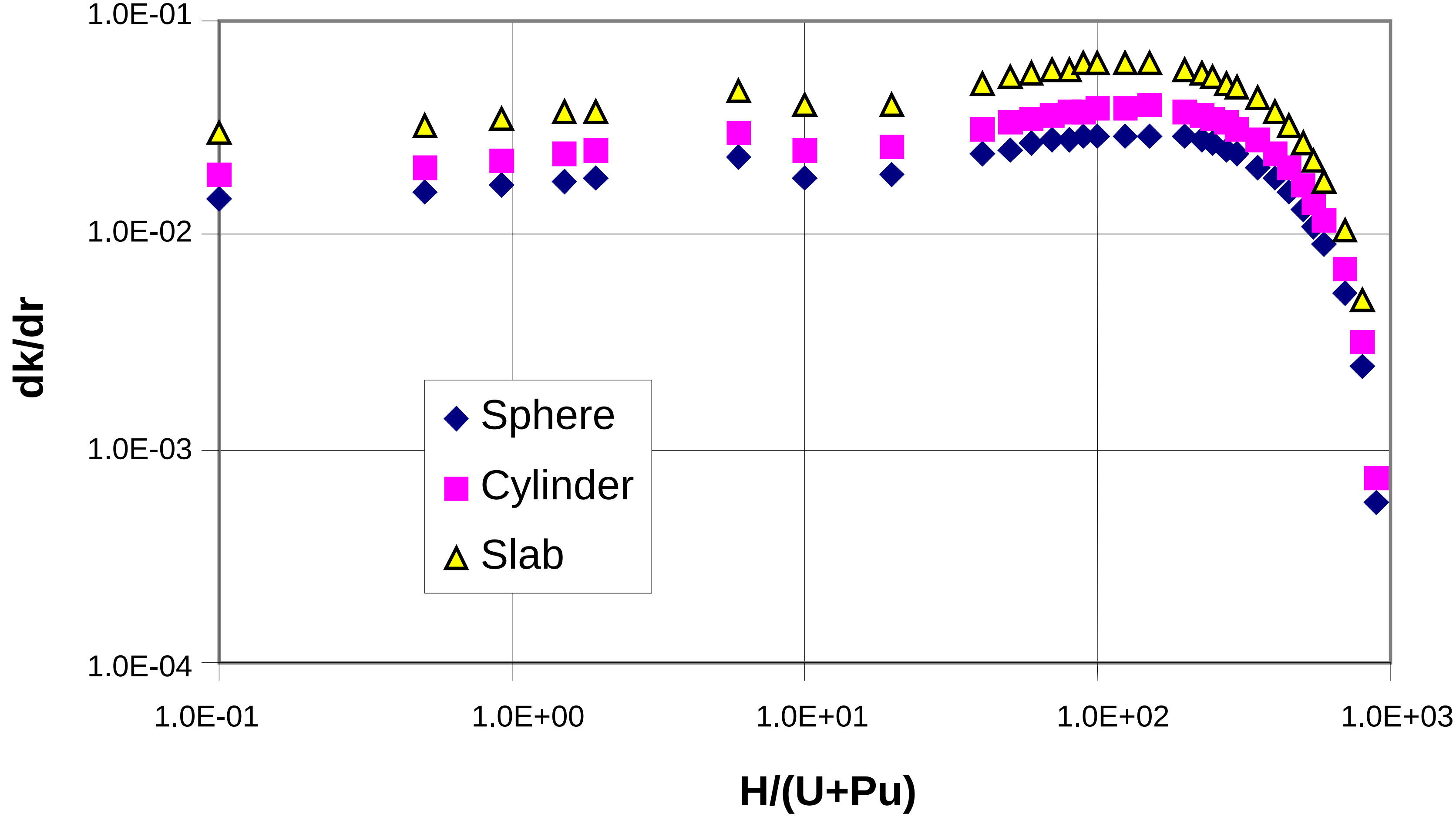

Fig. A.6.a.11. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 30.0 cm].

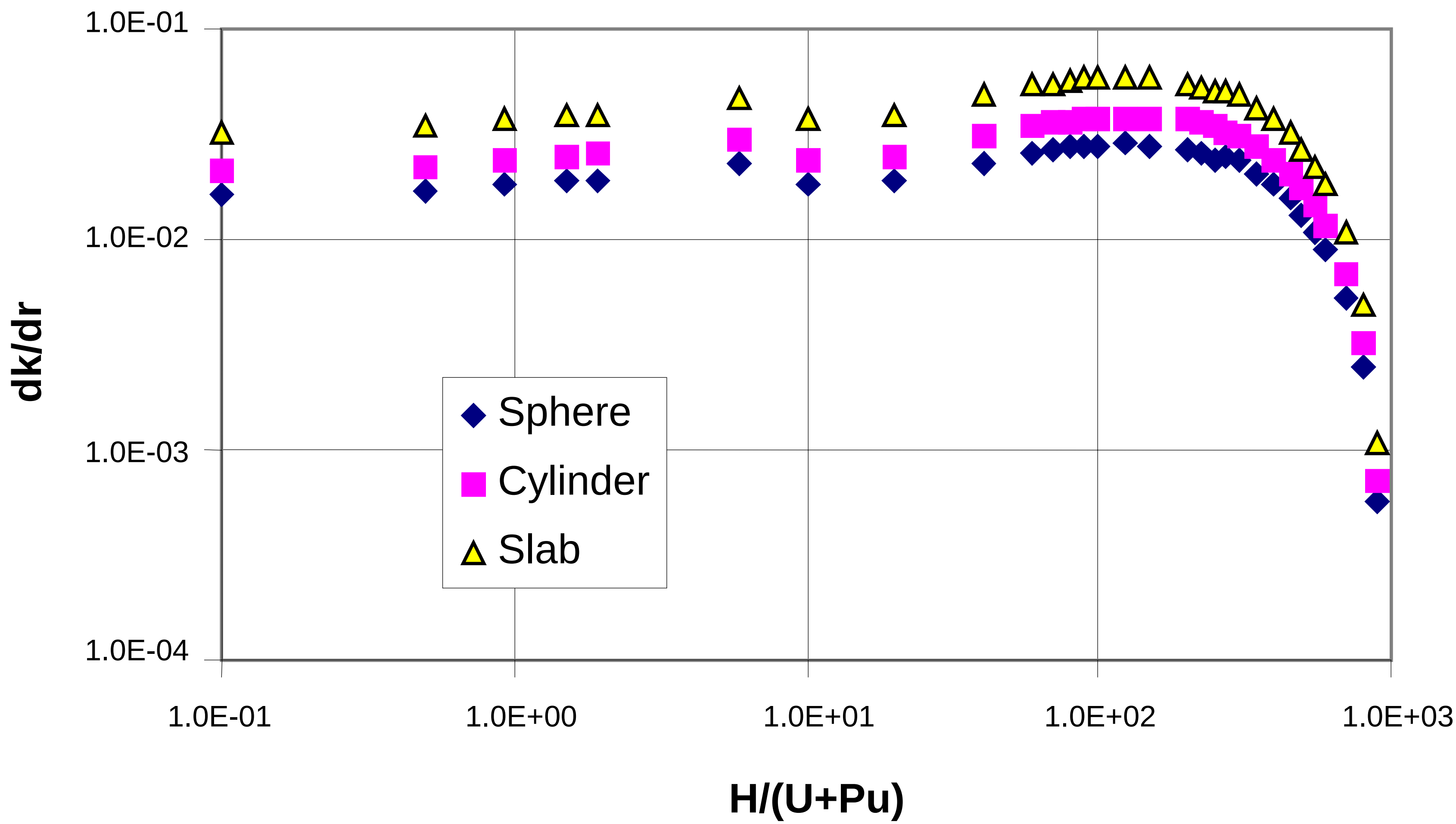

Fig. A.6.a.12. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 2.5 cm].

Table A.6.b.1. MOX data [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**65.883**	**20.000**	**12.941**	**1.176**

Fissile material oxide density void-free

Water reflector 30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	9.38005	10.64002	1.37945	6.760E-03	29.172	1.418E-02	103.990	975.432	1106.456	40.206	1.818E-02	11909.040	19.411	2.635E-02	182.078
0.5	1.64	8.21461	9.31803	1.33397	7.653E-03	27.716	1.423E-02	89.183	732.601	831.007	38.345	1.836E-02	9486.442	18.817	2.702E-02	154.573
0.928	3.00	7.25068	8.22462	1.28855	7.605E-03	27.915	1.282E-02	91.119	660.678	749.423	38.702	1.662E-02	8529.909	19.151	2.476E-02	138.860
1.5	4.76	6.26775	7.10966	1.24834	7.251E-03	28.698	1.120E-02	99.005	620.539	703.892	39.877	1.456E-02	7828.001	19.899	2.190E-02	124.719
1.916	6.00	5.70526	6.47162	1.23098	7.061E-03	29.127	1.045E-02	103.511	590.555	669.881	40.511	1.361E-02	7353.863	20.288	2.055E-02	115.747
5	14.29	3.42594	3.88613	1.22069	7.620E-03	27.682	9.748E-03	88.850	304.395	345.282	38.332	1.285E-02	3953.599	18.958	2.000E-02	64.947
10	25.00	2.07921	2.35850	1.27847	1.001E-02	23.520	1.371E-02	54.503	113.324	128.546	32.206	1.815E-02	1693.799	15.367	2.853E-02	31.950
20	40.00	1.16404	1.32040	1.36087	1.314E-02	20.163	1.951E-02	34.334	39.966	45.335	27.390	2.592E-02	685.890	12.771	4.104E-02	14.866
30	50.00	0.80827	0.91684	1.40134	1.458E-02	19.137	2.240E-02	29.358	23.729	26.916	25.998	2.979E-02	429.081	12.172	4.718E-02	9.839
40	57.14	0.61907	0.70223	1.41920	1.513E-02	**18.875**	2.364E-02	**28.169**	17.439	19.781	**25.710**	3.363E-02	321.381	**12.165**	5.251E-02	7.531
50	62.50	0.50164	0.56902	1.42410	1.522E-02	18.962	2.392E-02	28.559	14.326	16.251	25.920	3.404E-02	264.695	12.429	5.316E-02	6.235
60	66.67	0.42166	0.47830	1.42101	1.501E-02	19.245	2.544E-02	29.859	12.590	14.281	26.410	3.362E-02	230.991	12.843	5.246E-02	5.415
70	70.00	0.36368	0.41253	1.41278	1.464E-02	19.658	2.474E-02	31.820	11.572	13.127	27.084	3.267E-02	209.531	13.356	5.094E-02	4.857
80	72.73	0.31971	0.36265	1.40115	1.415E-02	20.167	2.380E-02	34.355	10.984	12.459	27.896	3.140E-02	195.405	13.944	4.888E-02	4.458
90	75.00	0.28523	0.32354	1.38724	1.359E-02	20.753	2.268E-02	37.441	10.679	12.114	28.820	2.992E-02	186.074	14.595	4.652E-02	4.163
100	76.92	0.25746	0.29204	1.37178	1.299E-02	21.410	2.147E-02	41.109	**10.584**	**12.005**	29.846	2.830E-02	180.129	15.261	4.410E-02	3.929
125	80.65	0.20707	0.23488	1.32944	1.139E-02	23.338	1.820E-02	53.246	11.026	12.507	32.834	2.395E-02	**175.325**	17.252	3.726E-02	3.572
150	83.33	0.17317	0.19643	1.28516	9.781E-03	25.707	1.494E-02	71.159	12.323	13.978	36.478	1.964E-02	180.981	19.652	3.048E-02	3.403
175	85.37	0.14881	0.16880	1.24114	8.208E-03	28.622	1.187E-02	98.212	14.615	16.578	40.949	1.559E-02	195.979	22.577	2.413E-02	**3.360**
200	86.96	0.13046	0.14798	1.19840	6.712E-03	32.292	8.860E-03	141.046	18.401	20.873	46.569	1.188E-02	222.213	26.236	1.834E-02	3.423
225	88.24	0.11627	0.13189	1.15745	5.296E-03	37.101	6.417E-03	213.919	24.872	28.213	53.927	8.572E-03	265.567	31.025	1.321E-02	3.607
250	89.29	0.10477	0.11884	1.11846	3.960E-03	43.813	4.298E-03	352.285	36.909	41.867	64.193	5.705E-03	339.076	37.705	8.762E-03	3.950
275	90.16	0.09534	0.10815	1.08152	2.712E-03	54.196	2.521E-03	666.796	63.572	72.112	80.074	3.326E-03	480.120	48.046	5.105E-03	4.581
300	90.91	0.08746	0.09921	1.04655	1.537E-03	73.876	1.114E-03	1688.907	147.712	167.553	110.185	1.463E-03	833.964	67.674	2.231E-03	5.919
325	91.550	0.08056	0.09138	1.01349												
330	91.667	0.07935	0.09001	1.00711												
335	91.781	0.07817	0.08867	1.00078												
336	**91.804**	**0.07794**	**0.08841**	**0.99954**												
337	91.826	0.07771	0.08815	0.99829												
338	91.848	0.07749	0.08790	0.99703												
339	91.870	0.07726	0.08764	0.99580												
340	91.892	0.07703	0.08738	0.99455												
350	92.106	0.07507	0.08515	0.98228												

Table A.6.b.2. MOX data [$^{235}U/U = 0.718\%$, $^{240}Pu/Pu = 20\%$, MOX density: void-free, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	99.282	65.883	20.000	12.941	1.176

Fissile material oxide density void-free

Water reflector 2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

						Sphere					Cylinder			Slab		
H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Radius (cm)	dk/dr	Volume (l)	Mass U + Pu (kg)	Mass MOX (kg)	Diameter (cm)	dk/dr	Linear den. Pu + U (g/cm)	Thickness (cm)	dk/dr	Surface den. Pu + U (g/cm^2)
0.1	0.33	9.38005	10.64002	1.37945	6.760E-03	33.503	1.485E-02	157.527	1477.612	1676.092	49.002	1.931E-02	17690.078	28.607	2.921E-02	268.337
0.5	1.64	8.21461	9.31803	1.33397	7.653E-03	31.388	1.461E-02	129.527	1064.010	1206.933	45.831	1.905E-02	13551.990	26.646	2.900E-02	218.886
0.928	3.00	7.25068	8.22462	1.28855	7.605E-03	31.468	1.302E-02	130.519	946.355	1073.474	45.945	1.700E-02	12021.021	26.710	2.595E-02	193.667
1.5	4.76	6.26775	7.10966	1.24834	7.251E-03	32.251	1.128E-02	140.517	880.728	999.032	47.112	1.475E-02	10926.179	27.428	2.256E-02	171.913
1.916	6.00	5.70526	6.47162	1.23098	7.061E-03	32.694	1.050E-02	146.378	835.127	947.305	47.767	1.373E-02	10224.010	27.825	2.102E-02	158.750
5	14.29	3.42594	3.88613	1.22069	7.620E-03	31.102	9.622E-03	126.028	431.763	489.760	45.268	1.265E-02	5513.767	26.113	1.963E-02	89.462
10	25.00	2.07921	2.35850	1.27847	1.001E-02	26.521	1.348E-02	78.134	162.456	184.278	38.286	1.775E-02	2393.667	21.613	2.770E-02	44.937
20	40.00	1.16404	1.32040	1.36087	1.314E-02	22.667	1.912E-02	48.783	56.786	64.413	32.464	2.526E-02	963.522	17.954	3.961E-02	20.899
30	50.00	0.80827	0.91684	1.40134	1.458E-02	21.385	2.196E-02	40.963	33.109	37.557	30.552	2.904E-02	592.559	16.810	4.557E-02	13.587
40	57.14	0.61907	0.70223	1.41920	1.513E-02	20.964	2.319E-02	38.595	23.893	27.103	29.943	3.068E-02	435.928	16.495	4.810E-02	10.211
50	62.50	0.50164	0.56902	1.42410	1.522E-02	20.943	2.349E-02	38.476	19.301	21.894	29.933	3.108E-02	353.011	16.526	4.874E-02	8.290
60	66.67	0.42166	0.47830	1.42101	1.501E-02	21.147	2.322E-02	39.612	16.703	18.946	30.262	3.071E-02	303.287	16.769	4.816E-02	7.071
70	70.00	0.36368	0.41253	1.41278	1.464E-02	21.498	2.258E-02	41.620	15.137	17.170	30.812	3.224E-02	271.182	17.150	4.680E-02	6.237
80	72.73	0.31971	0.36265	1.40115	1.415E-02	21.959	2.355E-02	44.354	14.180	16.085	31.526	3.102E-02	249.562	17.599	4.826E-02	5.626
90	75.00	0.28523	0.32354	1.38724	1.359E-02	22.507	2.247E-02	47.754	13.621	15.451	32.370	2.959E-02	234.728	18.161	4.289E-02	5.180
100	76.92	0.25746	0.29204	1.37178	1.299E-02	23.131	2.128E-02	51.841	13.347	15.140	33.329	2.801E-02	224.623	18.797	4.353E-02	4.839
125	80.65	0.20707	0.23488	1.32944	1.139E-02	24.999	1.807E-02	65.442	13.551	15.371	36.191	2.377E-02	213.019	20.656	3.688E-02	4.277
150	83.33	0.17317	0.19643	1.28516	9.781E-03	27.326	1.487E-02	85.472	14.801	16.789	39.750	1.953E-02	214.898	22.964	3.025E-02	3.977
175	85.37	0.14881	0.16880	1.24114	8.208E-03	30.211	1.183E-02	115.502	17.188	19.497	44.158	1.553E-02	227.898	25.822	2.400E-02	3.843
200	86.96	0.13046	0.14798	1.19840	6.712E-03	33.861	9.043E-03	162.622	21.216	24.066	49.733	1.185E-02	253.425	29.431	1.828E-02	3.840
225	88.24	0.11627	0.13189	1.15745	5.296E-03	38.655	6.528E-03	241.941	28.130	31.909	57.056	8.553E-03	297.280	34.183	1.318E-02	3.974
250	89.29	0.10477	0.11884	1.11846	3.960E-03	45.356	4.364E-03	390.842	40.949	46.449	67.297	5.697E-03	372.660	40.834	8.764E-03	4.278
275	90.16	0.09534	0.10815	1.08152	2.712E-03	55.732	2.540E-03	725.123	69.133	78.420	83.160	3.320E-03	517.843	51.153	5.082E-03	4.877
300	90.91	0.08746	0.09921	1.04655	1.537E-03	75.408	1.124E-03	1796.171	157.093	178.195	113.259	1.462E-03	881.146	70.765	2.230E-03	6.189
325	91.550	0.08056	0.09138	1.01349												
330	91.667	0.07935	0.09001	1.00711												
335	91.781	0.07817	0.08867	1.00078												
336	91.804	0.07794	0.08841	0.99954												
337	91.826	0.07771	0.08815	0.99829												
338	91.848	0.07749	0.08790	0.99703												
339	91.870	0.07726	0.08764	0.99580												
340	91.892	0.07703	0.08738	0.99455												
350	92.106	0.07507	0.08515	0.98228												

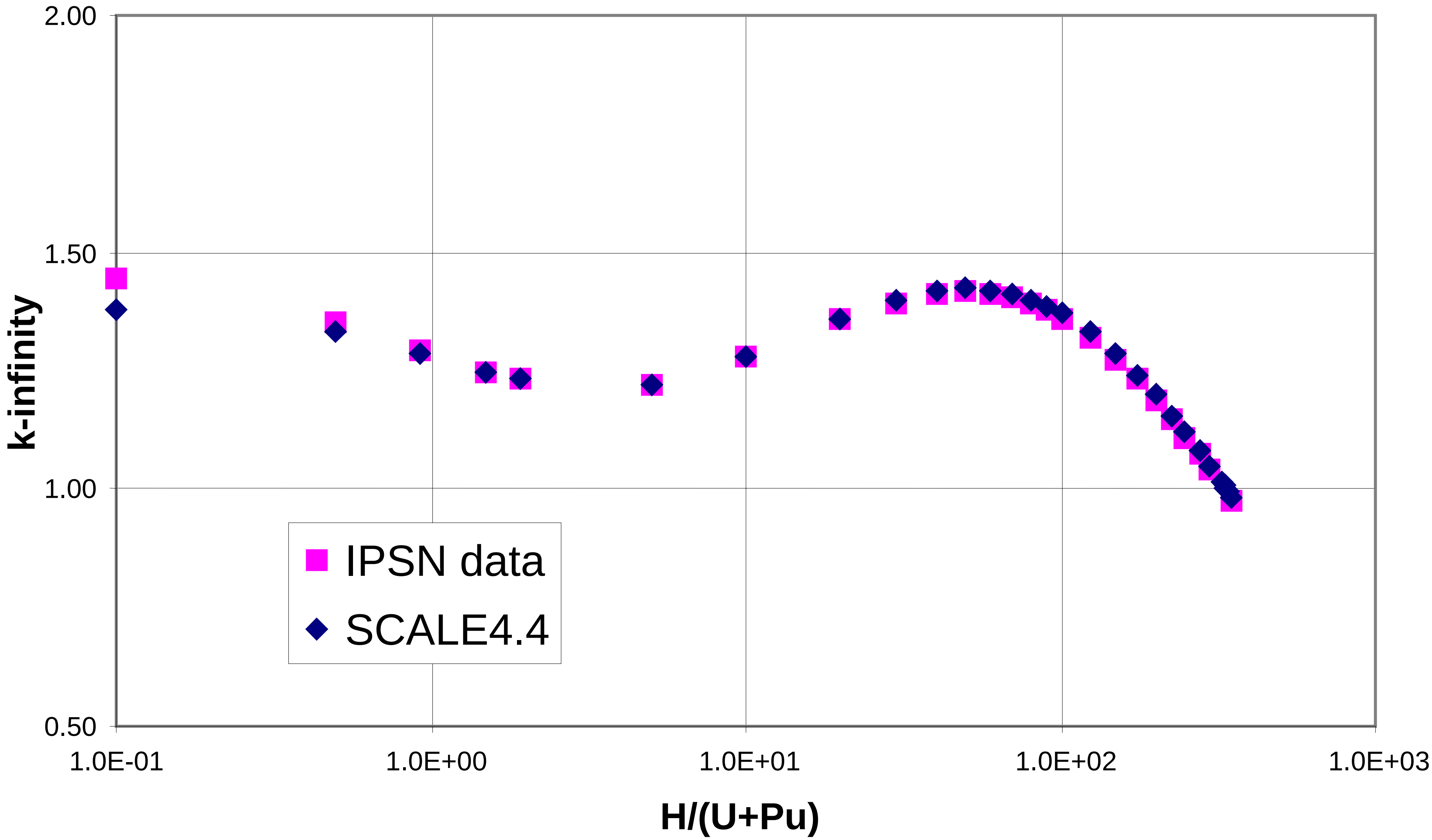

Fig. A.6.b.1. ***k*-infinity [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].**

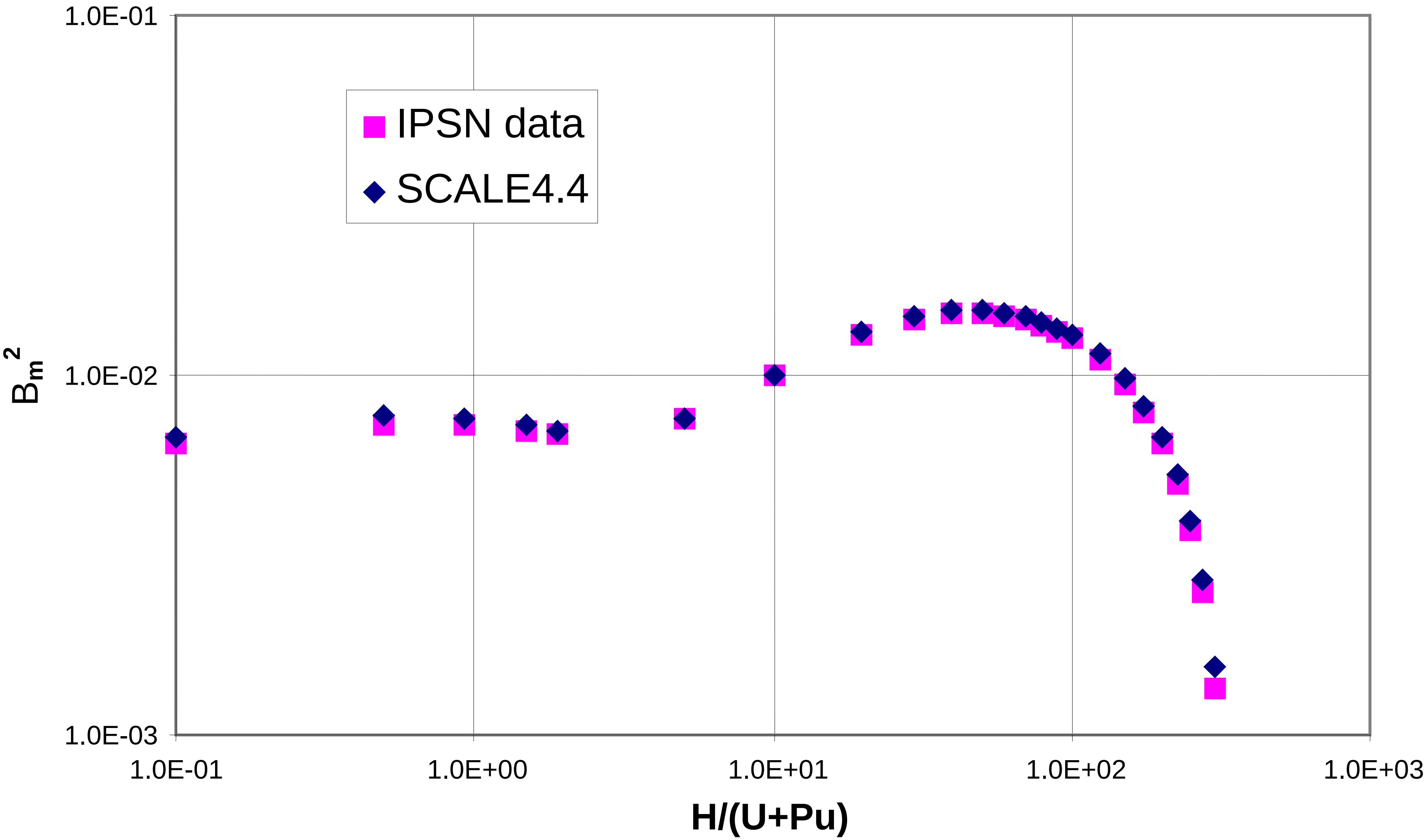

Fig. A.6.b.2. B_m^2 [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

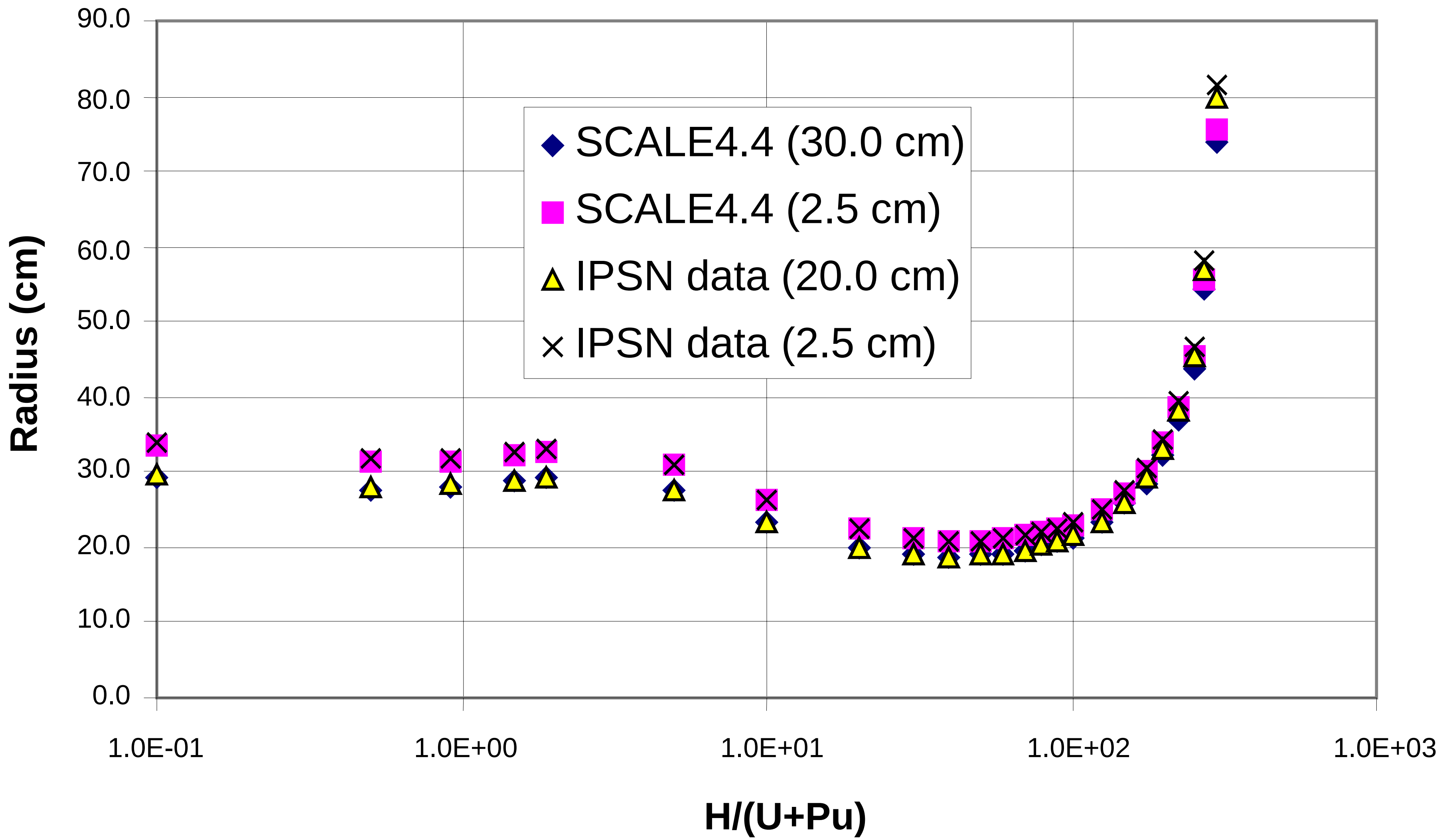

Fig. A.6.b.3-1. Sphere radius [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

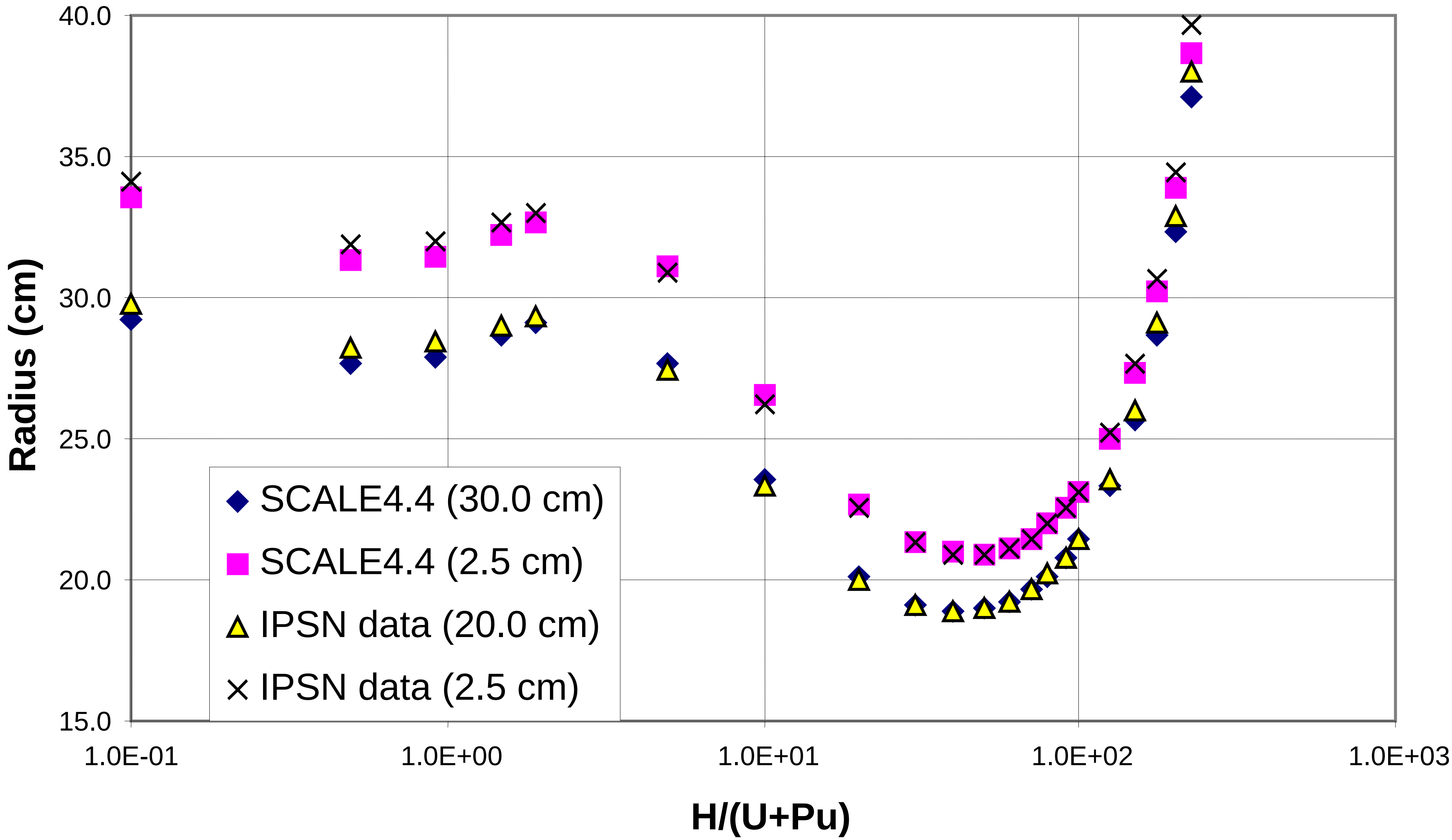

Fig. A.6.b.3-2. Sphere radius [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

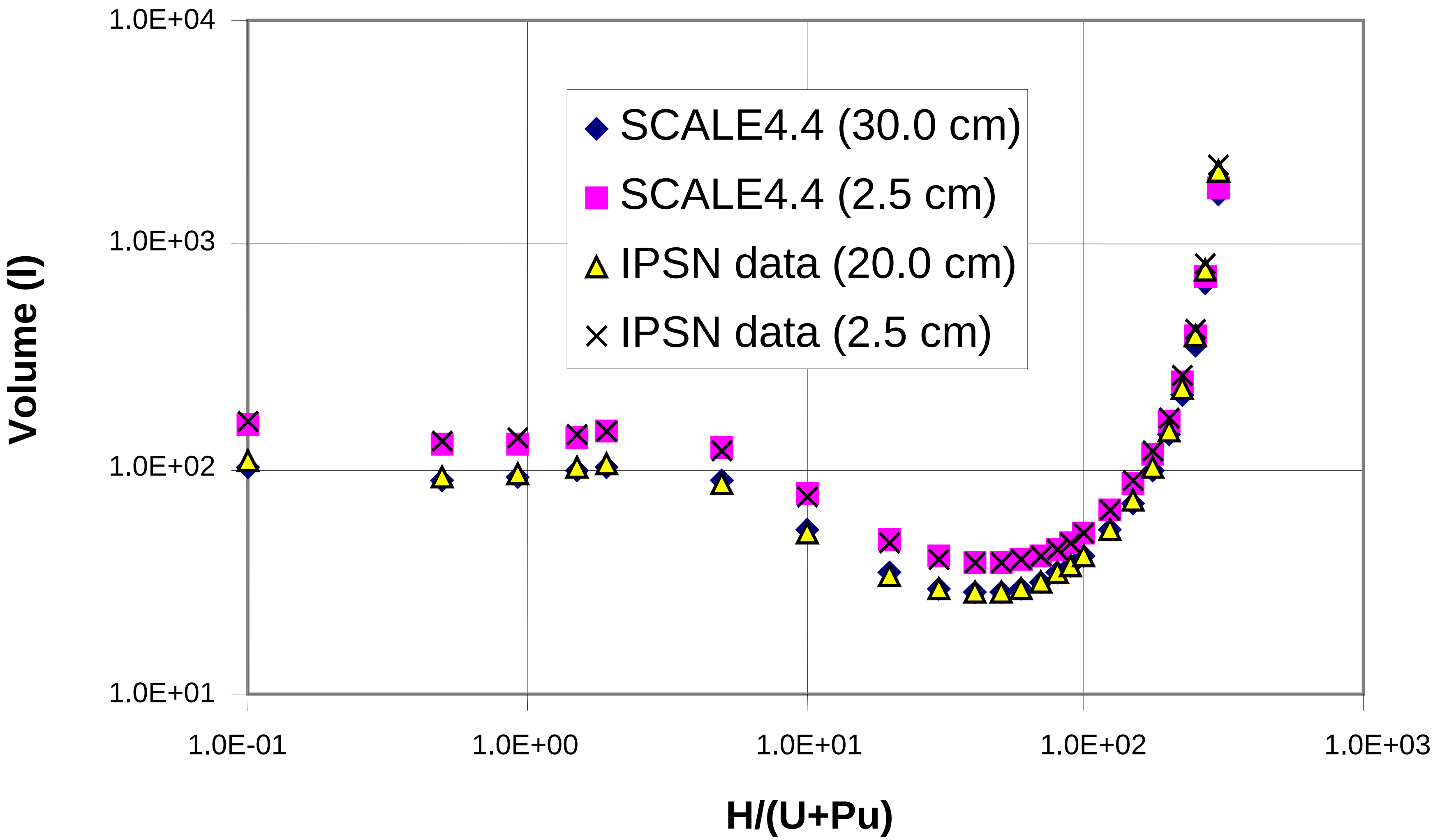

Fig. A.6.b.4. Sphere volume [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

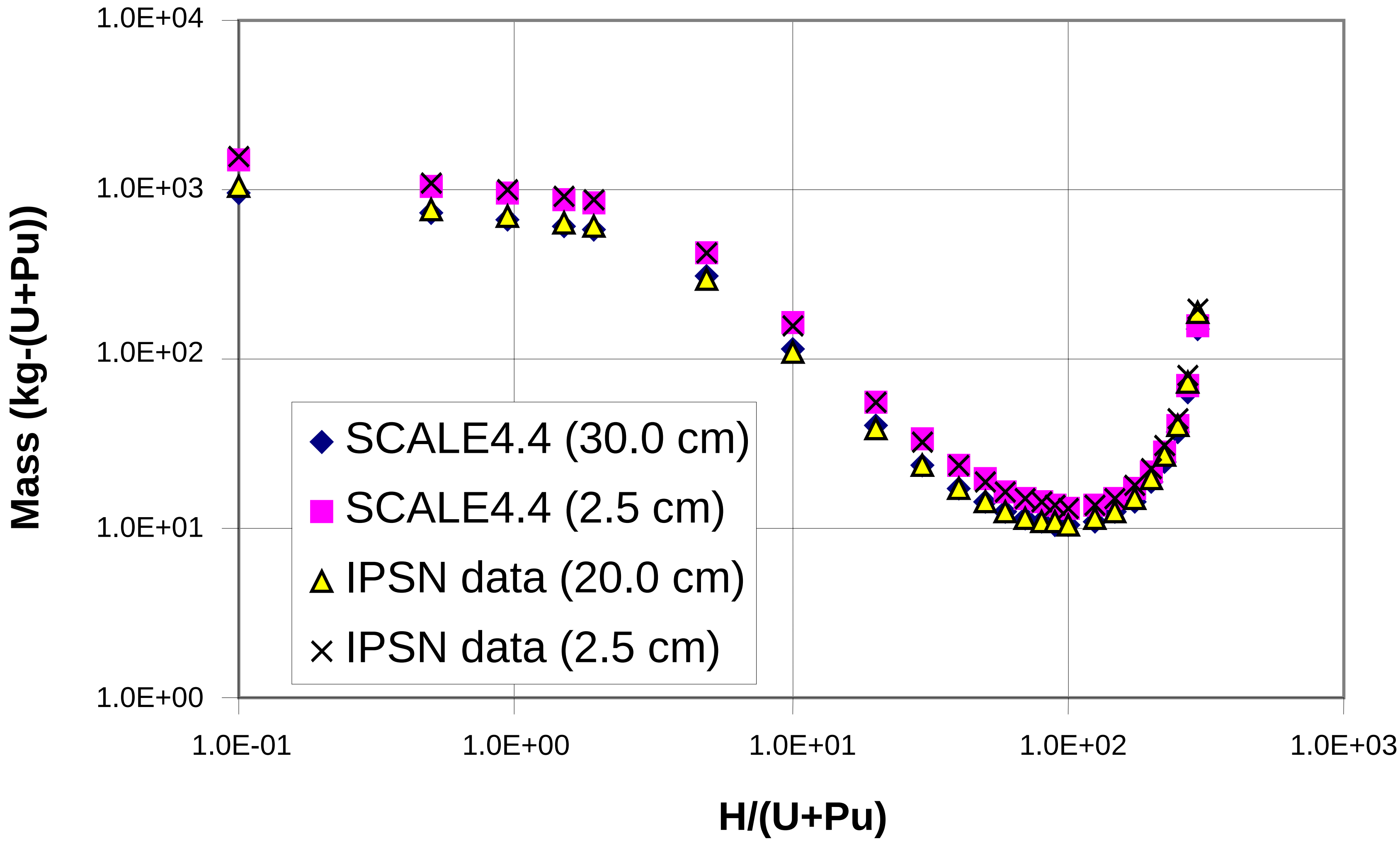

Fig. A.6.b.5. U + Pu mass [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

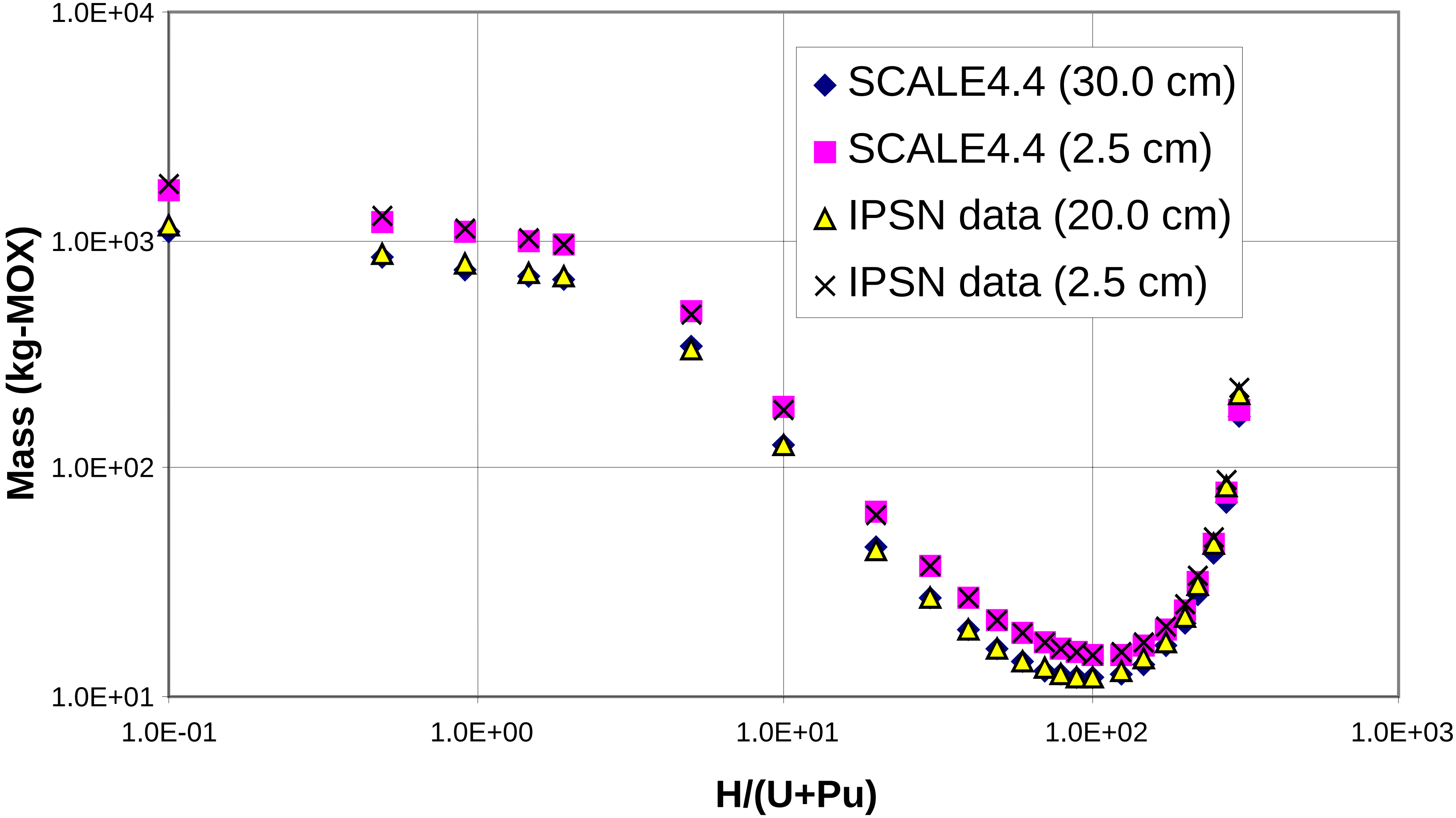

Fig. A.6.b.6. MOX mass [^{35}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

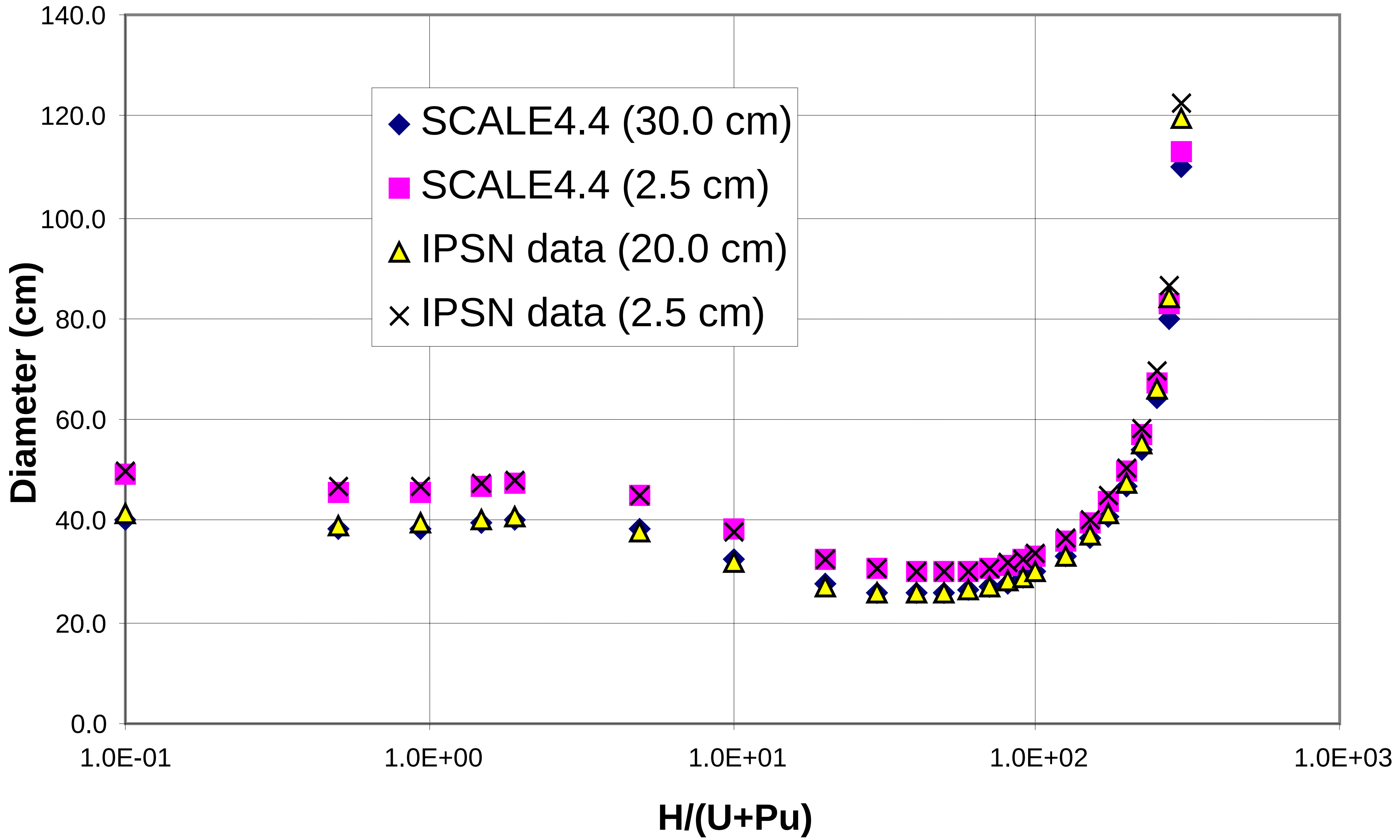

Fig. A.6.b.7-1. Cylinder diameter [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

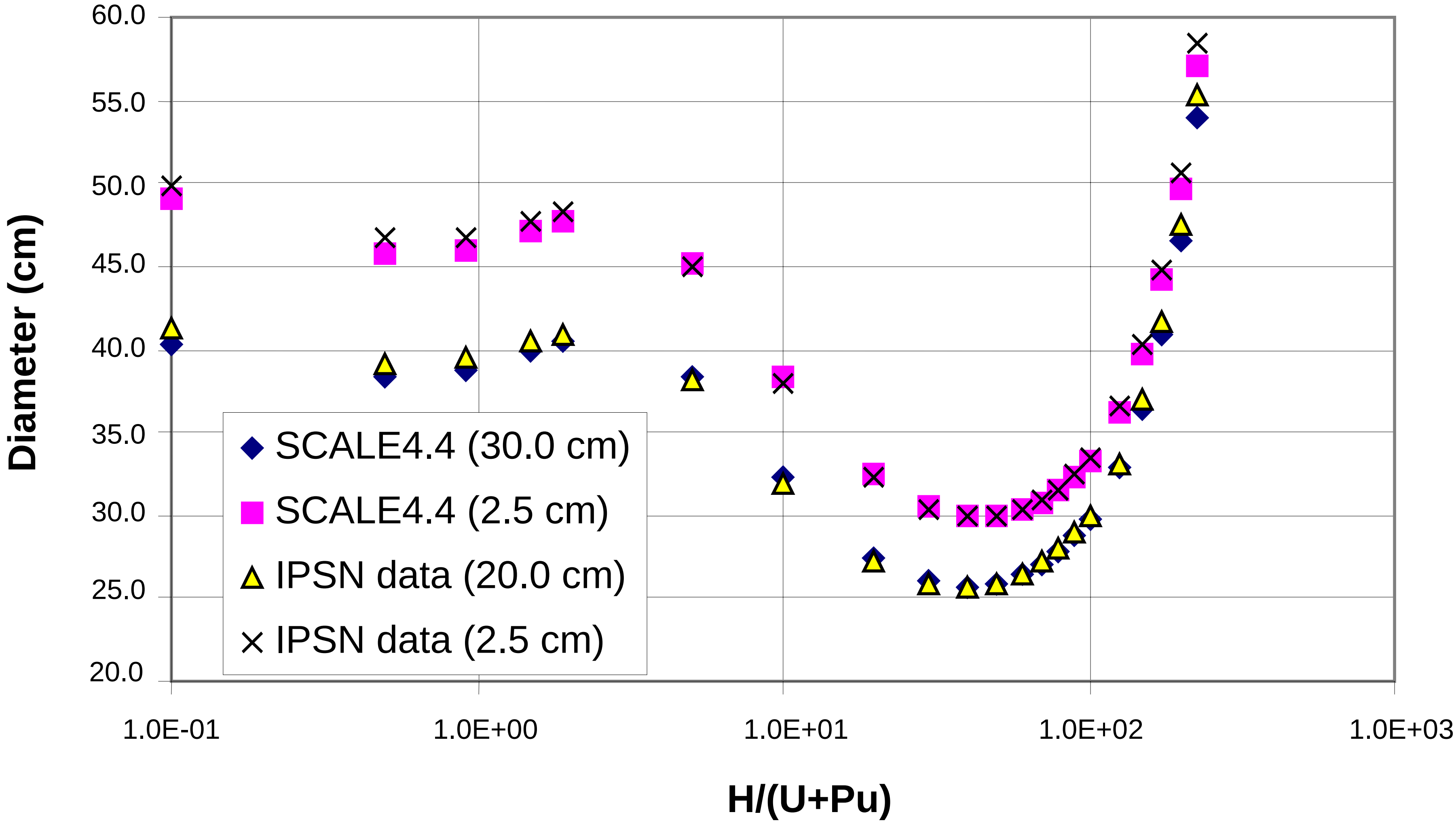

Fig. A.6.b.7-2. Cylinder diameter infinity [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

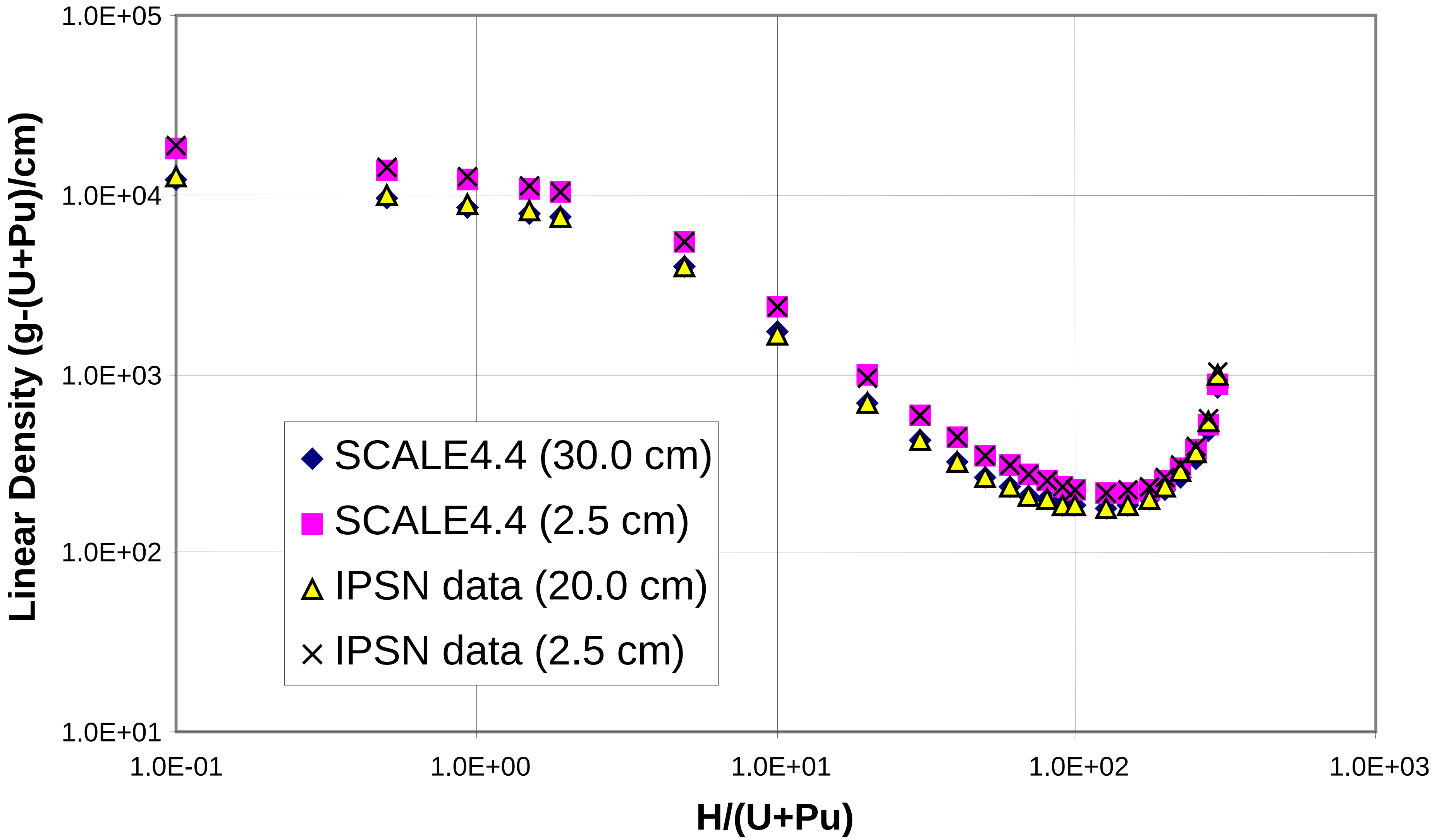

Fig. A.6.b.8. Linear density [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

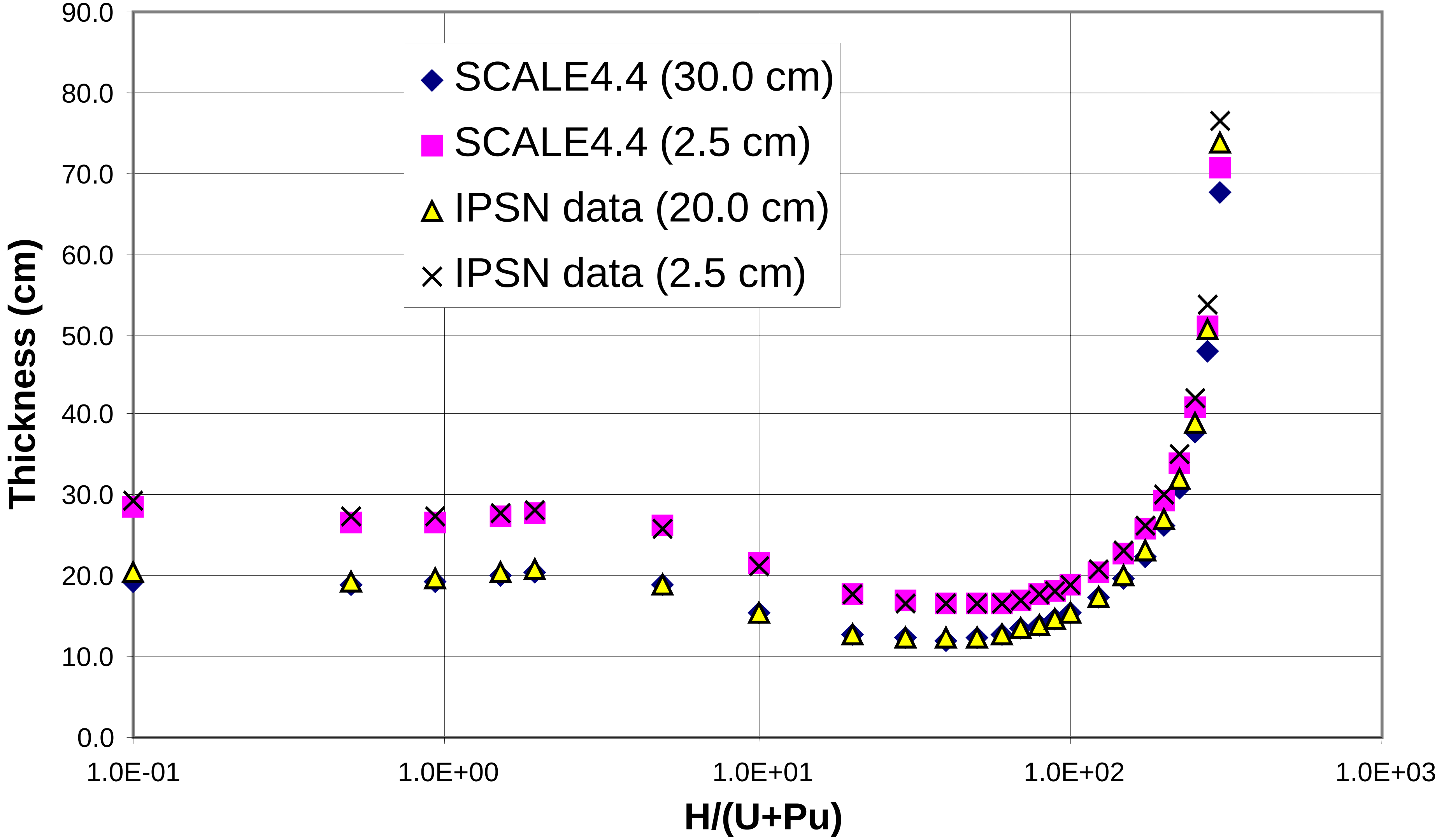

Fig. A.6.b.9-1. Slab thickness [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, void-free].

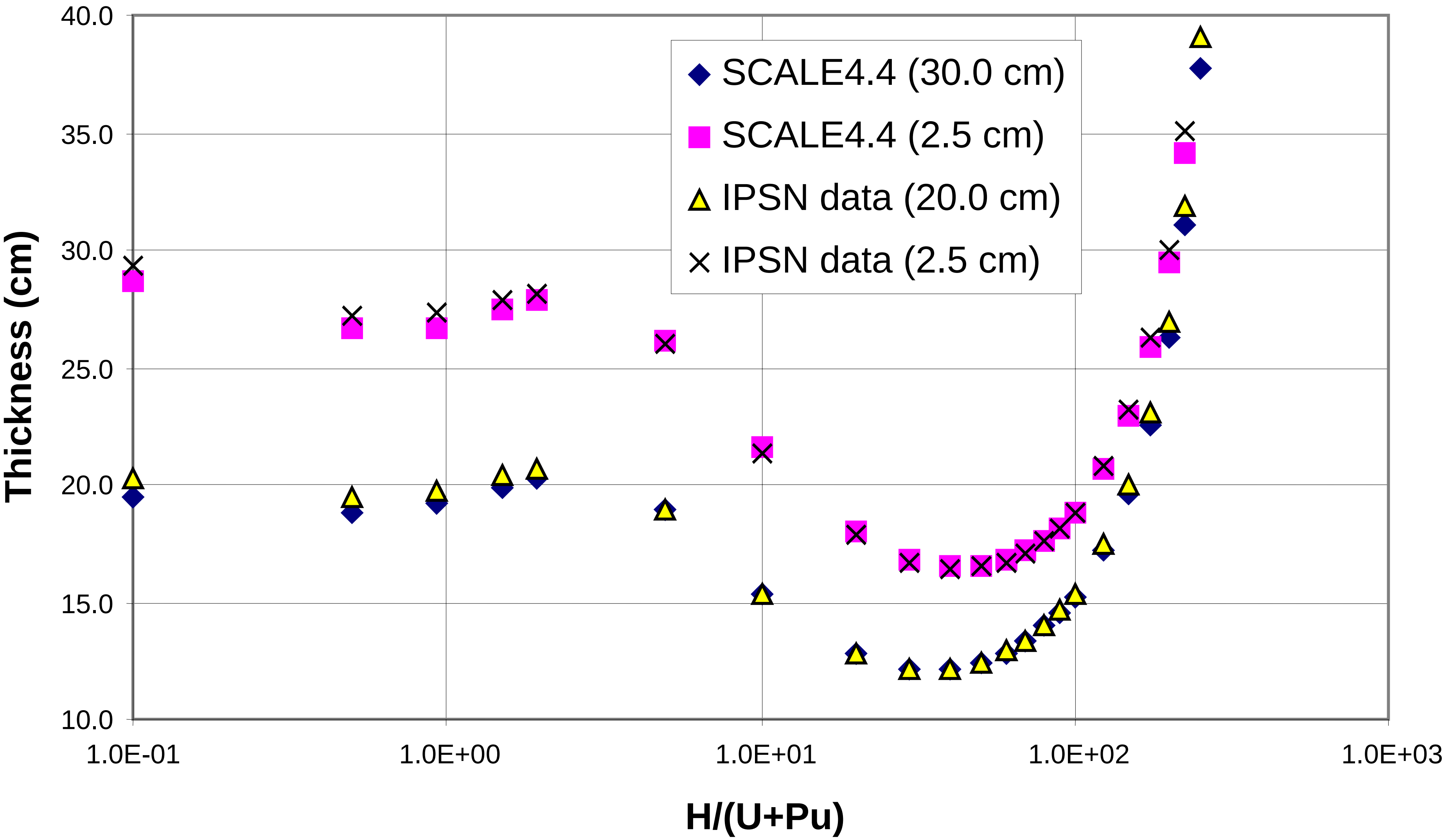

Fig. A.6.b.9-2. Slab thickness [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

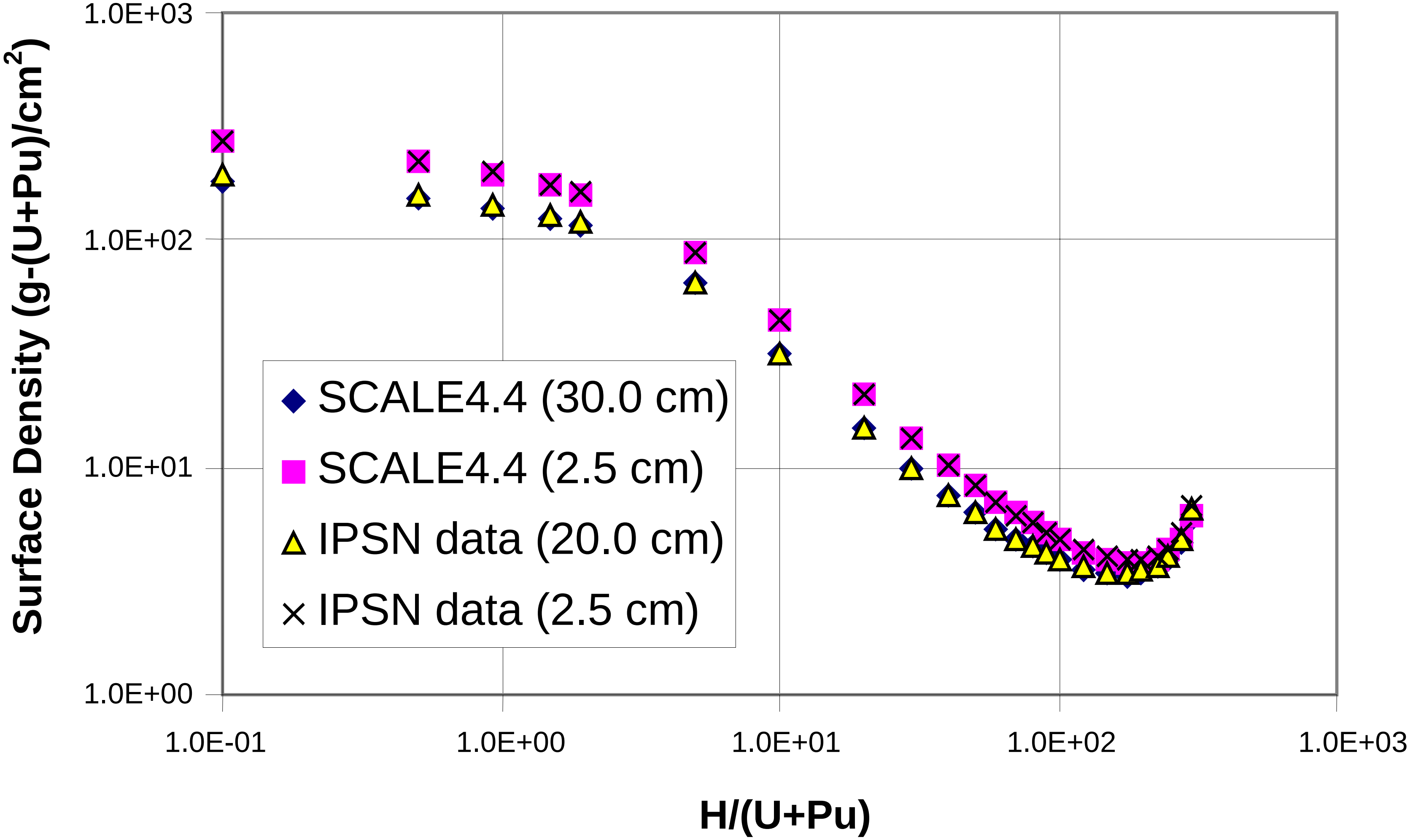

Fig. A.6.b.10. Surface density [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free].

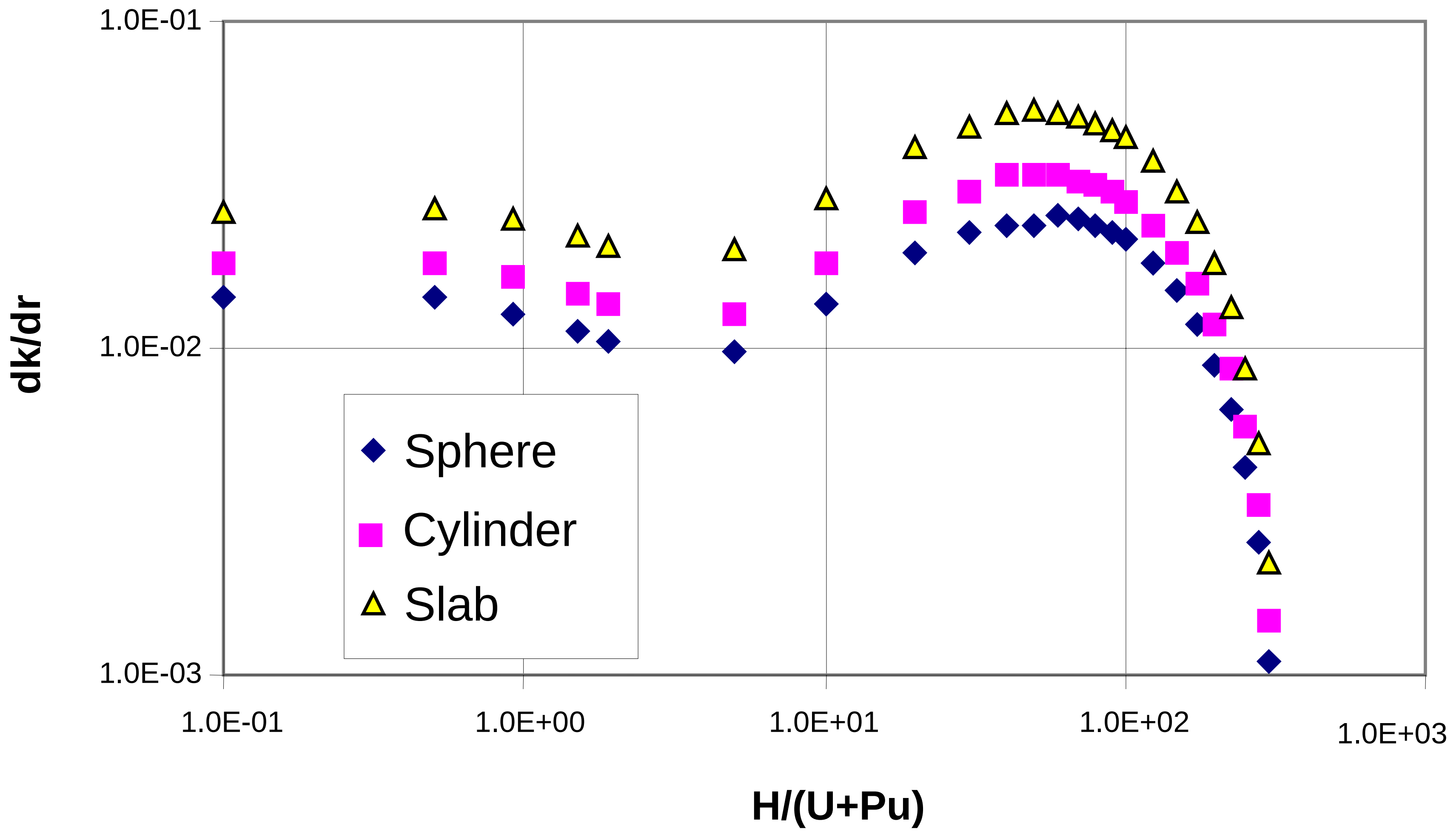

Fig. A.6.b.11. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 30.0 cm].

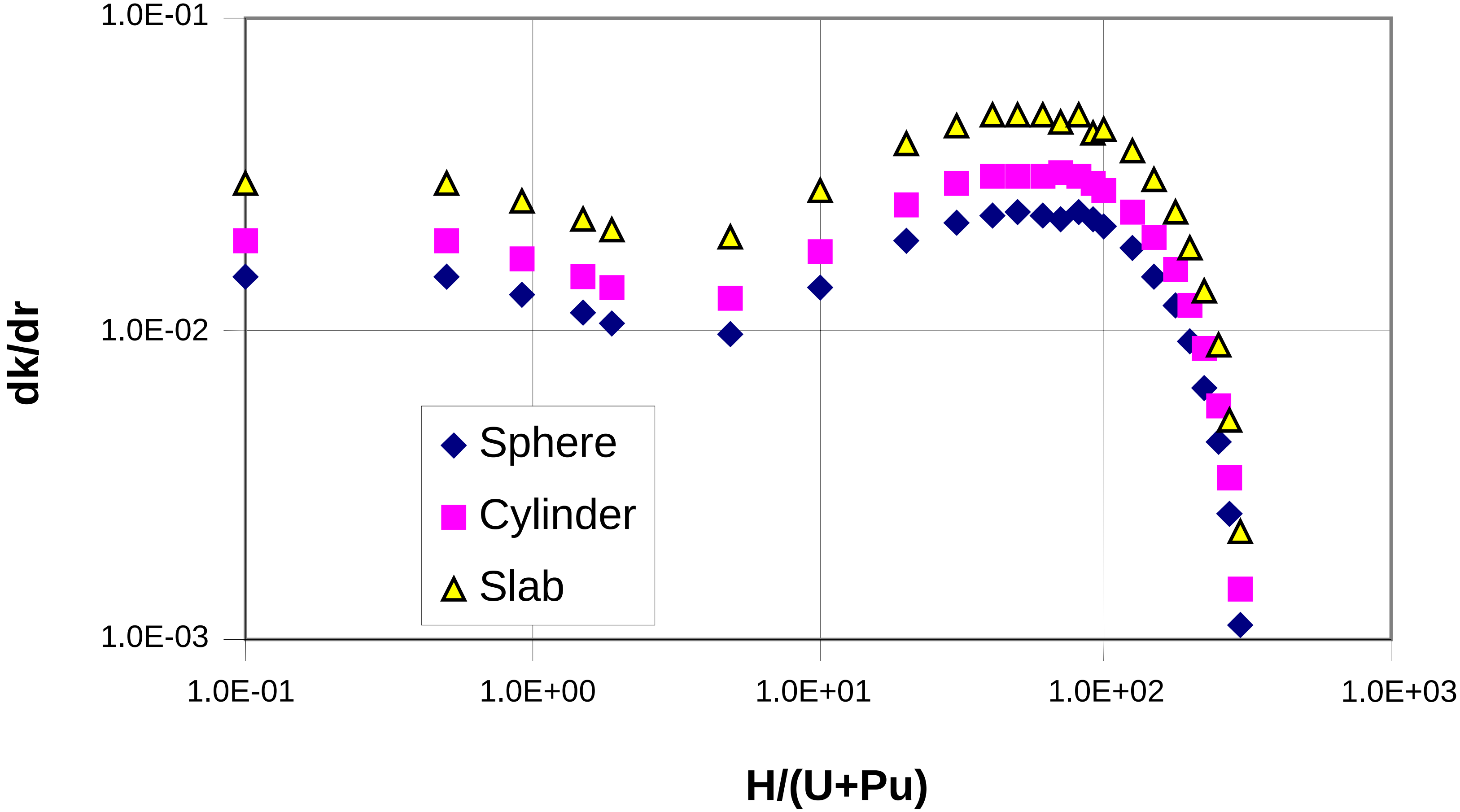

Fig. A.6.b.12. Comparison of delta lambda divided by delta dimension for geometry [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, void-free, water reflector: 2.5 cm].

Table A.6.c.1. MOX data [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5 % and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**65.883**	**20.000**	**12.941**	**1.176**

Fissile material oxide density
3.5 g (UO_2 + PuO_2)/cm^3

Water reflector
30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08554	3.50000	1.37946	7.315E-04	83.757	4.281E-03	2461.202	7594.130	8614.207	115.974	5.607E-03	32594.541	59.191	8.606E-03	182.637
0.5	1.64	3.08554	3.50000	1.33398	1.080E-03	70.357	4.960E-03	1458.831	4501.277	5105.909	97.719	6.519E-03	23140.814	50.289	1.003E-02	155.167
0.928	3.00	3.08554	3.50000	1.28854	1.377E-03	62.991	5.104E-03	1046.951	3230.404	3664.327	87.637	6.720E-03	18611.940	45.199	1.037E-02	139.462
1.5	4.76	3.08554	3.50000	1.24834	1.757E-03	56.413	5.169E-03	752.014	2320.368	2632.051	78.581	6.840E-03	14964.428	40.544	1.059E-02	125.101
1.916	6.00	3.08554	3.50000	1.23099	2.065E-03	52.333	5.337E-03	600.376	1852.481	2101.314	72.973	7.026E-03	12904.755	37.601	1.092E-02	116.019
5.84	16.29	3.08554	3.50000	1.22950	7.998E-03	26.877	1.074E-02	81.323	250.924	284.629	37.111	1.413E-02	3337.608	18.249	2.255E-02	56.309
10	25.00	2.07921	2.35850	1.27847	1.001E-02	23.520	1.371E-02	54.503	113.324	128.546	32.206	1.815E-02	1693.799	15.367	2.853E-02	31.950
20	40.00	1.16404	1.32040	1.36087	1.314E-02	20.163	1.951E-02	34.334	39.966	45.335	27.390	2.592E-02	685.890	12.771	4.104E-02	14.866
30	50.00	0.80827	0.91684	1.40134	1.458E-02	19.137	2.240E-02	29.358	23.729	26.916	25.998	2.979E-02	429.081	12.172	4.718E-02	9.839
40	57.14	0.61907	0.70223	1.41920	1.513E-02	**18.875**	2.364E-02	**28.169**	17.439	19.781	**25.710**	3.363E-02	321.381	**12.165**	5.251E-02	7.531
50	62.50	0.50164	0.56902	1.42410	1.522E-02	18.962	2.392E-02	28.559	14.326	16.251	25.920	3.404E-02	264.695	12.429	5.316E-02	6.235
60	66.67	0.42166	0.47830	1.42101	1.501E-02	19.245	2.544E-02	29.859	12.590	14.281	26.410	3.362E-02	230.991	12.843	5.246E-02	5.415
70	70.00	0.36368	0.41253	1.41278	1.464E-02	19.658	2.474E-02	31.820	11.572	13.127	27.084	3.267E-02	209.531	13.356	5.094E-02	4.857
80	72.73	0.31971	0.36265	1.40115	1.415E-02	20.167	2.380E-02	34.355	10.984	12.459	27.896	3.140E-02	195.405	13.944	4.888E-02	4.458
90	75.00	0.28523	0.32354	1.38724	1.359E-02	20.753	2.268E-02	37.441	10.679	12.114	28.820	2.992E-02	186.074	14.595	4.652E-02	4.163
100	76.92	0.25746	0.29204	1.37178	1.299E-02	21.410	2.147E-02	41.109	**10.584**	**12.005**	29.846	2.830E-02	180.129	15.261	4.410E-02	3.929
125	80.65	0.20707	0.23488	1.32944	1.139E-02	23.338	1.820E-02	53.246	11.026	12.507	32.834	2.395E-02	**175.325**	17.252	3.726E-02	3.572
150	83.33	0.17317	0.19643	1.28516	9.781E-03	25.707	1.494E-02	71.159	12.323	13.978	36.478	1.964E-02	180.981	19.652	3.048E-02	3.403
175	85.37	0.14881	0.16880	1.24114	8.208E-03	28.622	1.187E-02	98.212	14.615	16.578	40.949	1.559E-02	195.979	22.577	2.413E-02	**3.360**
200	86.96	0.13046	0.14798	1.19840	6.712E-03	32.292	8.860E-03	141.046	18.401	20.873	46.569	1.188E-02	222.213	26.236	1.834E-02	3.423
225	88.24	0.11627	0.13189	1.15745	5.296E-03	37.101	6.417E-03	213.919	24.872	28.213	53.927	8.572E-03	265.567	31.025	1.321E-02	3.607
250	89.29	0.10477	0.11884	1.11846	3.960E-03	43.813	4.298E-03	352.285	36.909	41.867	64.193	5.705E-03	339.076	37.705	8.762E-03	3.950
275	90.16	0.09534	0.10815	1.08152	2.712E-03	54.196	2.521E-03	666.796	63.572	72.112	80.074	3.326E-03	480.120	48.046	5.105E-03	4.581
300	90.91	0.08746	0.09921	1.04655	1.537E-03	73.876	1.114E-03	1688.907	147.712	167.553	110.185	1.463E-03	833.964	67.674	2.231E-03	5.919
325	91.550	0.08056	0.09138	1.01349												
330	91.667	0.07935	0.09001	1.00711												
335	91.781	0.07817	0.08867	1.00078												
336	**91.804**	**0.07794**	**0.08841**	**0.99954**												
337	91.826	0.07771	0.08815	0.99829												
338	91.848	0.07749	0.08790	0.99703												
339	91.870	0.07726	0.08764	0.99580												
340	91.892	0.07703	0.08738	0.99455												
350	92.106	0.07507	0.08515	0.98228												

* [grey shading] means the data are the same as the data of Table A.6.b.1.

Table A.6.c.2. MOX data [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5 % and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**65.883**	**20.000**	**12.941**	**1.176**

Fissile material oxide density
5.5 g ($UO_2 + PuO_2$)/cm^3

Water reflector
30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	4.84870	5.50000	1.37944	1.807E-03	54.337	6.952E-03	672.017	3258.410	3696.094	75.160	8.969E-03	21512.282	37.640	1.356E-02	182.504
0.5	1.64	4.84870	5.50000	1.33397	2.667E-03	45.608	8.078E-03	397.390	1926.827	2185.647	63.324	1.042E-02	15270.357	31.989	1.577E-02	155.105
0.928	3.00	4.84870	5.50000	1.28853	3.402E-03	40.856	8.372E-03	285.662	1385.091	1571.143	56.765	1.072E-02	12270.730	28.709	1.641E-02	139.201
1.5	4.76	4.84870	5.50000	1.24833	4.341E-03	36.614	8.308E-03	205.600	996.893	1130.800	50.940	1.097E-02	9881.733	25.814	1.661E-02	125.163
1.916	6.00	4.84870	5.50000	1.23098	5.100E-03	33.988	8.678E-03	164.465	797.441	904.557	47.311	1.148E-02	8523.923	23.939	1.712E-02	116.072
2.73	8.34	4.84870	5.50000	1.21472	6.924E-03	29.410	9.721E-03	106.559	516.674	586.076	40.917	1.267E-02	6375.501	20.547	1.903E-02	99.626
5	14.29	3.42594	3.88613	1.22069	7.620E-03	27.682	9.748E-03	88.850	304.395	345.282	38.332	1.285E-02	3953.599	18.958	2.000E-02	64.947
10	25.00	2.07921	2.35850	1.27847	1.001E-02	23.520	1.371E-02	54.503	113.324	128.546	32.206	1.815E-02	1693.799	15.367	2.853E-02	31.950
20	40.00	1.16404	1.32040	1.36087	1.314E-02	20.163	1.951E-02	34.334	39.966	45.335	27.390	2.592E-02	685.890	12.771	4.104E-02	14.866
30	50.00	0.80827	0.91684	1.40134	1.458E-02	19.137	2.240E-02	29.358	23.729	26.916	25.998	2.979E-02	429.081	12.172	4.718E-02	9.839
40	57.14	0.61907	0.70223	1.41920	1.513E-02	**18.875**	2.364E-02	**28.169**	17.439	19.781	**25.710**	3.363E-02	321.381	**12.165**	5.251E-02	7.531
50	62.50	0.50164	0.56902	1.42410	1.522E-02	18.962	2.392E-02	28.559	14.326	16.251	25.920	3.404E-02	264.695	12.429	5.316E-02	6.235
60	66.67	0.42166	0.47830	1.42101	1.501E-02	19.245	2.544E-02	29.859	12.590	14.281	26.410	3.362E-02	230.991	12.843	5.246E-02	5.415
70	70.00	0.36368	0.41253	1.41278	1.464E-02	19.658	2.474E-02	31.820	11.572	13.127	27.084	3.267E-02	209.531	13.356	5.094E-02	4.857
80	72.73	0.31971	0.36265	1.40115	1.415E-02	20.167	2.380E-02	34.355	10.984	12.459	27.896	3.140E-02	195.405	13.944	4.888E-02	4.458
90	75.00	0.28523	0.32354	1.38724	1.359E-02	20.753	2.268E-02	37.441	10.679	12.114	28.820	2.992E-02	186.074	14.595	4.652E-02	4.163
100	76.92	0.25746	0.29204	1.37178	1.299E-02	21.410	2.147E-02	41.109	**10.584**	**12.005**	29.846	2.830E-02	180.129	15.261	4.410E-02	3.929
125	80.65	0.20707	0.23488	1.32944	1.139E-02	23.338	1.820E-02	53.246	11.026	12.507	32.834	2.395E-02	**175.325**	17.252	3.726E-02	3.572
150	83.33	0.17317	0.19643	1.28516	9.781E-03	25.707	1.494E-02	71.159	12.323	13.978	36.478	1.964E-02	180.981	19.652	3.048E-02	3.403
175	85.37	0.14881	0.16880	1.24114	8.208E-03	28.622	1.187E-02	98.212	14.615	16.578	40.949	1.559E-02	195.979	22.577	2.413E-02	**3.360**
200	86.96	0.13046	0.14798	1.19840	6.712E-03	32.292	8.860E-03	141.046	18.401	20.873	46.569	1.188E-02	222.213	26.236	1.834E-02	3.423
225	88.24	0.11627	0.13189	1.15745	5.296E-03	37.101	6.417E-03	213.919	24.872	28.213	53.927	8.572E-03	265.567	31.025	1.321E-02	3.607
250	89.29	0.10477	0.11884	1.11846	3.960E-03	43.813	4.298E-03	352.285	36.909	41.867	64.193	5.705E-03	339.076	37.705	8.762E-03	3.950
275	90.16	0.09534	0.10815	1.08152	2.712E-03	54.196	2.521E-03	666.796	63.572	72.112	80.074	3.326E-03	480.120	48.046	5.105E-03	4.581
300	90.91	0.08746	0.09921	1.04655	1.537E-03	73.876	1.114E-03	1688.907	147.712	167.553	110.185	1.463E-03	833.964	67.674	2.231E-03	5.919
325	91.550	0.08056	0.09138	1.01349												
330	91.667	0.07935	0.09001	1.00711												
335	91.781	0.07817	0.08867	1.00078												
336	91.804	0.07794	0.08841	0.99954												
337	91.826	0.07771	0.08815	0.99829												
338	91.848	0.07749	0.08790	0.99703												
339	91.870	0.07726	0.08764	0.99580												
340	91.892	0.07703	0.08738	0.99455												
350	92.106	0.07507	0.08515	0.98228												

* (grey shading) means the data are the same as the data of Table A.6.b.1.

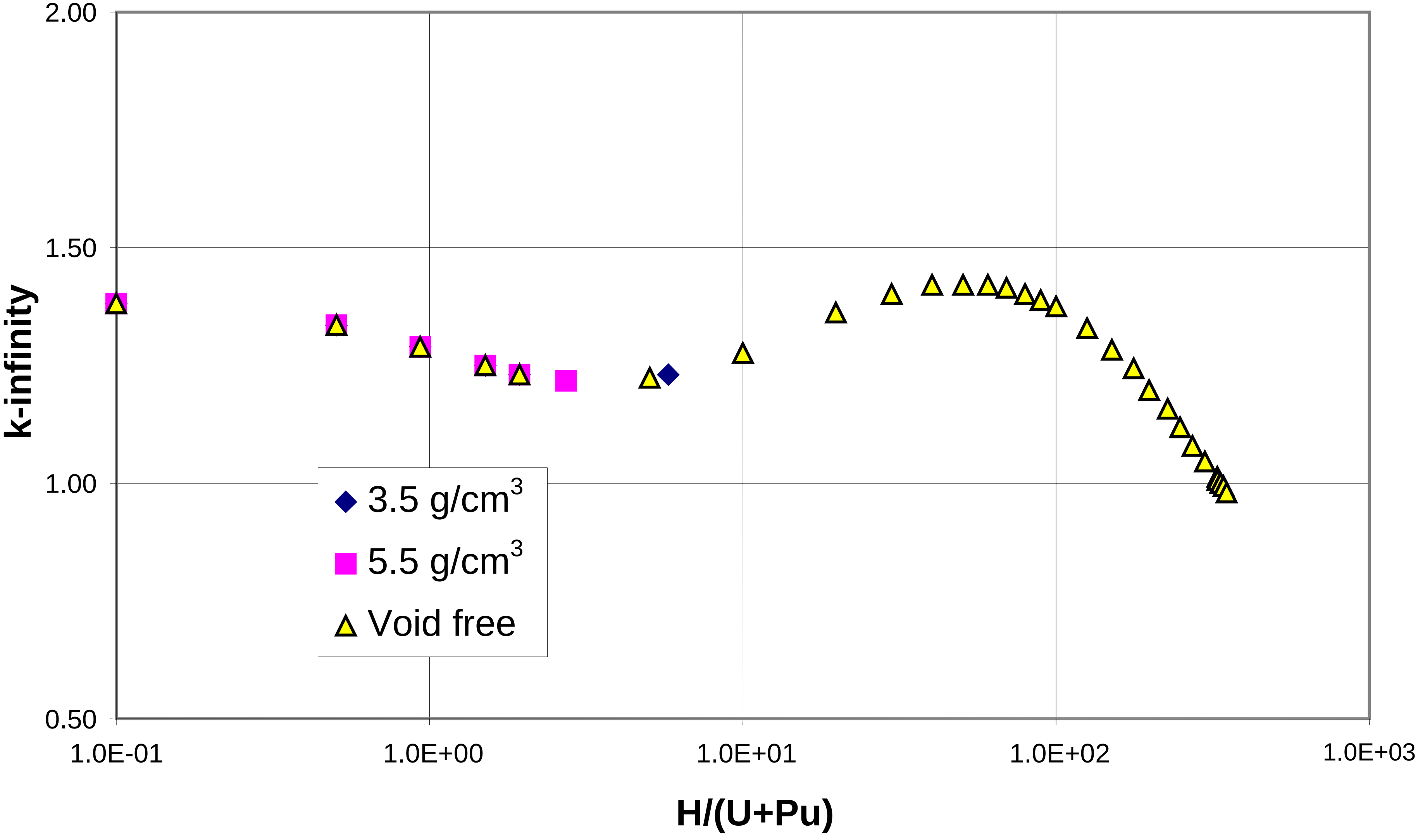

Fig. A.6.c.1. ***k*-infinity [^{235}U/U =0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%].**

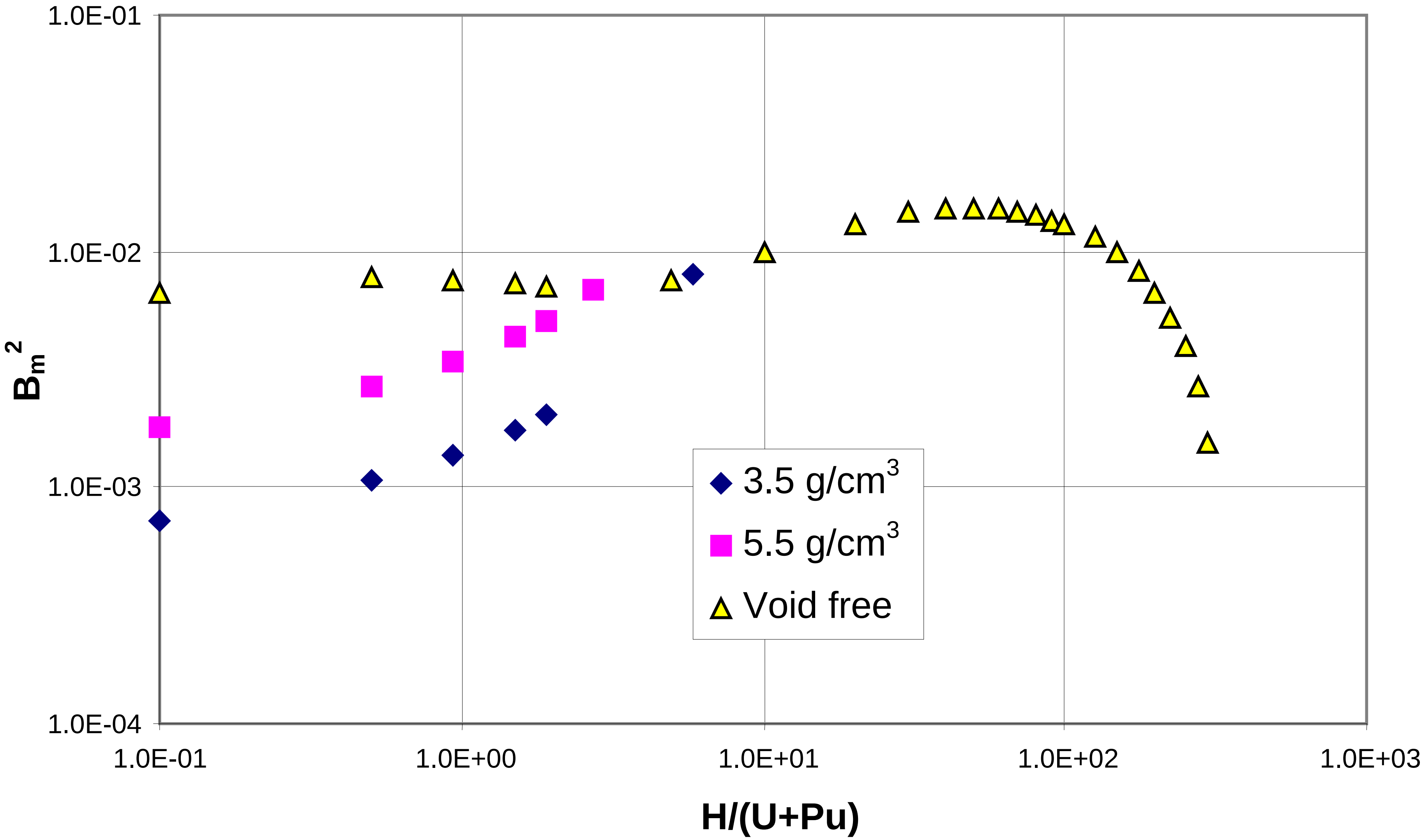

Fig. A.6.c.2. B_m^2 [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%].

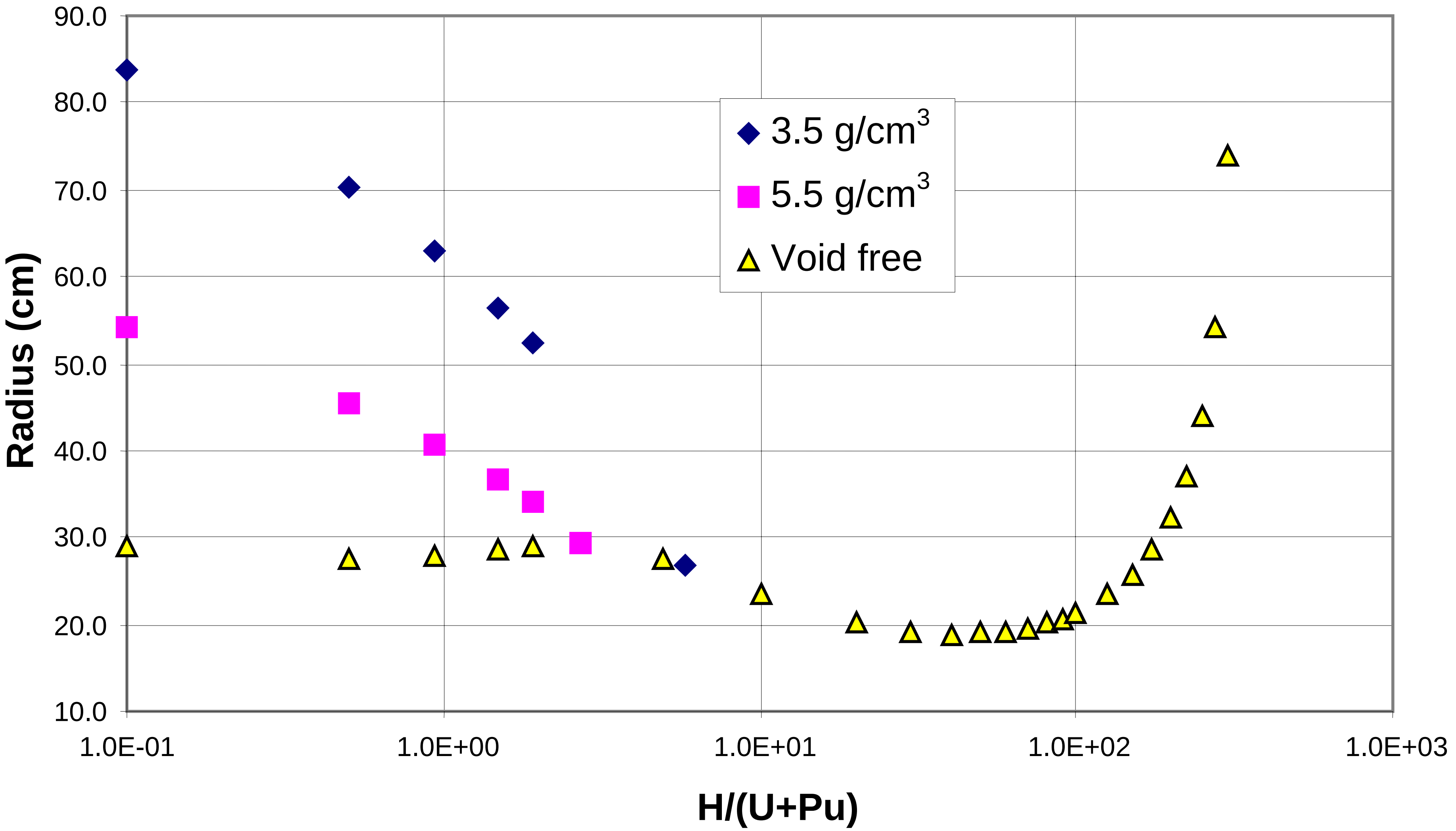

Fig. A.6.c.3. Sphere radius [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm]

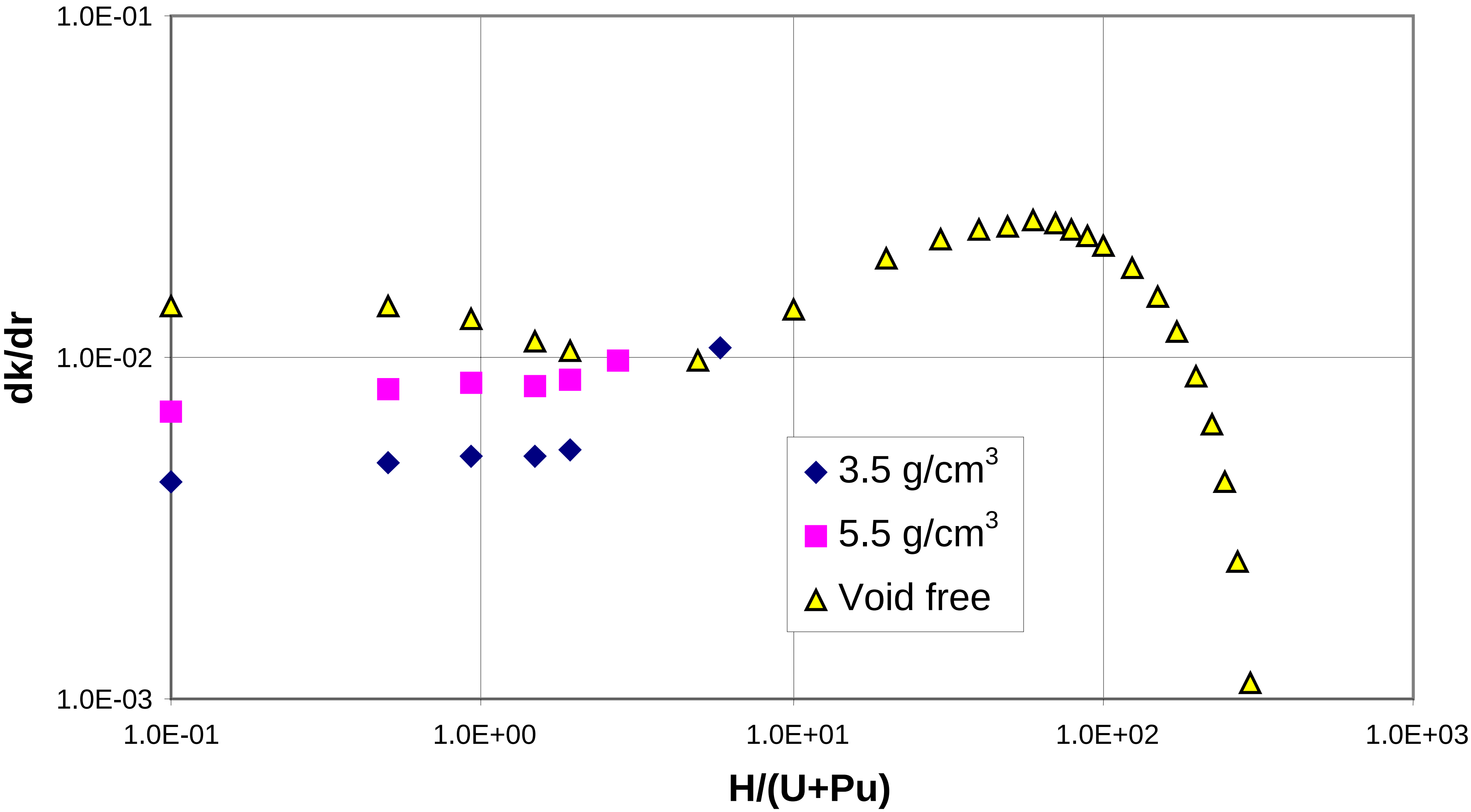

Fig. A.6.c.4. Delta lambda divided by delta dimension [sphere, ^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

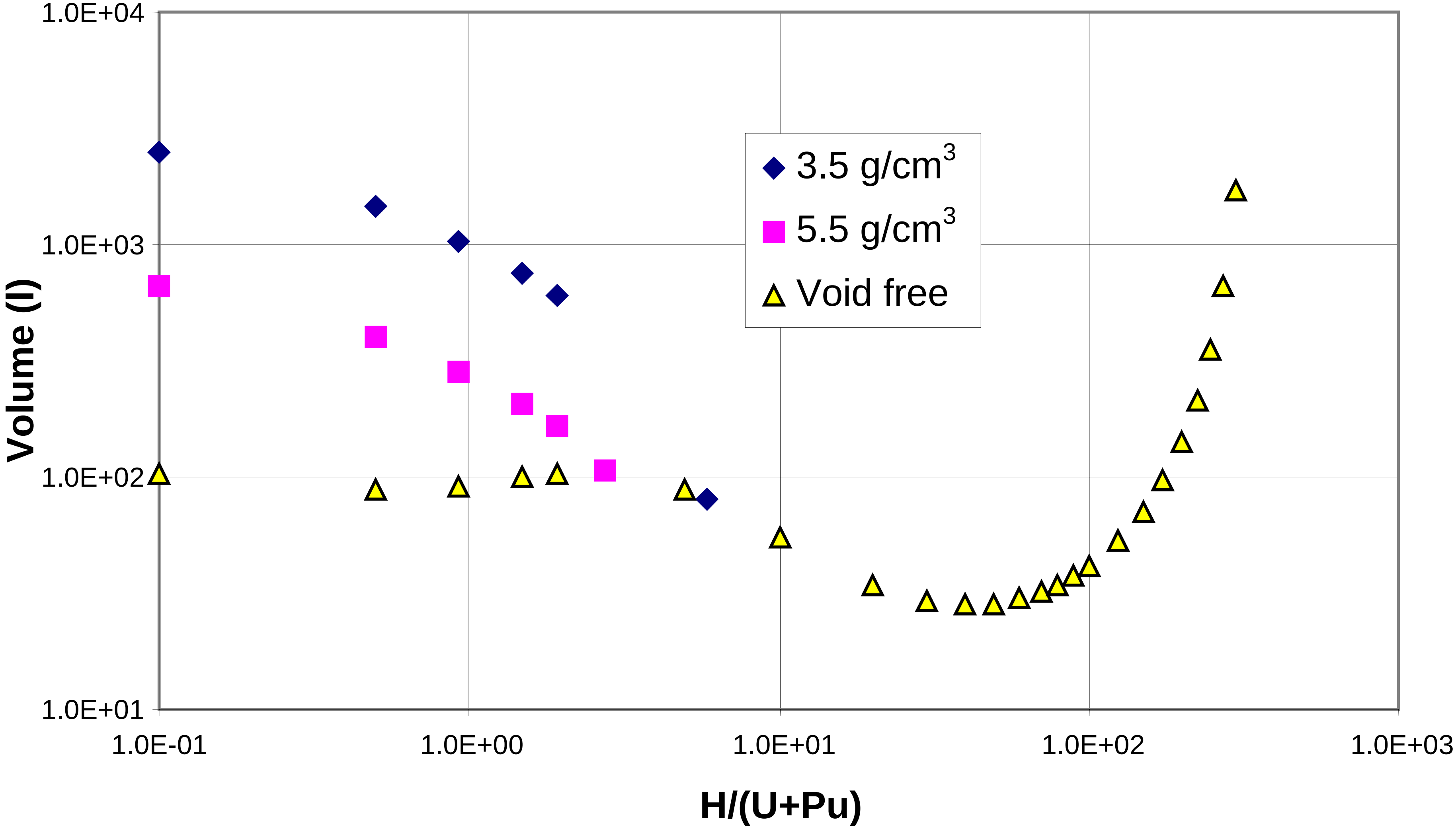

Fig. A.6.c.5. Sphere volume [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

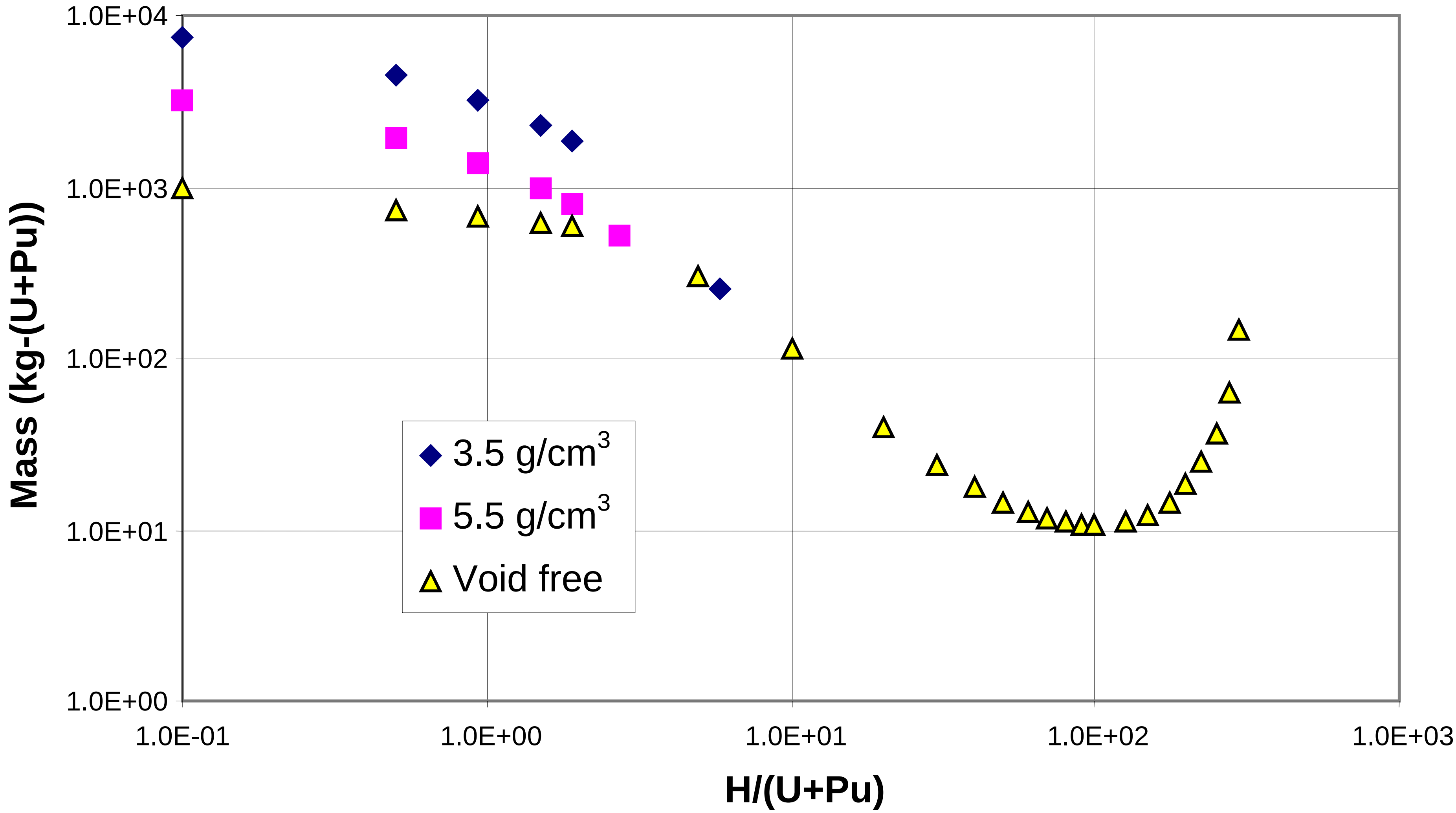

Fig. A.6.c.6. U + Pu mass [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

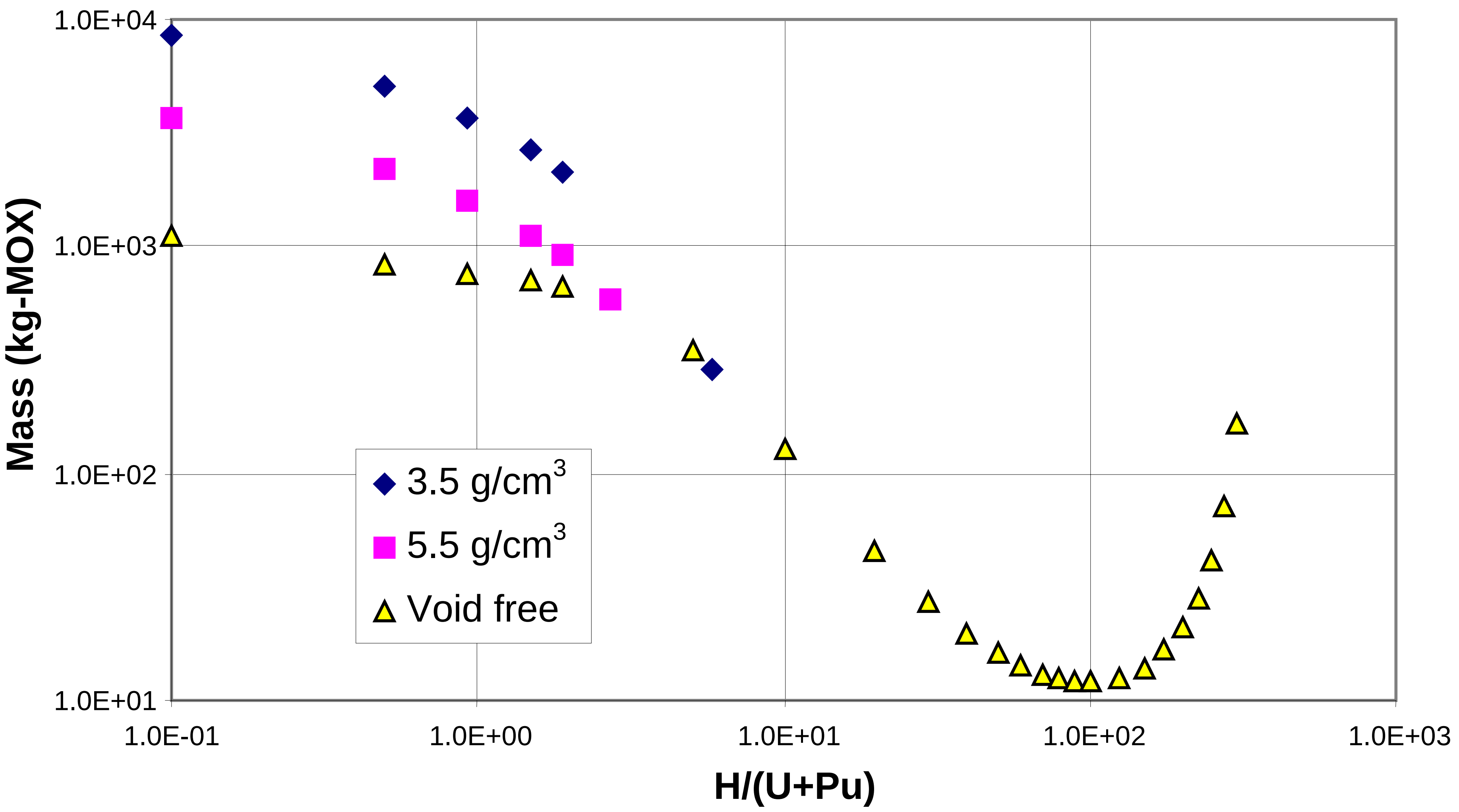

Fig. A.6.c.7. MOX mass [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

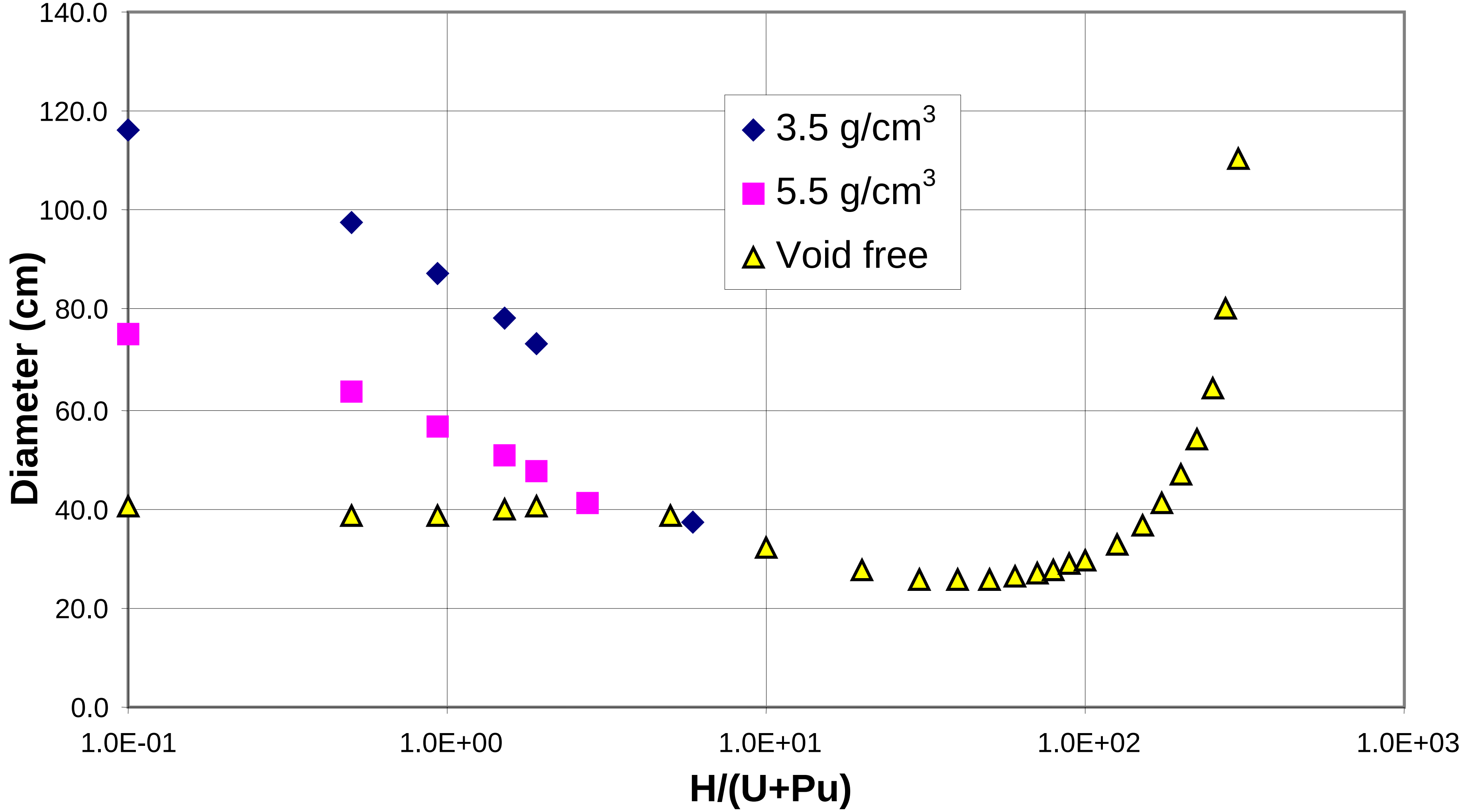

Fig. A.6.c.8. Cylinder diameter [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

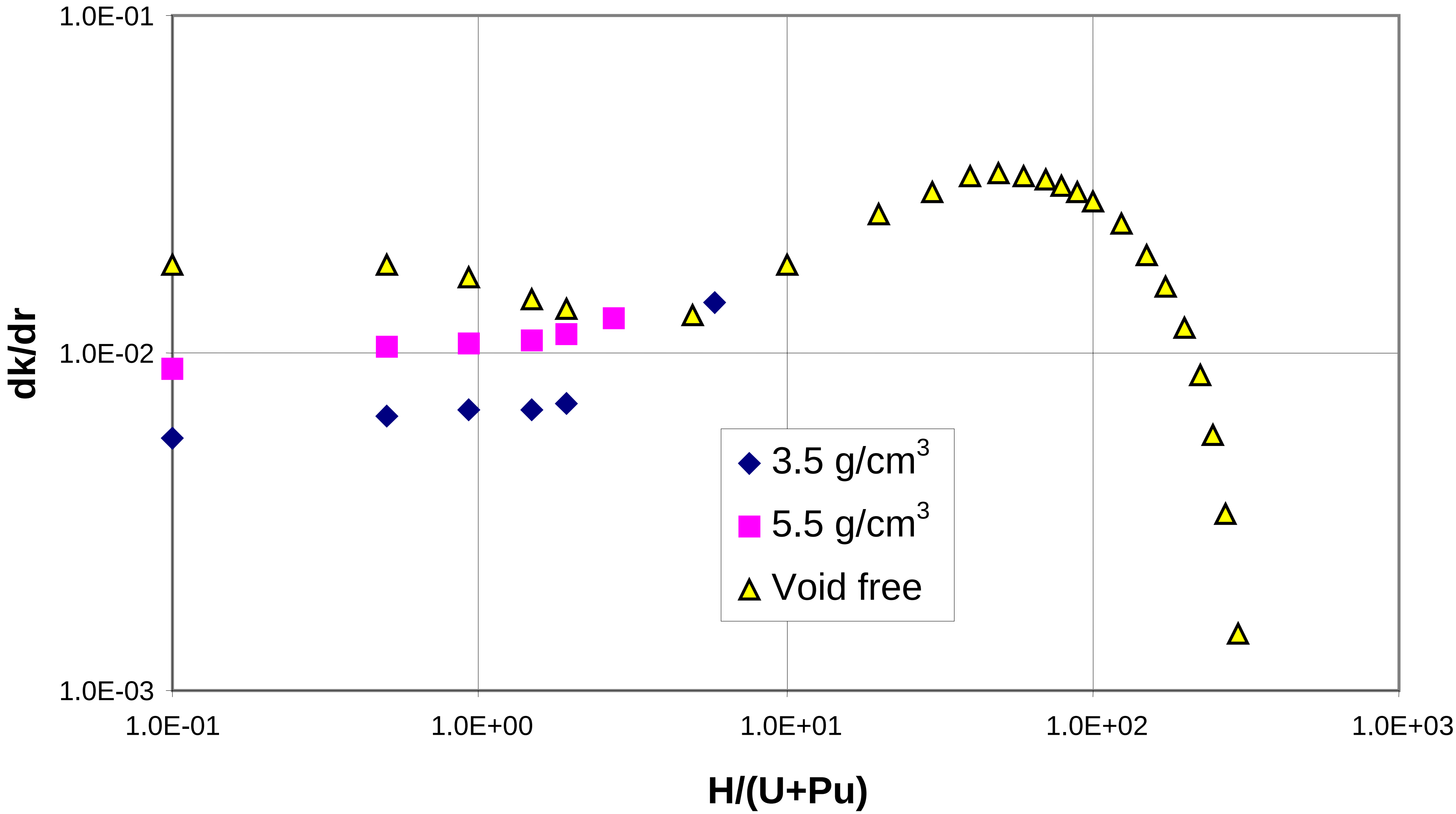

Fig. A.6.c.9. Delta lambda divided by delta dimension [cylinder, $^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

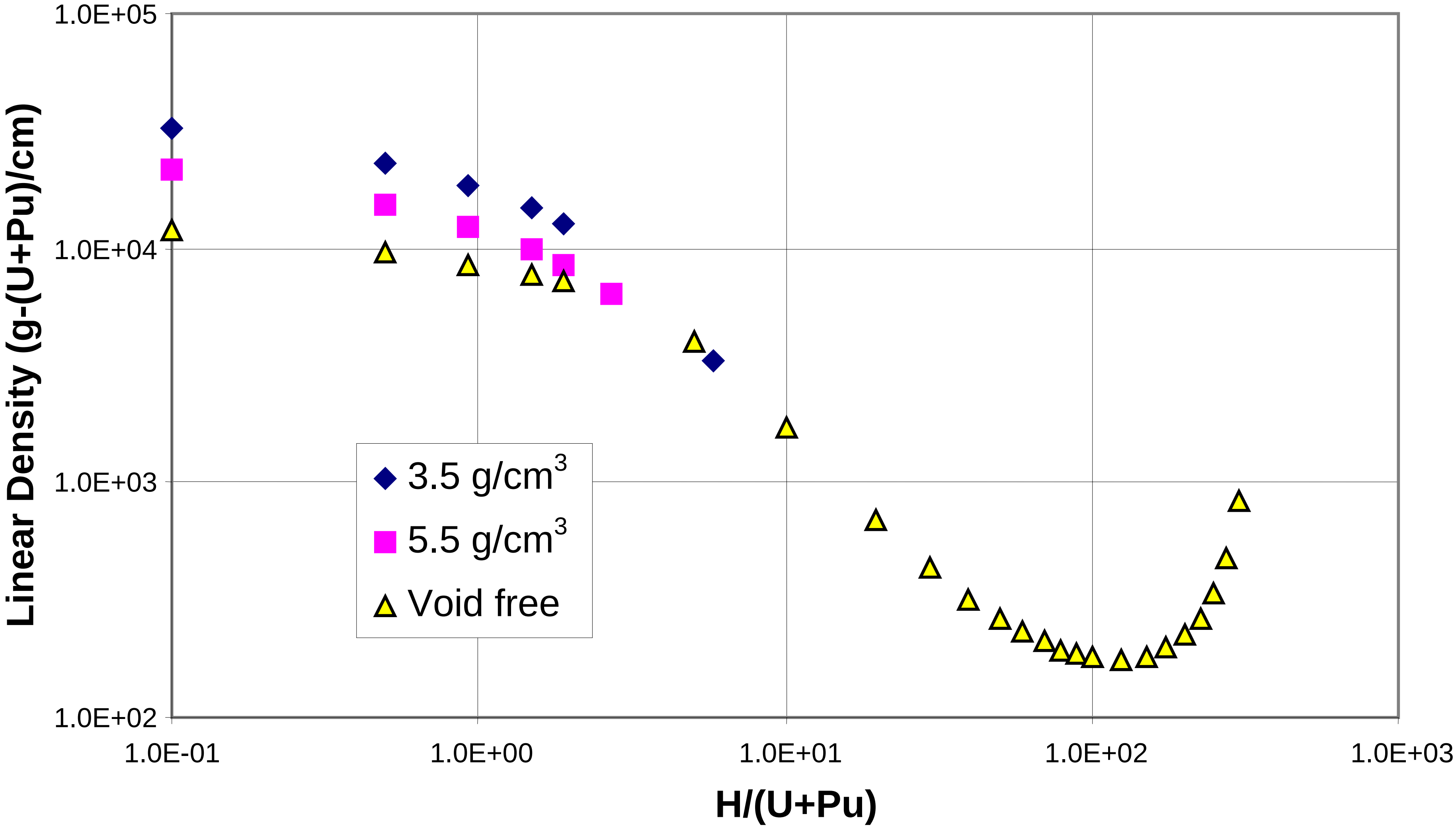

Fig. A.6.c.10. Linear density [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

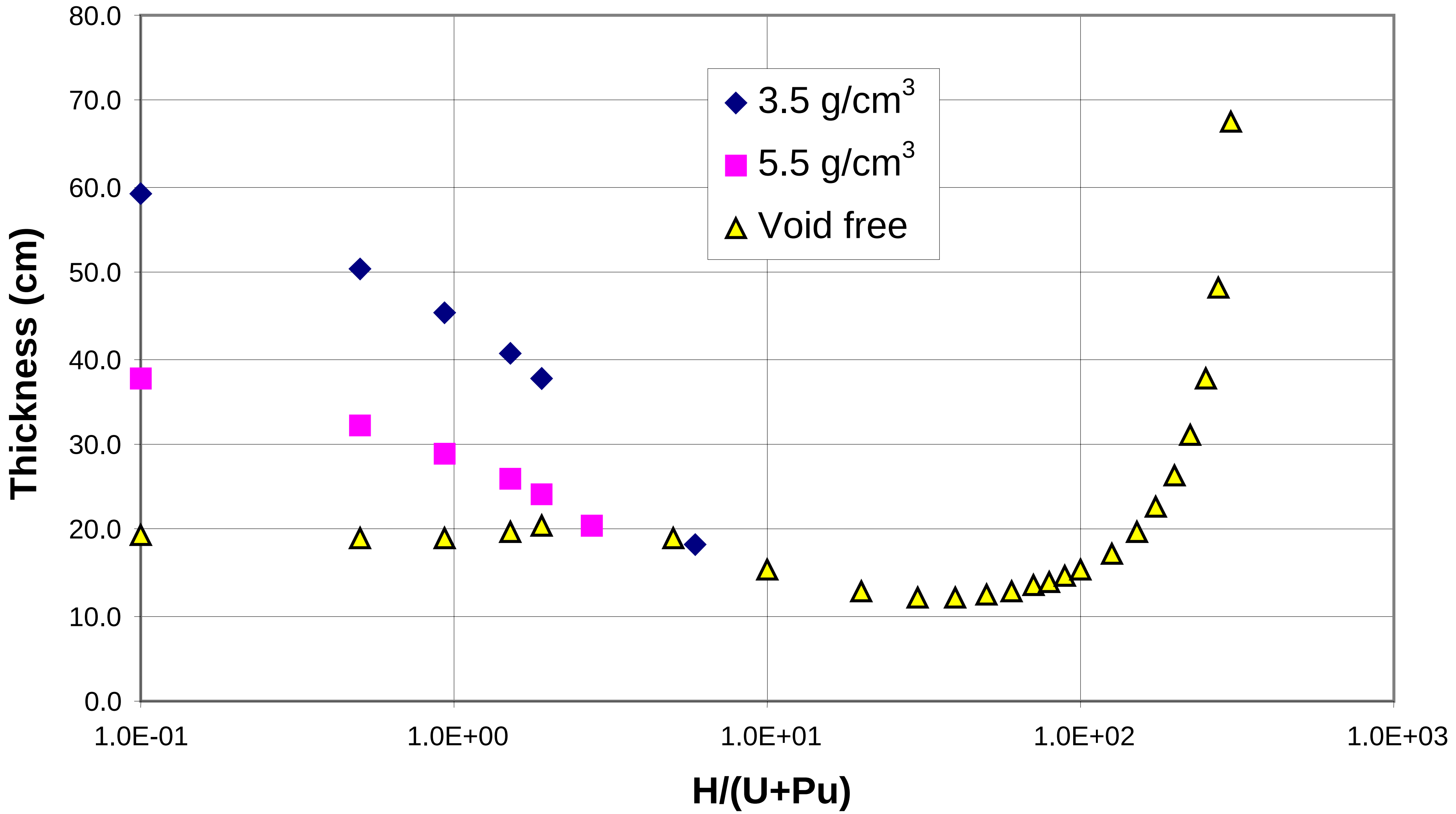

Fig. A.6.c.11. Slab thickness [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

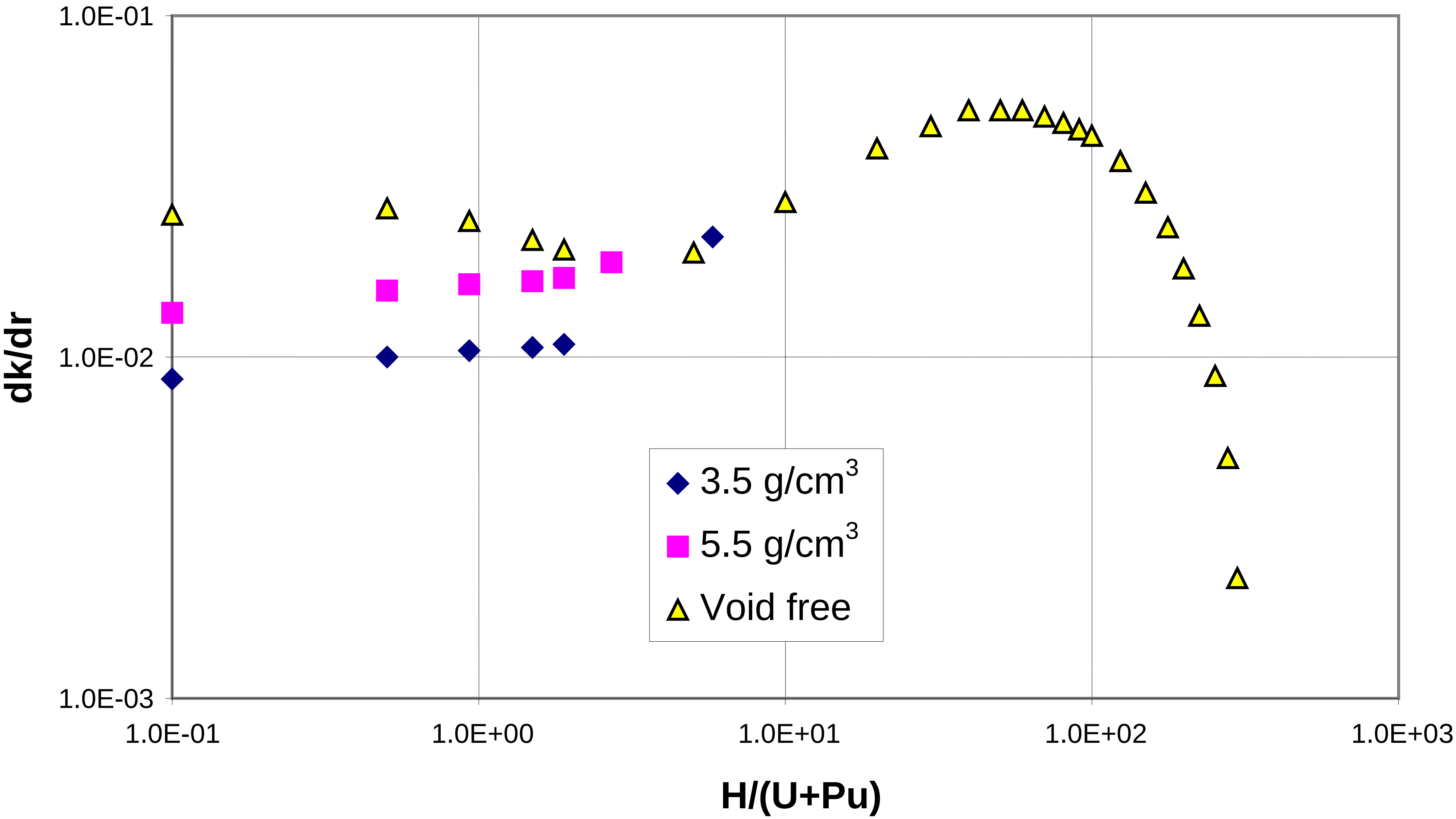

Fig. A.6.c.12. Delta lambda divided by delta dimension [slab, ^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

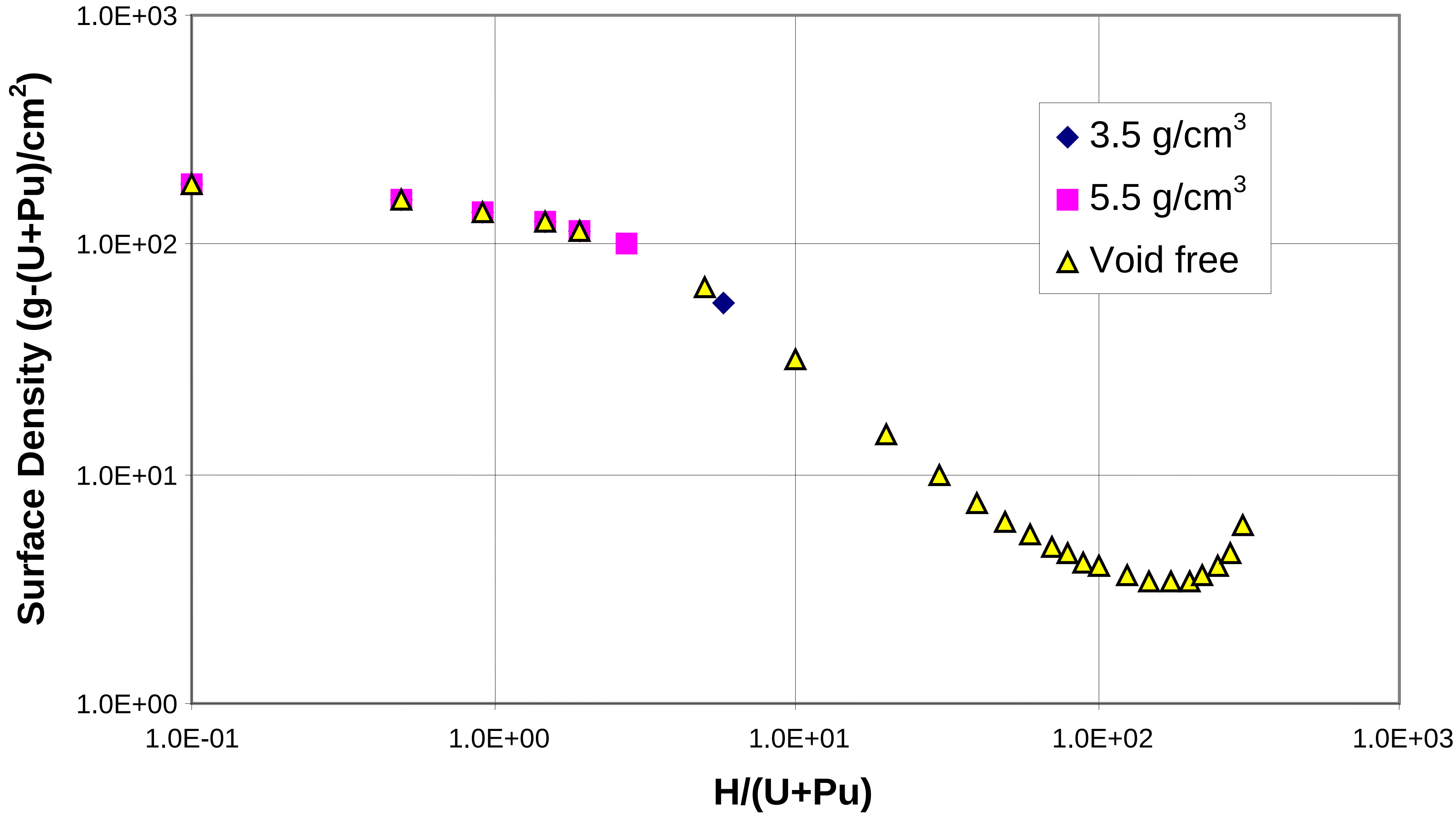

Fig. A.6.c.13. Surface density [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 30.0 cm].

Table A.6.d.1. MOX data [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**65.883**	**20.000**	**12.941**	**1.176**

Fissile material oxide density
3.5 g ($UO_2 + PuO_2$)/cm^3

Water reflector
2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08554	3.50000	1.37946	7.315E-04	101.123	4.740E-03	4331.501	13365.006	15160.254	148.111	6.168E-03	53160.968	87.128	9.439E-03	268.837
0.5	1.64	3.08554	3.50000	1.33398	1.080E-03	83.024	5.314E-03	2397.165	7396.542	8390.079	121.385	6.930E-03	35707.012	71.082	1.067E-02	219.327
0.928	3.00	3.08554	3.50000	1.28854	1.377E-03	73.549	5.343E-03	1666.559	5142.229	5832.957	107.487	6.987E-03	27998.145	62.888	1.079E-02	194.044
1.5	4.76	3.08554	3.50000	1.24834	1.757E-03	65.221	5.342E-03	1162.109	3585.731	4067.383	95.335	7.002E-03	22025.386	55.818	1.077E-02	172.228
1.916	6.00	3.08554	3.50000	1.23099	2.065E-03	60.201	5.484E-03	913.889	2819.837	3198.610	88.033	7.141E-03	18780.607	51.521	1.105E-02	158.971
5.84	16.29	3.08554	3.50000	1.22950	7.998E-03	30.216	1.067E-02	115.554	356.547	404.440	43.919	1.439E-02	4674.311	25.232	2.086E-02	77.855
10	25.00	2.07921	2.35850	1.27847	1.001E-02	26.521	1.348E-02	78.134	162.456	184.278	38.286	1.775E-02	2393.667	21.613	2.770E-02	44.937
20	40.00	1.16404	1.32040	1.36087	1.314E-02	22.667	1.912E-02	48.783	56.786	64.413	32.464	2.526E-02	963.522	17.954	3.961E-02	20.899
30	50.00	0.80827	0.91684	1.40134	1.458E-02	21.385	2.196E-02	40.963	33.109	37.557	30.552	2.904E-02	592.559	16.810	4.557E-02	13.587
40	57.14	0.61907	0.70223	1.41920	1.513E-02	20.964	2.319E-02	38.595	23.893	27.103	29.943	3.068E-02	435.928	**16.495**	4.810E-02	10.211
50	62.50	0.50164	0.56902	1.42410	1.522E-02	**20.943**	2.349E-02	**38.476**	19.301	21.894	**29.933**	3.108E-02	353.011	16.526	4.874E-02	8.290
60	66.67	0.42166	0.47830	1.42101	1.501E-02	21.147	2.322E-02	39.612	16.703	18.946	30.262	3.071E-02	303.287	16.769	4.816E-02	7.071
70	70.00	0.36368	0.41253	1.41278	1.464E-02	21.498	2.258E-02	41.620	15.137	17.170	30.812	3.224E-02	271.182	17.150	4.680E-02	6.237
80	72.73	0.31971	0.36265	1.40115	1.415E-02	21.959	2.355E-02	44.354	14.180	16.085	31.526	3.102E-02	249.562	17.599	4.826E-02	5.626
90	75.00	0.28523	0.32354	1.38724	1.359E-02	22.507	2.247E-02	47.754	13.621	15.451	32.370	2.959E-02	234.728	18.161	4.289E-02	5.180
100	76.92	0.25746	0.29204	1.37178	1.299E-02	23.131	2.128E-02	51.841	**13.347**	**15.140**	33.329	2.801E-02	224.623	18.797	4.353E-02	4.839
125	80.65	0.20707	0.23488	1.32944	1.139E-02	24.999	1.807E-02	65.442	13.551	15.371	36.191	2.377E-02	**213.019**	20.656	3.688E-02	4.277
150	83.33	0.17317	0.19643	1.28516	9.781E-03	27.326	1.487E-02	85.472	14.801	16.789	39.750	1.953E-02	214.898	22.964	3.025E-02	3.977
175	85.37	0.14881	0.16880	1.24114	8.208E-03	30.211	1.183E-02	115.502	17.188	19.497	44.158	1.553E-02	227.898	25.822	2.400E-02	3.843
200	86.96	0.13046	0.14798	1.19840	6.712E-03	33.861	9.043E-03	162.622	21.216	24.066	49.733	1.185E-02	253.425	29.431	1.828E-02	**3.840**
225	88.24	0.11627	0.13189	1.15745	5.296E-03	38.655	6.528E-03	241.941	28.130	31.909	57.056	8.553E-03	297.280	34.183	1.318E-02	3.974
250	89.29	0.10477	0.11884	1.11846	3.960E-03	45.356	4.364E-03	390.842	40.949	46.449	67.297	5.697E-03	372.660	40.834	8.764E-03	4.278
275	90.16	0.09534	0.10815	1.08152	2.712E-03	55.732	2.540E-03	725.123	69.133	78.420	83.160	3.320E-03	517.843	51.153	5.082E-03	4.877
300	90.91	0.08746	0.09921	1.04655	1.537E-03	75.408	1.124E-03	1796.171	157.093	178.195	113.259	1.462E-03	881.146	70.765	2.230E-03	6.189
325	91.550	0.08056	0.09138	1.01349												
330	91.667	0.07935	0.09001	1.00711												
335	91.781	0.07817	0.08867	1.00078												
336	**91.804**	**0.07794**	**0.08841**	**0.99954**												
337	91.826	0.07771	0.08815	0.99829												
338	91.848	0.07749	0.08790	0.99703												
339	91.870	0.07726	0.08764	0.99580												
340	91.892	0.07703	0.08738	0.99455												
350	92.106	0.07507	0.08515	0.98228												

* [grey shading] means the data are the same as the data of Table A.6.b.2.

Table A.6.d.2. MOX data [^{235}U/U = 0.718%, ^{240}Pu/Pu=20%, MOX density: 5.5 g/cm^3, Pu/(U + Pu): 12.5% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**65.883**	**20.000**	**12.941**	**1.176**

Fissile material oxide density
5.5 g (UO_2 + PuO_2)/cm^3

Water reflector
2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 12.5 wt %

H/(U + Pu)	Wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere: Radius (cm)	Sphere: dk/dr	Sphere: Volume (l)	Sphere: Mass U + Pu (kg)	Sphere: Mass MOX (kg)	Cylinder: Diameter (cm)	Cylinder: dk/dr	Cylinder: Linear den. Pu + U (g/cm)	Slab: Thickness (cm)	Slab: dk/dr	Slab: Surface den. Pu + U (g/cm^2)
0.1	0.33	4.84870	5.50000	1.37944	1.807E-03	64.514	7.473E-03	1124.715	5453.406	6185.932	94.477	9.702E-03	33991.417	55.461	1.481E-02	268.912
0.5	1.64	4.84870	5.50000	1.33397	2.667E-03	52.977	8.394E-03	622.810	3019.819	3425.455	77.494	1.085E-02	22869.459	45.272	1.667E-02	219.508
0.928	3.00	4.84870	5.50000	1.28853	3.402E-03	46.932	8.466E-03	433.008	2099.526	2381.543	68.588	1.101E-02	17914.573	40.024	1.694E-02	194.063
1.5	4.76	4.84870	5.50000	1.24833	4.341E-03	41.613	8.386E-03	301.828	1463.475	1660.056	60.858	1.099E-02	14104.084	35.542	1.666E-02	172.331
1.916	6.00	4.84870	5.50000	1.23098	5.100E-03	38.439	8.668E-03	237.913	1153.570	1308.522	56.188	1.129E-02	12022.539	32.803	1.719E-02	159.053
2.73	8.34	4.84870	5.50000	1.21472	6.924E-03	32.990	9.484E-03	150.400	729.244	827.199	48.194	1.239E-02	8845.215	28.098	1.898E-02	136.241
5	14.29	3.42594	3.88613	1.22069	7.620E-03	31.102	9.622E-03	126.028	431.763	489.760	45.268	1.265E-02	5513.767	26.113	1.963E-02	89.462
10	25.00	2.07921	2.35850	1.27847	1.001E-02	26.521	1.348E-02	78.134	162.456	184.278	38.286	1.775E-02	2393.667	21.613	2.770E-02	44.937
20	40.00	1.16404	1.32040	1.36087	1.314E-02	22.667	1.912E-02	48.783	56.786	64.413	32.464	2.526E-02	963.522	17.954	3.961E-02	20.899
30	50.00	0.80827	0.91684	1.40134	1.458E-02	21.385	2.196E-02	40.963	33.109	37.557	30.552	2.904E-02	592.559	16.810	4.557E-02	13.587
40	57.14	0.61907	0.70223	1.41920	1.513E-02	20.964	2.319E-02	38.595	23.893	27.103	29.943	3.068E-02	435.928	**16.495**	4.810E-02	10.211
50	62.50	0.50164	0.56902	1.42410	1.522E-02	**20.943**	2.349E-02	**38.476**	19.301	21.894	**29.933**	3.108E-02	353.011	16.526	4.874E-02	8.290
60	66.67	0.42166	0.47830	1.42101	1.501E-02	21.147	2.322E-02	39.612	16.703	18.946	30.262	3.071E-02	303.287	16.769	4.816E-02	7.071
70	70.00	0.36368	0.41253	1.41278	1.464E-02	21.498	2.258E-02	41.620	15.137	17.170	30.812	3.224E-02	271.182	17.150	4.680E-02	6.237
80	72.73	0.31971	0.36265	1.40115	1.415E-02	21.959	2.355E-02	44.354	14.180	16.085	31.526	3.102E-02	249.562	17.599	4.826E-02	5.626
90	75.00	0.28523	0.32354	1.38724	1.359E-02	22.507	2.247E-02	47.754	13.621	15.451	32.370	2.959E-02	234.728	18.161	4.289E-02	5.180
100	76.92	0.25746	0.29204	1.37178	1.299E-02	23.131	2.128E-02	51.841	**13.347**	**15.140**	33.329	2.801E-02	224.623	18.797	4.353E-02	4.839
125	80.65	0.20707	0.23488	1.32944	1.139E-02	24.999	1.807E-02	65.442	13.551	15.371	36.191	2.377E-02	**213.019**	20.656	3.688E-02	4.277
150	83.33	0.17317	0.19643	1.28516	9.781E-03	27.326	1.487E-02	85.472	14.801	16.789	39.750	1.953E-02	214.898	22.964	3.025E-02	3.977
175	85.37	0.14881	0.16880	1.24114	8.208E-03	30.211	1.183E-02	115.502	17.188	19.497	44.158	1.553E-02	227.898	25.822	2.400E-02	3.843
200	86.96	0.13046	0.14798	1.19840	6.712E-03	33.861	9.043E-03	162.622	21.216	24.066	49.733	1.185E-02	253.425	29.431	1.828E-02	**3.840**
225	88.24	0.11627	0.13189	1.15745	5.296E-03	38.655	6.528E-03	241.941	28.130	31.909	57.056	8.553E-03	297.280	34.183	1.318E-02	3.974
250	89.29	0.10477	0.11884	1.11846	3.960E-03	45.356	4.364E-03	390.842	40.949	46.449	67.297	5.697E-03	372.660	40.834	8.764E-03	4.278
275	90.16	0.09534	0.10815	1.08152	2.712E-03	55.732	2.540E-03	725.123	69.133	78.420	83.160	3.320E-03	517.843	51.153	5.082E-03	4.877
300	90.91	0.08746	0.09921	1.04655	1.537E-03	75.408	1.124E-03	1796.171	157.093	178.195	113.259	1.462E-03	881.146	70.765	2.230E-03	6.189
325	91.550	0.08056	0.09138	1.01349												
330	91.667	0.07935	0.09001	1.00711												
335	91.781	0.07817	0.08867	1.00078												
336	**91.804**	**0.07794**	**0.08841**	**0.99954**												
337	91.826	0.07771	0.08815	0.99829												
338	91.848	0.07749	0.08790	0.99703												
339	91.870	0.07726	0.08764	0.99580												
340	91.892	0.07703	0.08738	0.99455												
350	92.106	0.07507	0.08515	0.98228												

* [grey shading] means the data are the same as the data of Table A.6.b.2.

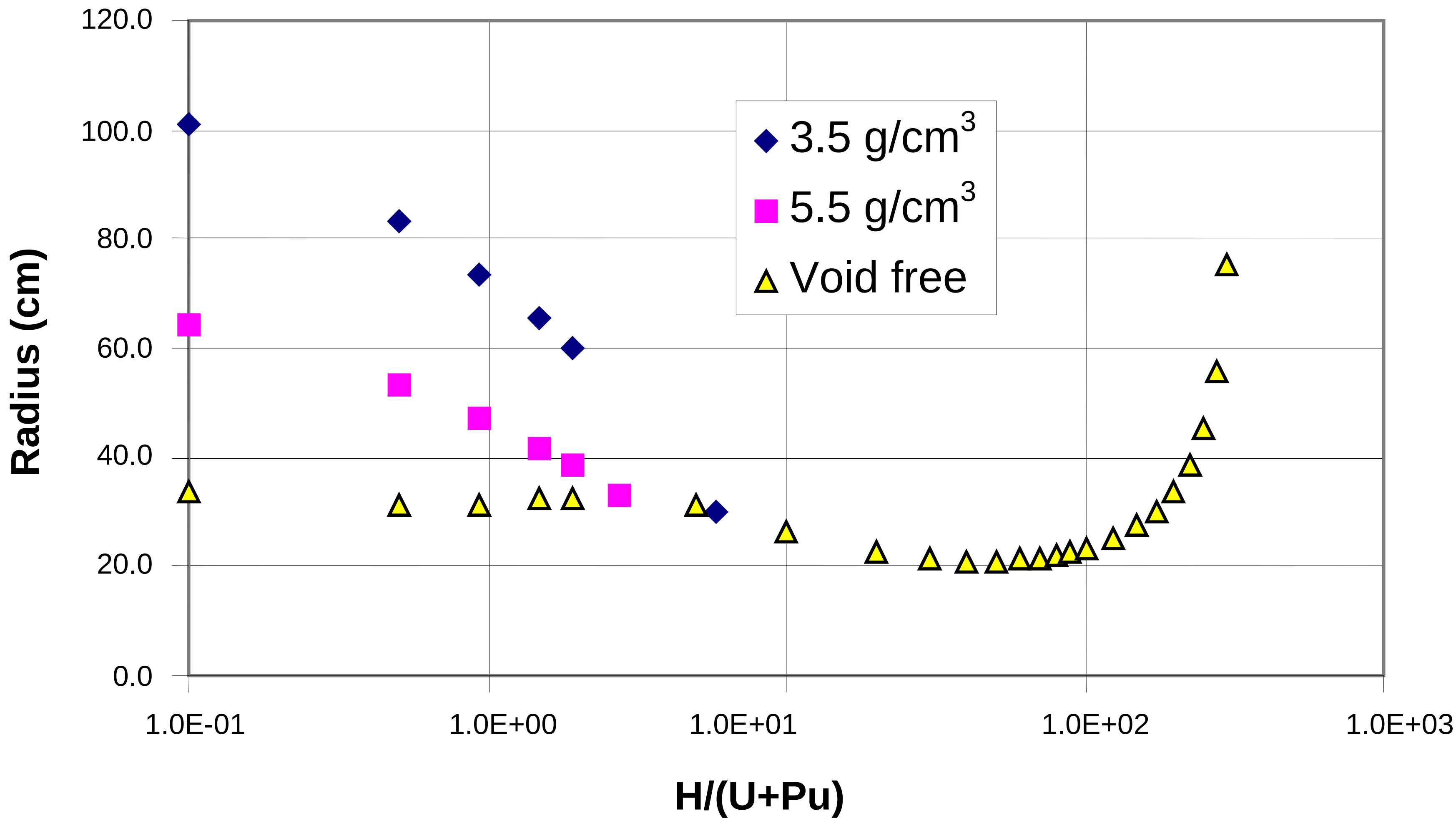

Fig. A.6.d.1. Sphere radius [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

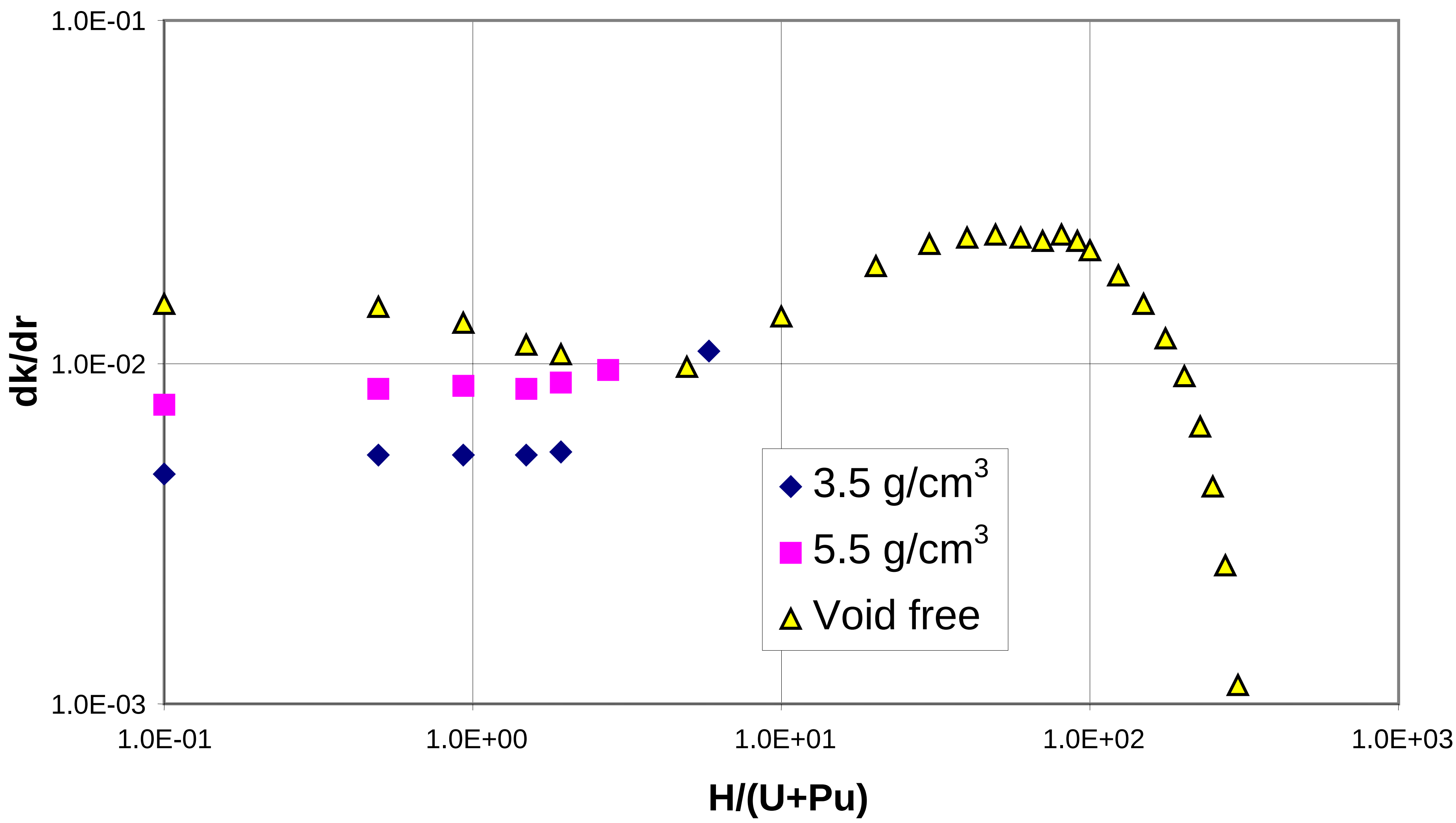

Fig. A.6.d.2. Delta lambda divided by delta dimension [sphere, $^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

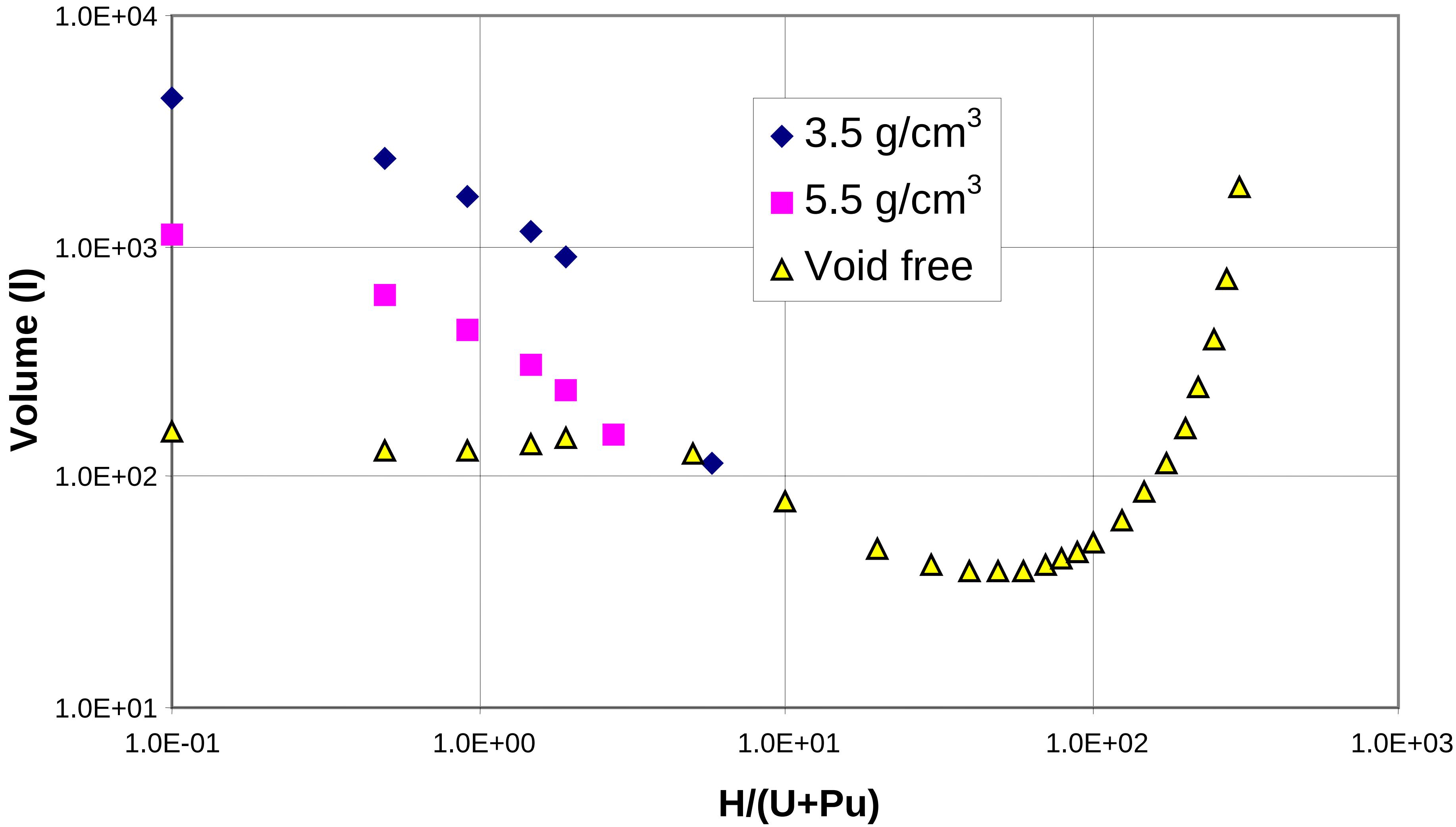

Fig. A.6.d.3. Sphere volume [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

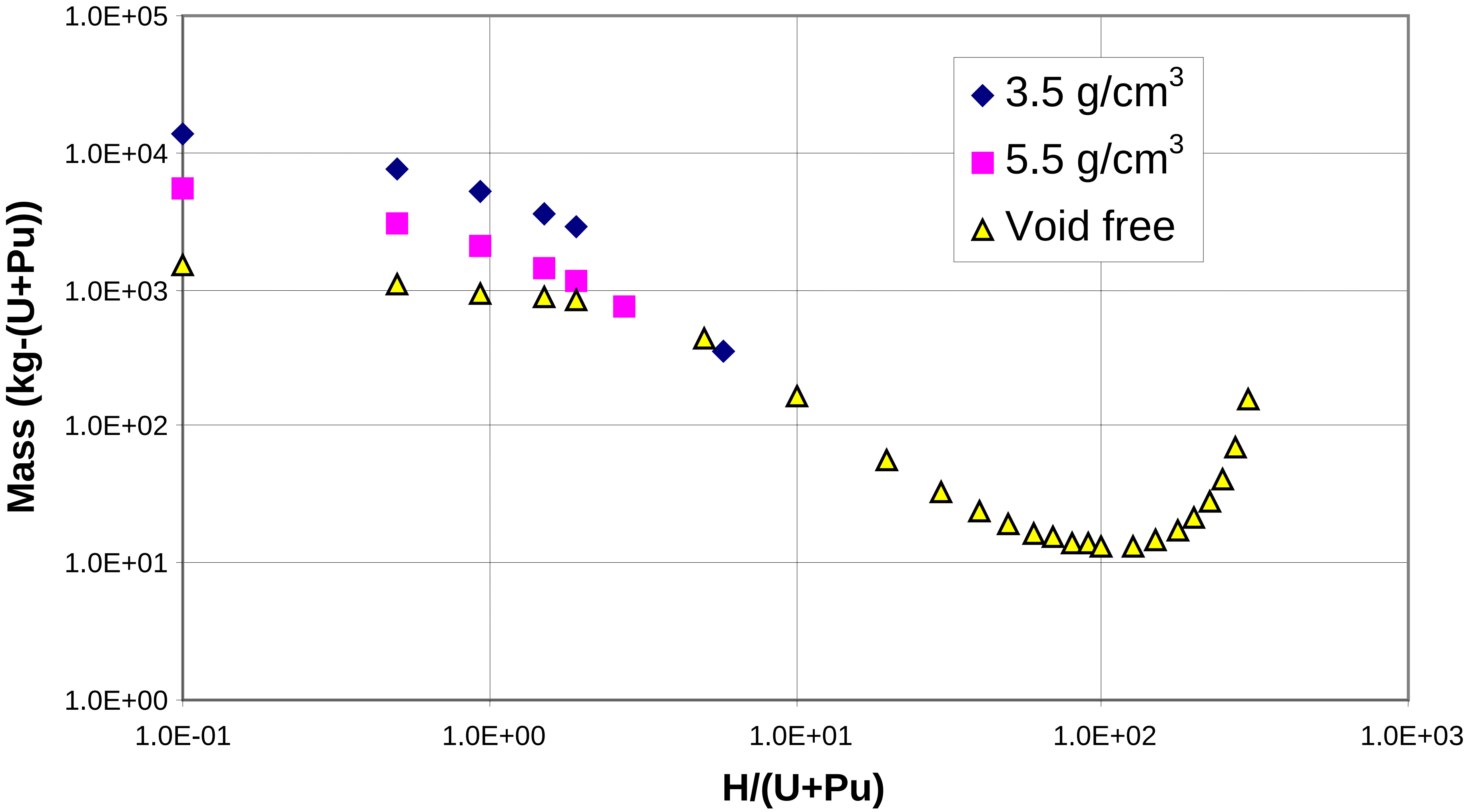

Fig. A.6.d.4. U + Pu mass [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

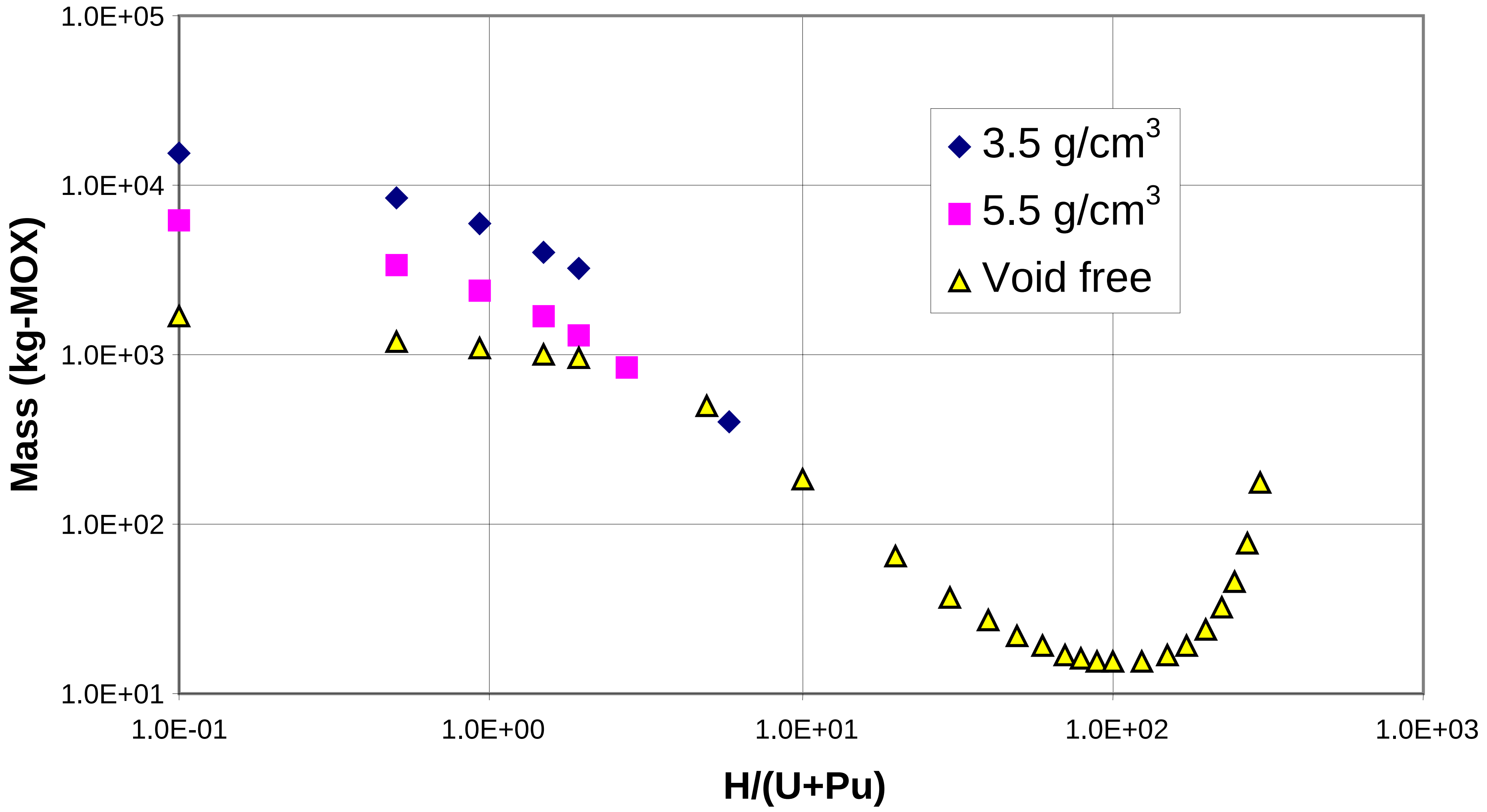

Fig. A.6.d.5. MOX mass [$^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

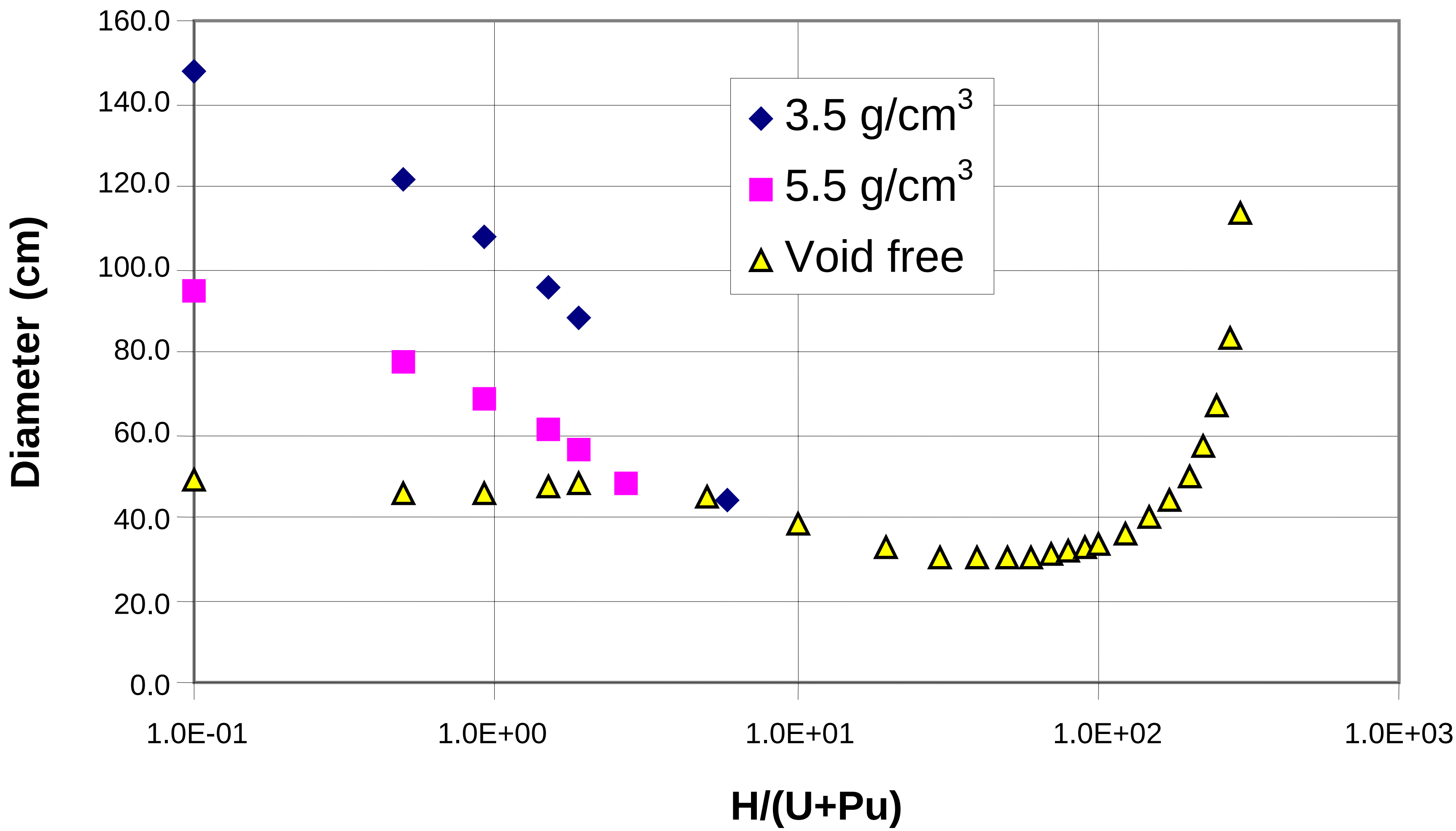

Fig. A.6.d.6. Cylinder diameter [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

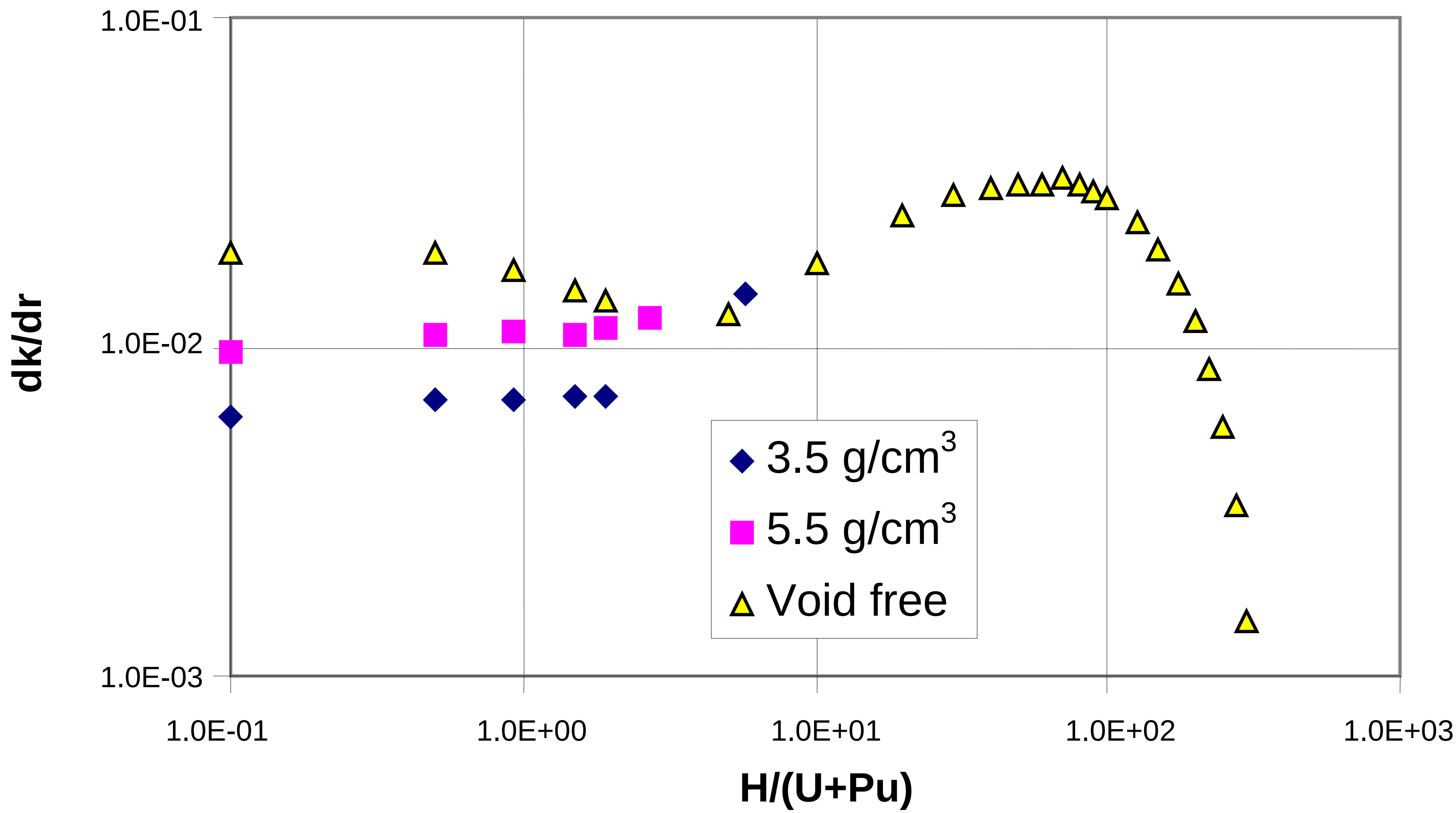

Fig. A.6.d.7. Delta lambda divided by delta dimension [cylinder, ^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

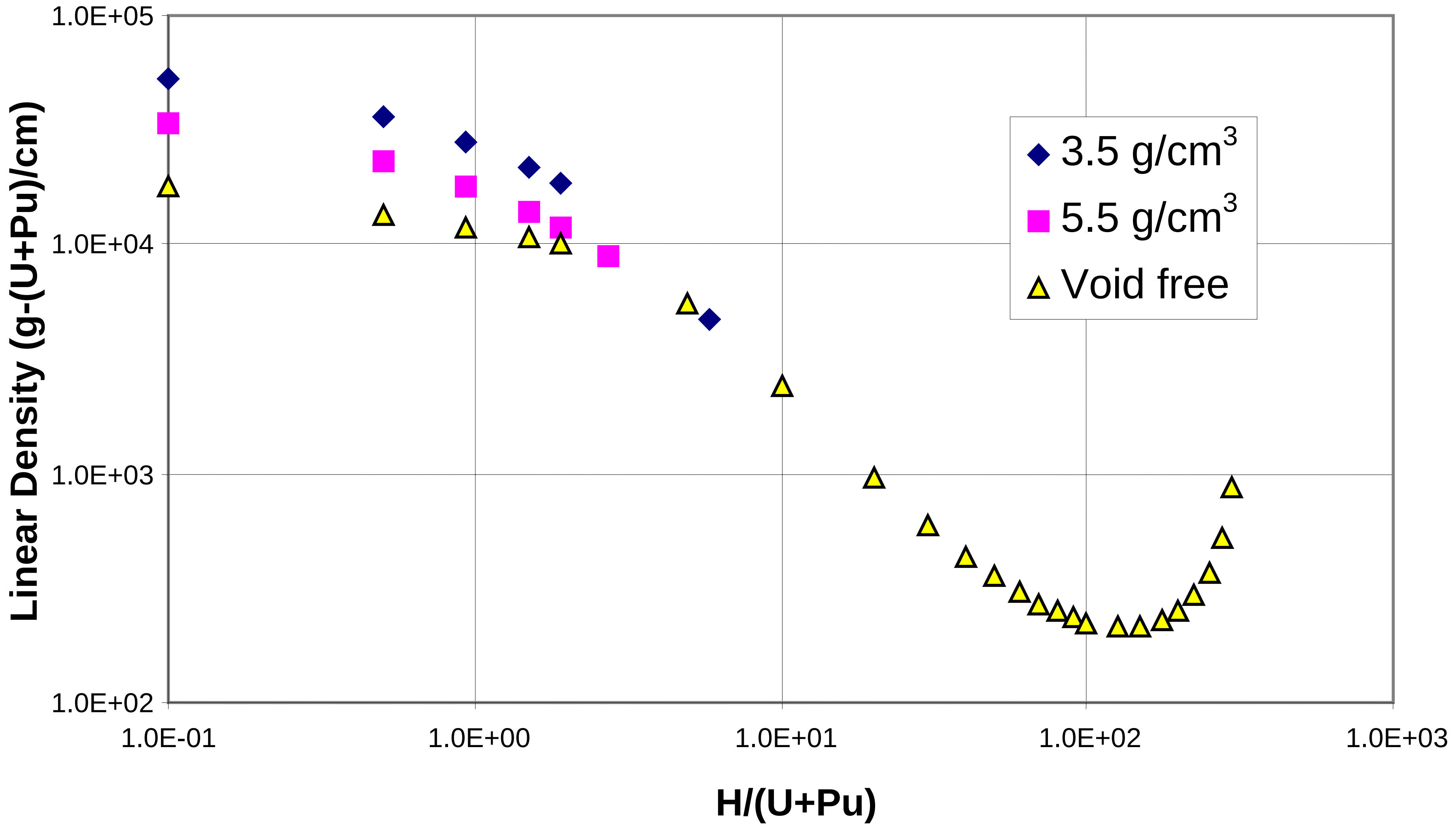

Fig. A.6.d.8. Linear density [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

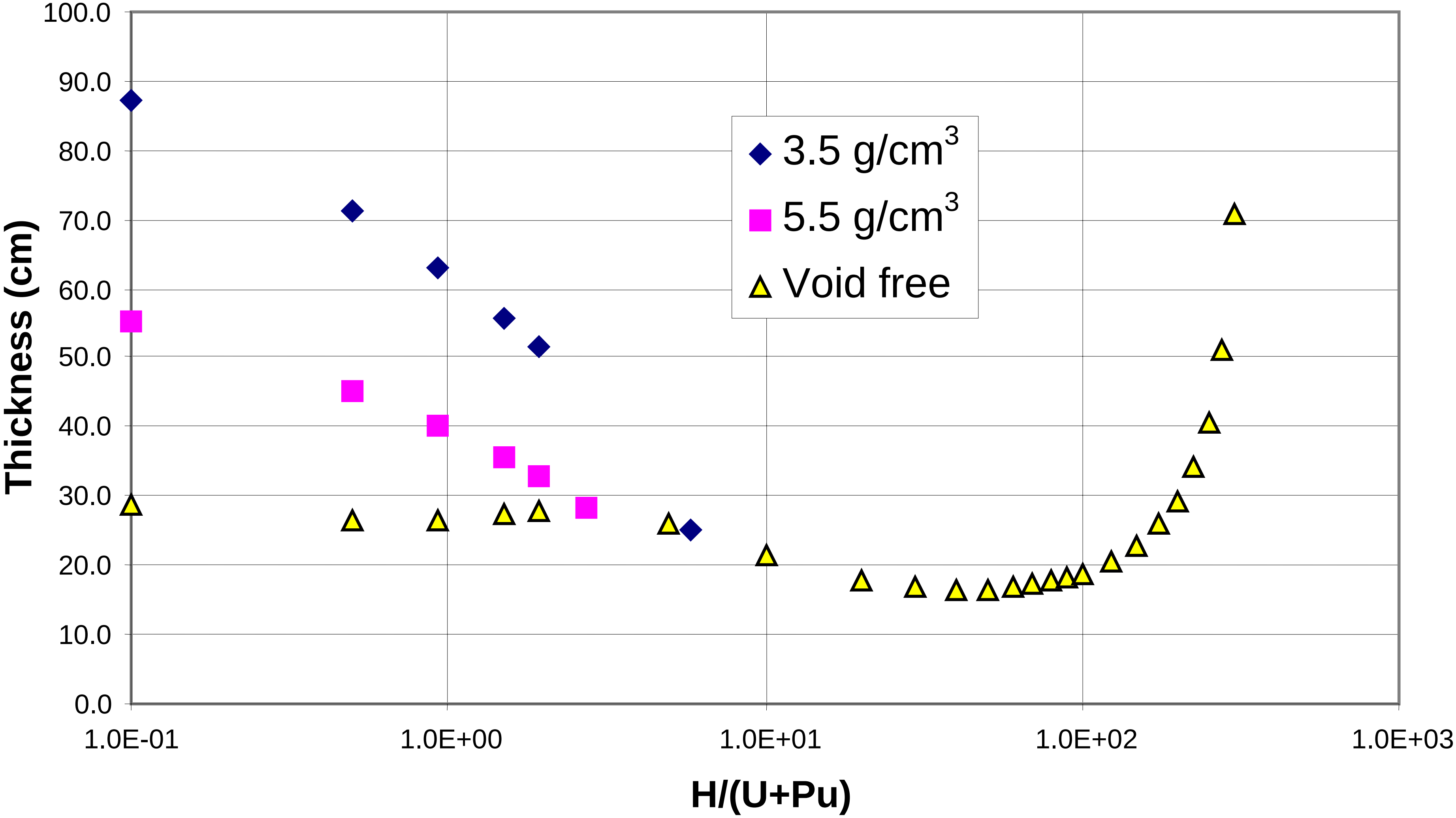

Fig. A.6.d.9. Slab thickness[^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

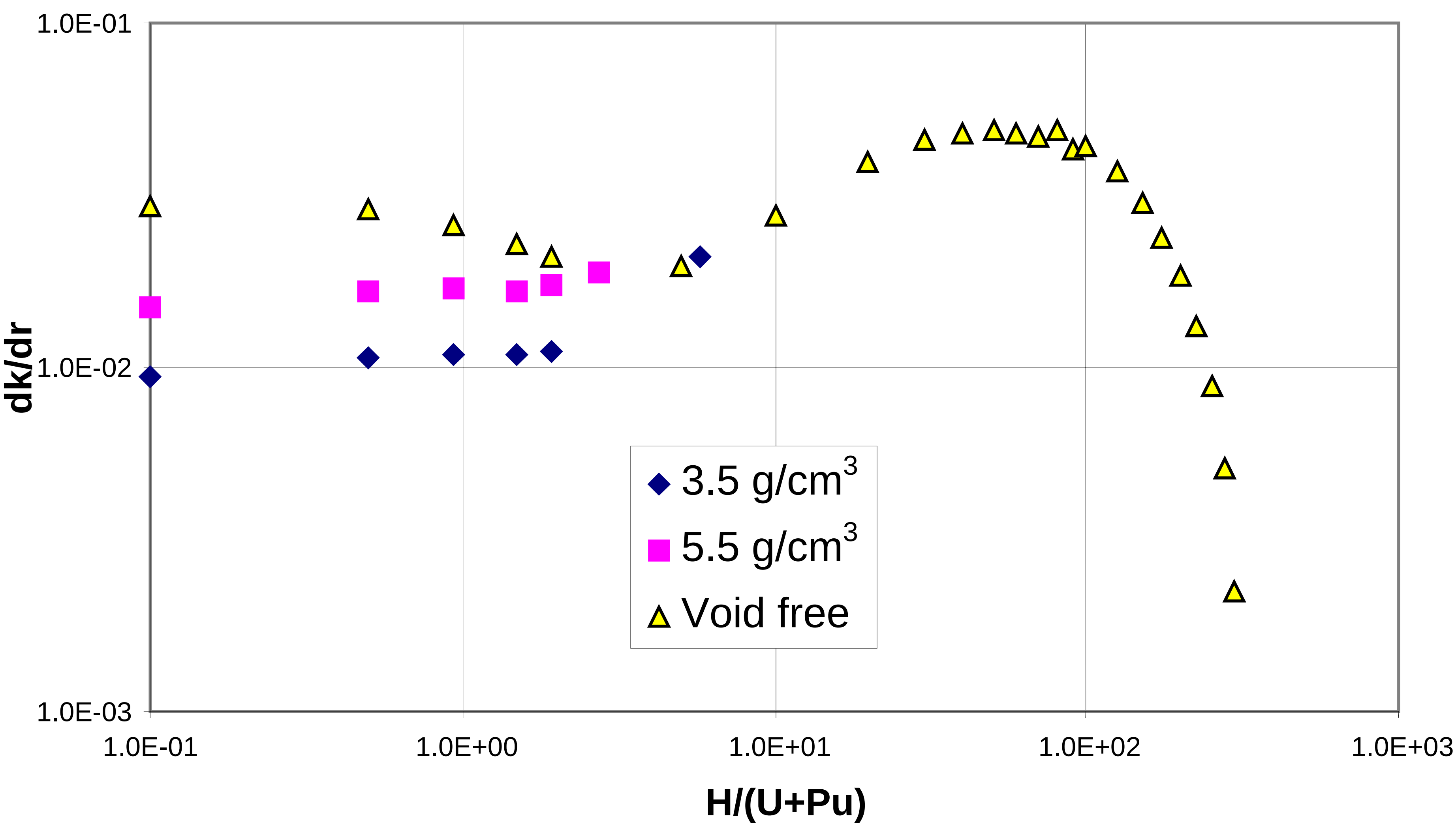

Fig. A.6.d.10. Delta lambda divided by delta dimension [slab, ^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

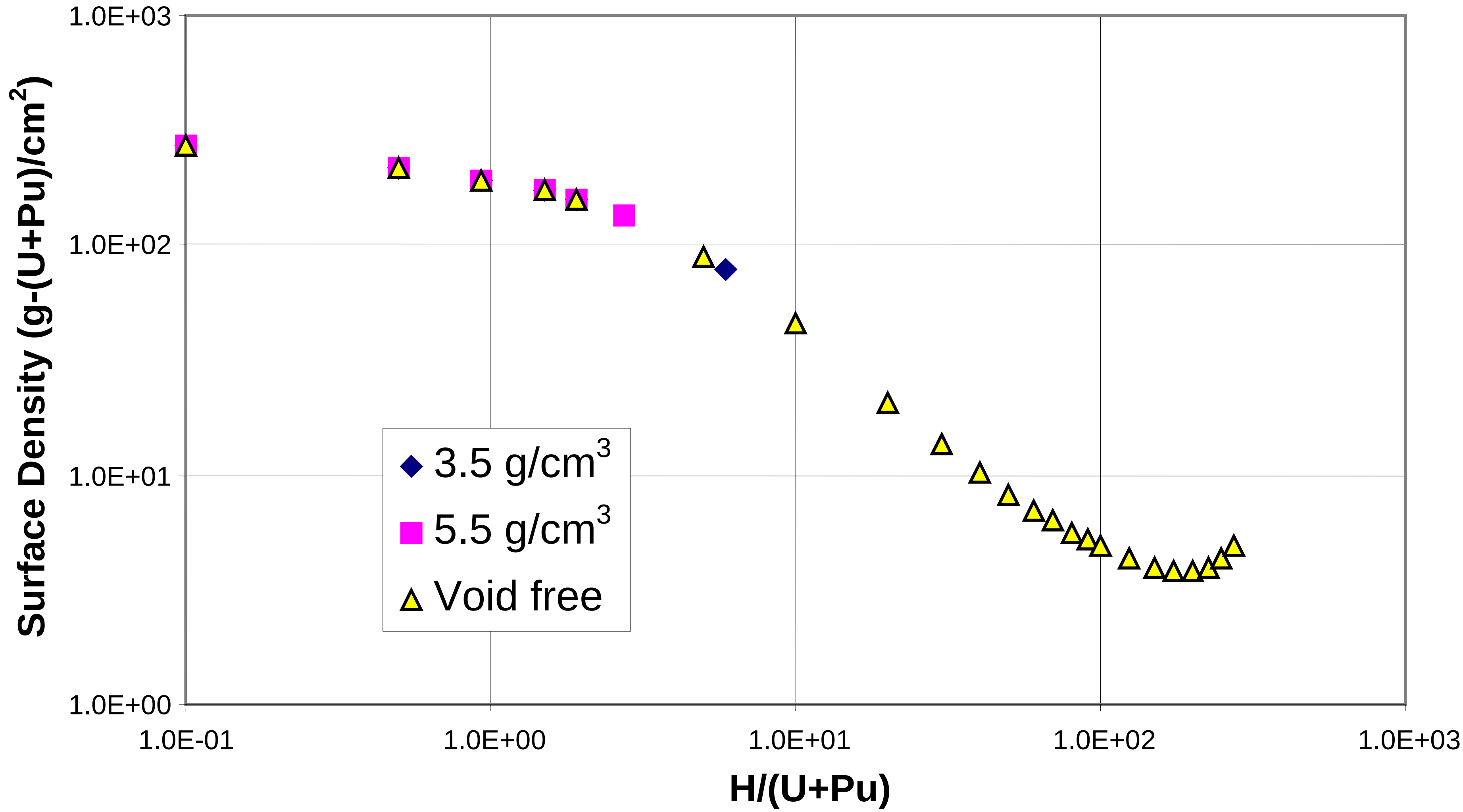

Fig. A.6.d.11. Surface density [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, Pu/(U + Pu) = 12.5%, water reflector: 2.5 cm].

APPENDIX B

COMPARISON OF THE DATA OF THIS REPORT AND THE CALCULATIONAL RESULTS OF MODIFIED XSDRNPM FOR dk/dr

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COMPARISON OF THE DATA OF THIS REPORT AND THE CALCULATIONAL RESULTS OF MODIFIED XSDRNPM FOR dk/dr

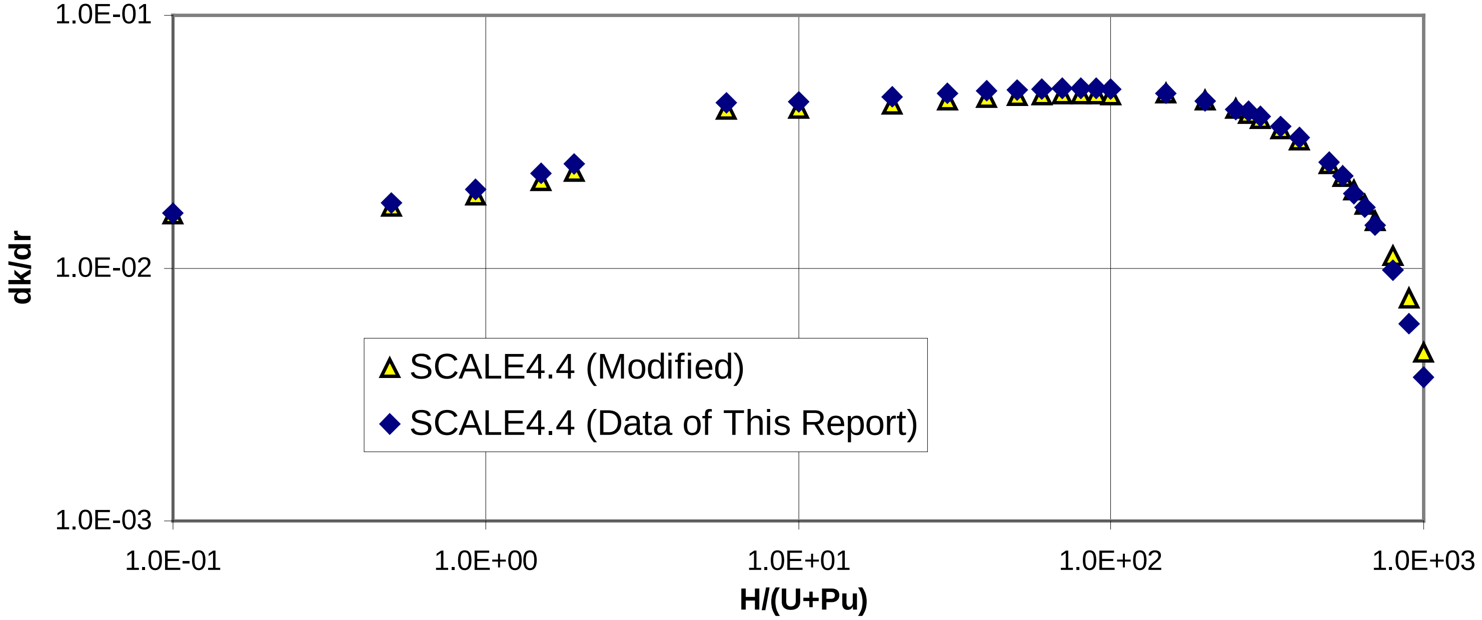

Fig. B.1. Comparison of the data of this report and the results of modified XSDRNPM for dk/dr [sphere, $^{235}U = 0.718$, $^{239}Pu = 100\%$, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 30.0 cm].

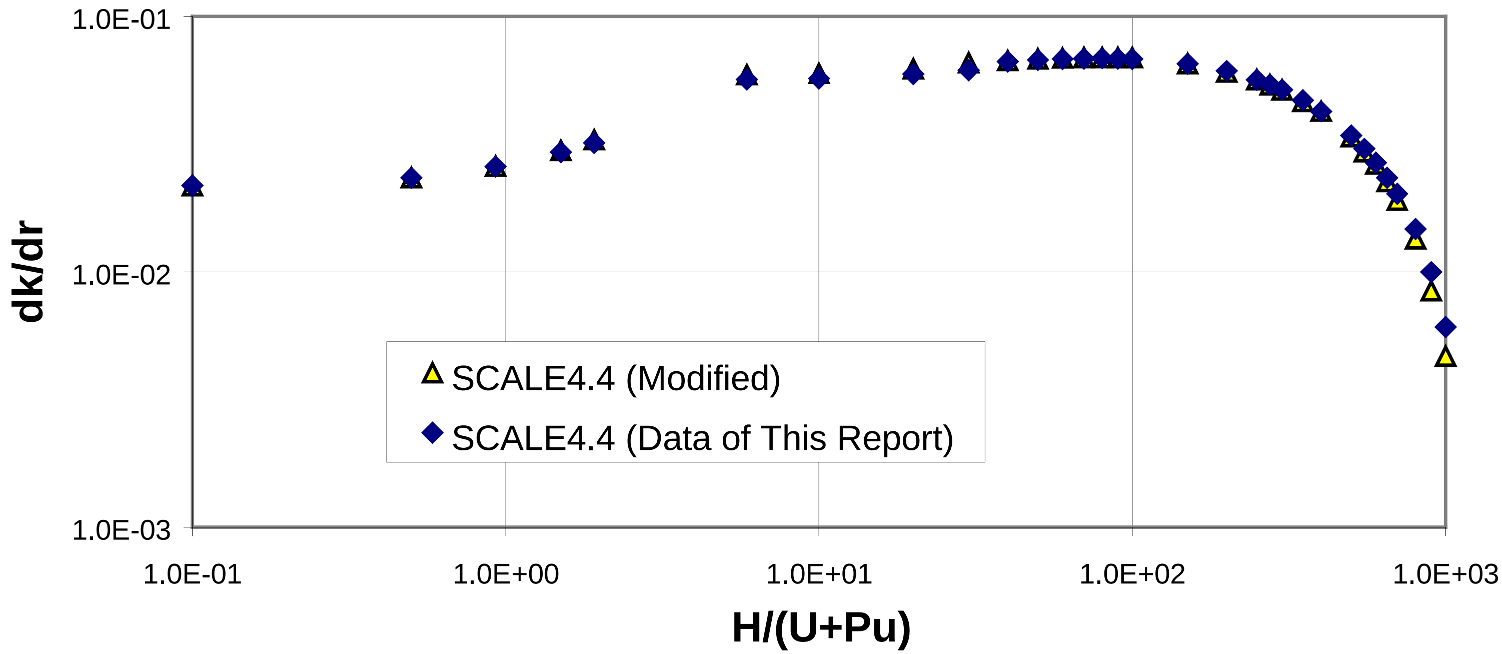

Fig. B.2. Comparison of the data of this report and the results of modified XSDRNPM for dk/dr, [cylinder, ^{235}U = 0.718, ^{239}Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 30.0 cm].

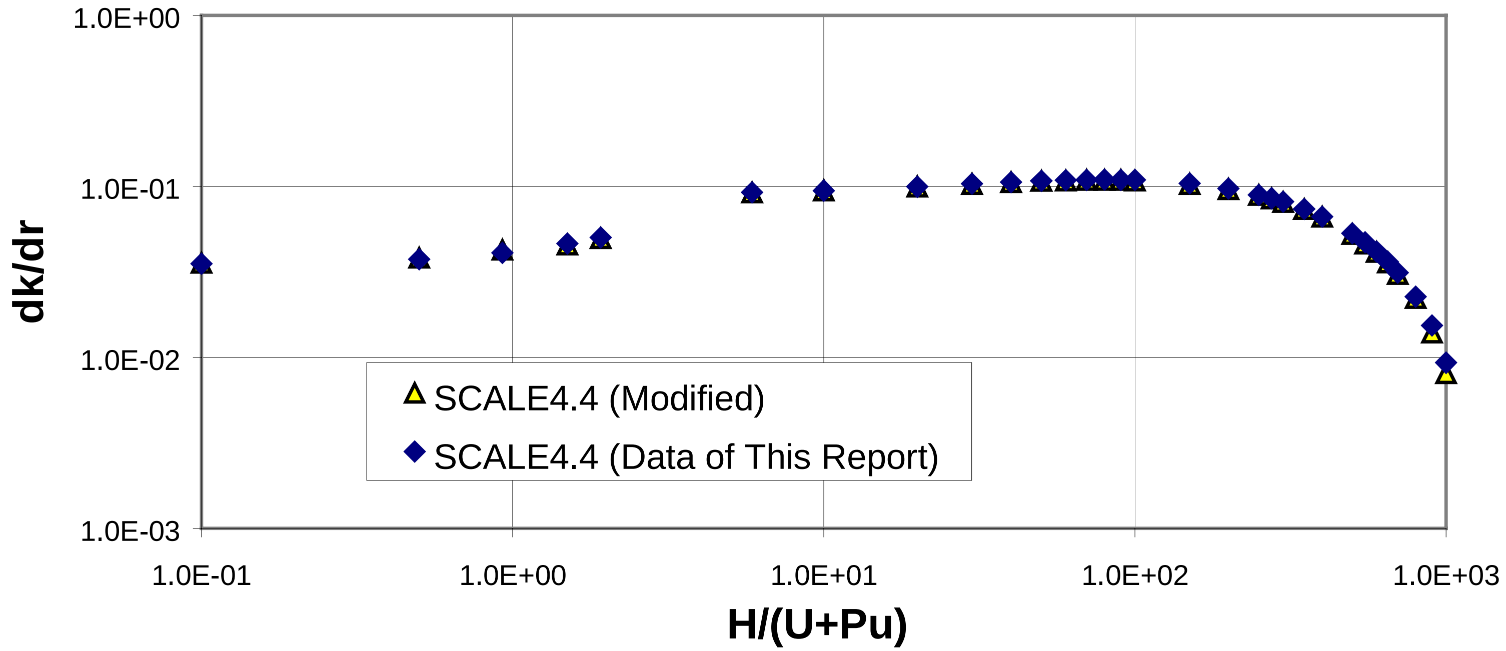

Fig. B.3. Comparison of the data of this report and the results of modified XSDRNPM for dk/dr [slab, ^{235}U = 0.718, ^{239}Pu = 100%, Pu/(U + Pu) = 35%, 3.5 g/cm^3, water reflector: 30.0 cm].

APPENDIX C

COMPARISON OF PLUTONIUM ISOTOPIC WEIGHT PERCENTAGES

APPENDIX C

COMPARISON OF PLUTONIUM ISOTOPIC WEIGHT PERCENTAGES

Table C.1 Minimum critical values [^{235}U enrichment: 0.718%, Pu/(U + Pu) = 35%]

Minimum critical value	Water reflector (cm)	Plutonium isotopic weight percentages	
		This report[a]	IPSN data[b]
Sphere radius (cm)	30	17.009	17.005
	2.5	19.017	19.012
Sphere volume (L)	30	20.612	20.596
	2.5	28.808	28.787
Critical mass (kg-(U + Pu))	30	3.139	3.137
	2.5	3.979	3.976
Critical mass (kg-MOX)	30	3.560	3.557
	2.5	4.513	4.509
Critical diameter (cm)	30	22.884	22.878
	2.5	26.989	26.982
Critical linear density (g-(U + Pu)/cm)	30	55.499	55.462
	2.5	67.836	67.795
Critical thickness (cm)	30	10.285	10.280
	2.5	14.649	14.645
Critical surface density (g-(U + Pu)/cm^2)	30	1.128	1.128
	2.5	1.291	1.290
U + Pu density g-(U + Pu)/L	-	27.44	27.44[c]
MOX density g-MOX/L	-	31.12	31.12[c]

[a] ^{239}Pu: ^{240}Pu: ^{241}Pu: ^{242}Pu = 65.833: 20.000: 12.941: 1.176%
[b] ^{239}Pu: ^{240}Pu: ^{241}Pu: ^{242}Pu = 65.83: 20.000: 13.0: 1.17%
[c] Though the *k*-infinity for the calculated minimum critical concentration is very slightly different for the different plutonium isotopics, the determined minimum critical concentration are identical to within a variation is H/X of 1. That is H/X = 961 and H/X = 962.

Table C.2. The calculation results of the Pu isotopic weight percentages [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 30.0 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**65.830**	**20.000**	**13.000**	**1.170**

Maximum fissile material oxide density = 3.5 g (UO_2 + PuO_2)/cm^3

Water reflector 30.0 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 35 wt %

						Sphere					Cylinder			Slab		
H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Radius (cm)	dk/dr	Volume (l)	Mass U + Pu (kg)	Mass MOX (kg)	Diameter (cm)	dk/dr	Linear den. Pu + U (g/cm)	Thickness (cm)	dk/dr	Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08605	3.49999	2.03700	2.492E-03	37.639	1.486E-02	223.355	689.285	781.740	49.103	1.920E-02	5843.887	20.619	3.129E-02	63.630
0.5	1.64	3.08605	3.49999	1.85083	2.997E-03	34.551	1.649E-02	172.766	533.166	604.680	45.322	2.091E-02	4978.555	19.278	3.034E-02	59.492
0.928	3.00	3.08605	3.49999	1.74808	3.586E-03	31.679	1.804E-02	133.171	410.974	466.099	41.714	2.268E-02	4217.514	17.909	3.410E-02	55.267
1.5	4.76	3.08605	3.49999	1.65305	4.350E-03	28.824	1.914E-02	100.313	309.570	351.093	38.086	2.431E-02	3515.869	16.468	3.661E-02	50.822
1.916	6.00	3.08605	3.49999	1.60072	4.898E-03	27.221	2.041E-02	84.491	260.743	295.718	36.041	2.531E-02	3148.410	15.637	3.795E-02	48.256
5.88	16.37	3.08605	3.49999	1.38780	1.133E-02	18.699	2.408E-02	27.386	84.513	95.849	25.034	3.350E-02	1519.033	10.943	4.723E-02	33.772
10	24.98	2.08611	2.36592	1.34226	1.039E-02	19.843	2.118E-02	32.725	68.269	77.426	26.678	2.674E-02	1166.094	11.877	4.207E-02	24.776
20	39.97	1.16693	1.32345	1.35139	1.137E-02	19.491	2.271E-02	31.016	36.194	41.049	26.183	2.755E-02	628.329	11.661	4.322E-02	13.608
40	57.11	0.62030	0.70350	1.41122	1.383E-02	17.994	2.680E-02	24.403	15.137	17.167	24.102	3.342E-02	283.003	10.676	5.248E-02	6.622
50	62.47	0.50259	0.57000	1.43362	1.464E-02	17.570	2.830E-02	22.721	11.419	12.951	23.535	3.582E-02	218.649	10.442	5.607E-02	5.248
60	66.64	0.42242	0.47908	1.45085	1.523E-02	17.298	2.945E-02	21.682	9.159	10.387	23.185	3.762E-02	178.346	10.322	5.880E-02	4.360
70	69.97	0.36432	0.41319	1.46387	1.566E-02	17.131	3.003E-02	21.057	7.672	8.701	22.984	3.939E-02	151.161	**10.280**	6.084E-02	3.745
80	72.70	0.32026	0.36322	1.47348	1.596E-02	17.040	3.068E-02	20.723	6.637	7.527	22.891	4.031E-02	131.807	10.295	6.267E-02	3.297
90	74.98	0.28571	0.32403	1.48032	1.615E-02	**17.005**	3.113E-02	**20.596**	5.885	6.674	**22.878**	4.094E-02	117.448	10.351	6.368E-02	2.957
100	76.90	0.25789	0.29248	1.48492	1.625E-02	17.012	3.139E-02	20.624	5.319	6.032	22.924	4.132E-02	106.440	10.437	6.431E-02	2.692
125	80.63	0.20740	0.23522	1.48895	1.626E-02	17.166	3.151E-02	21.189	4.395	4.984	23.228	4.136E-02	87.885	10.747	6.467E-02	2.229
150	83.32	0.17344	0.19670	1.48552	1.601E-02	17.450	3.106E-02	22.258	3.860	4.378	23.713	4.132E-02	76.598	11.148	6.380E-02	1.933
200	86.94	0.13066	0.14819	1.46553	1.508E-02	18.260	2.918E-02	25.501	3.332	3.779	25.022	3.881E-02	64.249	12.120	5.990E-02	1.584
225	88.22	0.11631	0.13191	1.45164	1.450E-02	18.752	2.800E-02	27.622	3.213	3.644	25.800	3.718E-02	60.807	12.671	5.741E-02	1.474
250	89.27	0.10481	0.11887	1.43622	1.389E-02	19.291	2.714E-02	30.069	3.152	3.574	26.644	3.531E-02	58.437	13.258	5.474E-02	1.390
275	90.15	0.09537	0.10816	1.41976	1.325E-02	19.875	2.602E-02	32.888	**3.137**	**3.557**	27.555	3.337E-02	56.871	13.884	5.195E-02	1.324
300	90.90	0.08749	0.09923	1.40262	1.260E-02	20.503	2.431E-02	36.103	3.159	3.582	28.528	3.110E-02	55.923	14.504	4.882E-02	1.269
350	92.10	0.07509	0.08516	1.36729	1.128E-02	21.888	1.981E-02	43.925	3.298	3.741	30.666	2.588E-02	**55.462**	15.936	4.212E-02	1.197
400	93.02	0.06577	0.07459	1.33160	9.994E-03	23.464	1.628E-02	54.111	3.559	4.036	33.090	2.296E-02	56.560	17.518	3.590E-02	1.152
450	93.74	0.05850	0.06635	1.29631	8.740E-03	25.268	1.423E-02	67.573	3.953	4.483	35.856	1.917E-02	59.071	19.321	3.118E-02	1.130
500	94.33	0.05268	0.05975	1.26186	7.533E-03	27.344	1.147E-02	85.642	4.512	5.117	39.037	1.642E-02	63.050	21.405	2.586E-02	**1.128**
550	94.82	0.04792	0.05435	1.22848	6.381E-03	29.768	9.553E-03	110.491	5.295	6.005	42.745	1.306E-02	68.768	23.815	2.149E-02	1.141
600	95.23	0.04394	0.04983	1.19630	5.282E-03	32.660	7.401E-03	145.929	6.412	7.272	47.168	1.013E-02	76.781	26.682	1.709E-02	1.172
700	95.89	0.03769	0.04275	1.13568	3.252E-03	40.641	4.866E-03	281.182	10.598	12.019	59.371	6.160E-03	104.342	34.614	1.005E-02	1.305
800	96.38	0.03299	0.03742	1.07999	1.416E-03	54.932	3.006E-03	694.336	22.906	25.979	81.225	2.289E-03	170.943	48.835	4.012E-03	1.611
900	96.77	0.02934	0.03328	1.02895		95.663	3.827E-04	3667.128	107.594	122.025	143.517	4.070E-04	474.629	89.456	9.141E-04	2.625
940	96.904	0.02805	0.03181	1.00972												
950	96.935	0.02775	0.03147	1.00503												
960	96.966	0.02747	0.03115	1.00035												
961	**96.969**	**0.02744**	**0.03112**	**0.99990**												
962	96.972	0.02741	0.03109	0.99945												
963	96.975	0.02738	0.03105	0.99897												

Table C.3. The calculation results of the Pu isotopic weight percentages [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 2.5 cm]

Isotopic weight percentages, wt %					
^{235}U	^{238}U	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu
0.718	**99.282**	**65.830**	**20.000**	**13.000**	**1.170**

Maximum fissile material oxide density = 3.5 g (UO_2 + PuO_2)/cm^3

Water reflector 2.5 cm

Plutonium weight percentages = 100*gPu/(gU + gPu) = 35 wt %

H/(U + Pu)	wt % H_2O	Pu + U density (g/cm^3)	MOX density (g/cm^3)	k-infinity	B_m^2	Sphere Radius (cm)	Sphere dk/dr	Sphere Volume (l)	Sphere Mass U + Pu (kg)	Sphere Mass MOX (kg)	Cylinder Diameter (cm)	Cylinder dk/dr	Cylinder Linear den. Pu + U (g/cm)	Slab Thickness (cm)	Slab dk/dr	Slab Surface den. Pu + U (g/cm^2)
0.1	0.33	3.08605	3.49999	2.03700	2.492E-03	48.325	1.559E-02	472.717	1458.829	1654.505	68.096	2.065E-02	11239.151	36.251	3.242E-02	111.871
0.5	1.64	3.08605	3.49999	1.85083	2.997E-03	43.308	1.688E-02	340.246	1050.016	1190.857	61.146	2.210E-02	9061.983	32.702	3.478E-02	100.920
0.928	3.00	3.08605	3.49999	1.74808	3.586E-03	39.008	1.782E-02	248.622	767.260	870.174	55.146	2.335E-02	7371.013	29.579	3.680E-02	91.282
1.5	4.76	3.08605	3.49999	1.65305	4.350E-03	34.917	1.888E-02	178.318	550.299	624.112	49.443	2.422E-02	5925.240	26.611	3.839E-02	82.122
1.916	6.00	3.08605	3.49999	1.60072	4.898E-03	32.676	1.927E-02	146.147	451.018	511.514	46.324	2.467E-02	5201.217	24.992	3.907E-02	77.127
5.88	16.37	3.08605	3.49999	1.38780	1.133E-02	21.372	2.375E-02	40.891	126.191	143.117	30.520	3.071E-02	2257.618	16.692	4.279E-02	51.511
10	24.98	2.08611	2.36592	1.34226	1.039E-02	22.662	2.039E-02	48.754	101.705	115.347	32.432	2.644E-02	1723.312	17.856	4.087E-02	37.250
20	39.97	1.16693	1.32345	1.35139	1.137E-02	22.239	2.169E-02	46.074	53.765	60.976	31.768	2.751E-02	924.919	17.418	4.219E-02	20.326
40	57.11	0.62030	0.70350	1.41122	1.383E-02	20.438	2.577E-02	35.763	22.184	25.159	29.064	3.295E-02	411.537	15.770	5.091E-02	9.782
60	66.64	0.42242	0.47908	1.45085	1.523E-02	19.538	2.842E-02	31.240	13.196	14.966	28.116	3.649E-02	262.258	14.992	5.714E-02	6.333
70	69.97	0.36432	0.41319	1.46387	1.566E-02	19.294	2.928E-02	30.087	10.961	12.431	27.374	3.821E-02	214.409	14.841	5.854E-02	5.407
80	72.70	0.32026	0.36322	1.47348	1.596E-02	19.140	2.991E-02	29.370	9.406	10.668	27.153	3.939E-02	185.445	14.719	5.999E-02	4.714
90	74.98	0.28571	0.32403	1.48032	1.615E-02	19.051	3.035E-02	28.963	8.275	9.385	27.030	3.997E-02	163.946	14.659	6.101E-02	4.188
100	76.90	0.25789	0.29248	1.48492	1.625E-02	**19.012**	3.060E-02	**28.787**	7.424	8.420	**26.982**	4.031E-02	147.457	**14.645**	6.167E-02	3.777
125	80.63	0.20740	0.23522	1.48895	1.626E-02	19.074	3.075E-02	29.069	6.029	6.838	27.099	4.048E-02	119.619	14.758	6.216E-02	3.061
150	83.32	0.17344	0.19670	1.48552	1.601E-02	19.290	3.035E-02	30.064	5.214	5.914	27.444	3.993E-02	102.600	14.955	6.161E-02	2.594
200	86.94	0.13066	0.14819	1.46553	1.508E-02	20.003	2.861E-02	33.525	4.380	4.968	28.556	3.817E-02	83.683	15.718	5.809E-02	2.054
225	88.22	0.11631	0.13191	1.45164	1.450E-02	20.461	2.749E-02	35.880	4.173	4.733	29.263	3.660E-02	78.225	16.192	5.577E-02	1.883
250	89.27	0.10481	0.11887	1.43622	1.389E-02	20.970	2.624E-02	38.625	4.048	4.591	30.046	3.497E-02	74.315	16.714	5.325E-02	1.752
275	90.15	0.09537	0.10816	1.41976	1.325E-02	21.530	2.548E-02	41.806	3.987	4.522	30.907	3.305E-02	71.550	17.250	5.052E-02	1.645
300	90.90	0.08749	0.09923	1.40262	1.260E-02	22.137	2.363E-02	45.441	**3.976**	**4.509**	31.837	3.093E-02	69.648	17.862	4.768E-02	1.563
350	92.10	0.07509	0.08516	1.36729	1.128E-02	23.489	1.994E-02	54.283	4.076	4.623	33.905	2.604E-02	**67.795**	19.218	4.165E-02	1.443
400	93.02	0.06577	0.07459	1.33160	9.994E-03	25.039	1.655E-02	65.756	4.325	4.905	36.274	2.191E-02	67.970	20.743	3.548E-02	1.364
450	93.74	0.05850	0.06635	1.29631	8.740E-03	26.823	1.359E-02	80.838	4.729	5.363	38.999	1.930E-02	69.881	22.502	3.097E-02	1.316
500	94.33	0.05268	0.05975	1.26186	7.533E-03	28.885	1.170E-02	100.947	5.318	6.031	42.147	1.580E-02	73.496	24.537	2.584E-02	1.293
550	94.82	0.04792	0.05435	1.22848	6.381E-03	31.295	9.323E-03	128.390	6.152	6.978	45.829	1.326E-02	79.046	26.921	2.105E-02	**1.290**
600	95.23	0.04394	0.04983	1.19630	5.282E-03	34.179	7.522E-03	167.246	7.349	8.334	50.231	1.037E-02	87.074	29.774	1.718E-02	1.308
700	95.89	0.03769	0.04275	1.13568	3.252E-03	42.147	4.695E-03	313.616	11.820	13.406	62.403	6.234E-03	115.274	37.668	9.812E-03	1.420
800	96.38	0.03299	0.03742	1.07999	1.416E-03	56.433	3.319E-03	752.807	24.835	28.166	84.241	4.756E-03	183.874	51.869	6.158E-03	1.711
900	96.77	0.02934	0.03328	1.02895		97.133	3.901E-04	3838.767	112.629	127.737	146.520	3.517E-04	494.704	92.478	7.543E-04	2.713
940	96.904	0.02805	0.03181	1.00972												
950	96.935	0.02775	0.03147	1.00503												
960	96.966	0.02747	0.03115	1.00035												
961	**96.969**	**0.02744**	**0.03112**	**0.99990**												
962	96.972	0.02741	0.03109	0.99945												
963	96.975	0.02738	0.03105	0.99897												

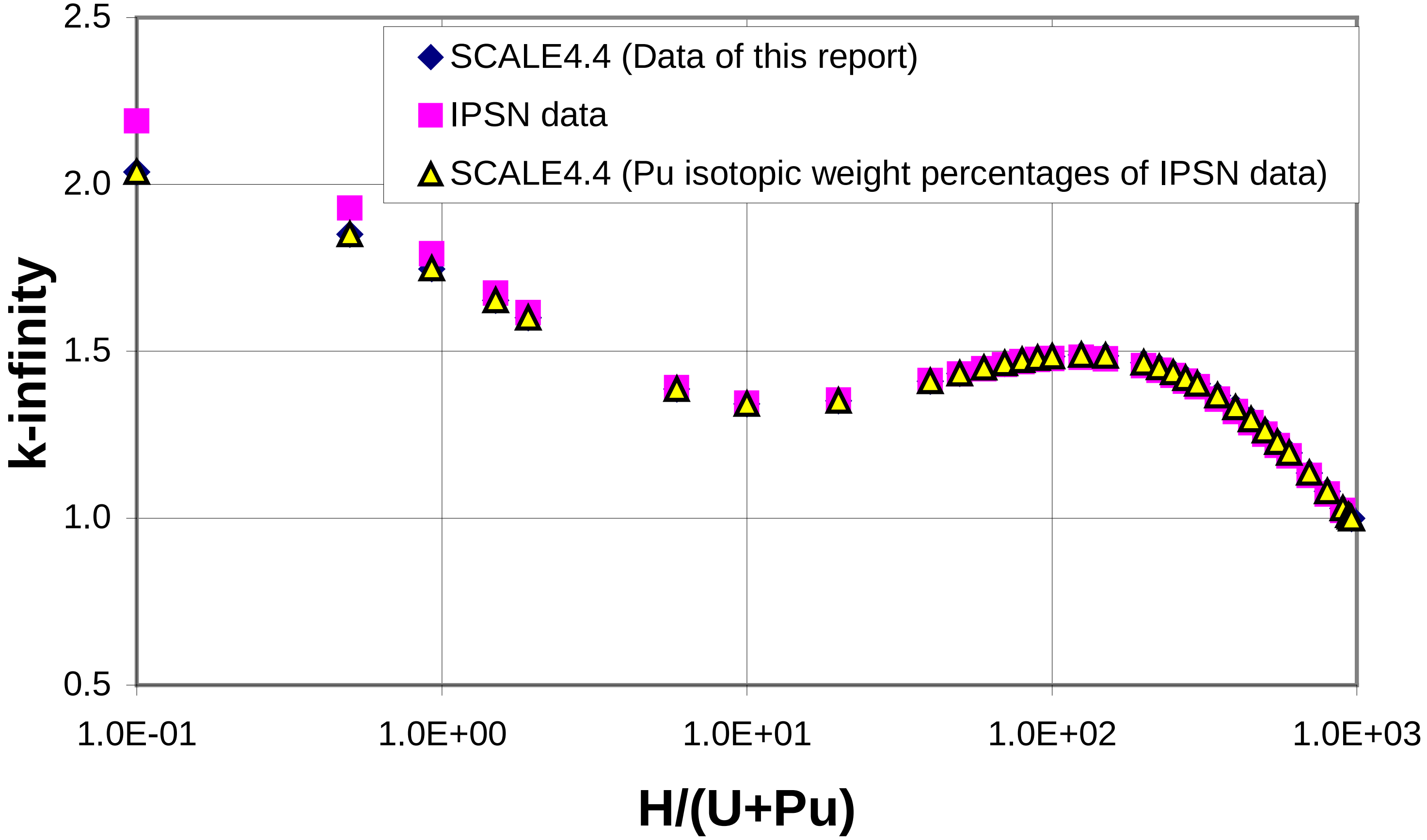

Fig. C.1. Comparison of *k*-infinity [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35%].

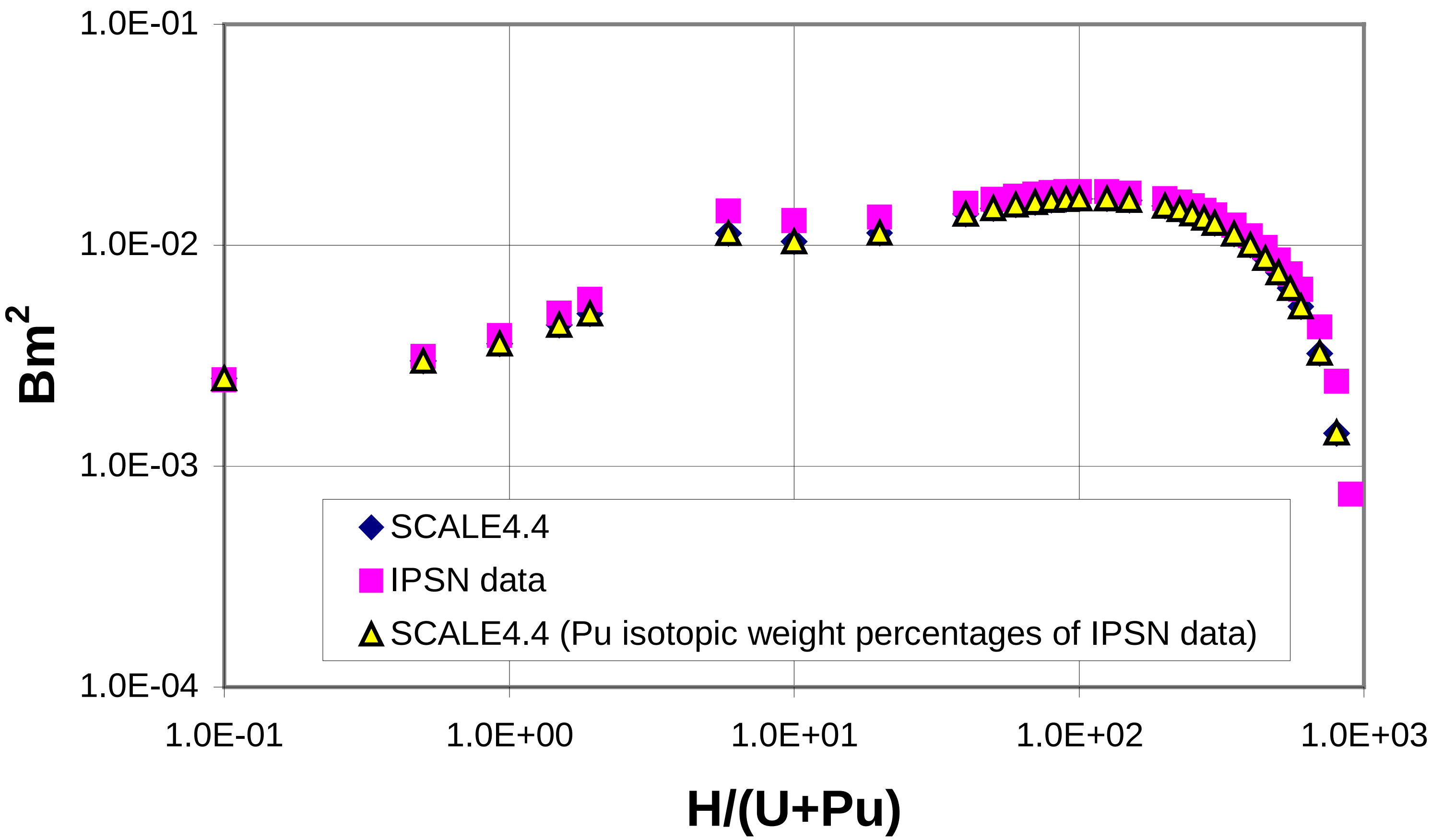

Fig. C.2. Comparison of Bm^2 [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35%].

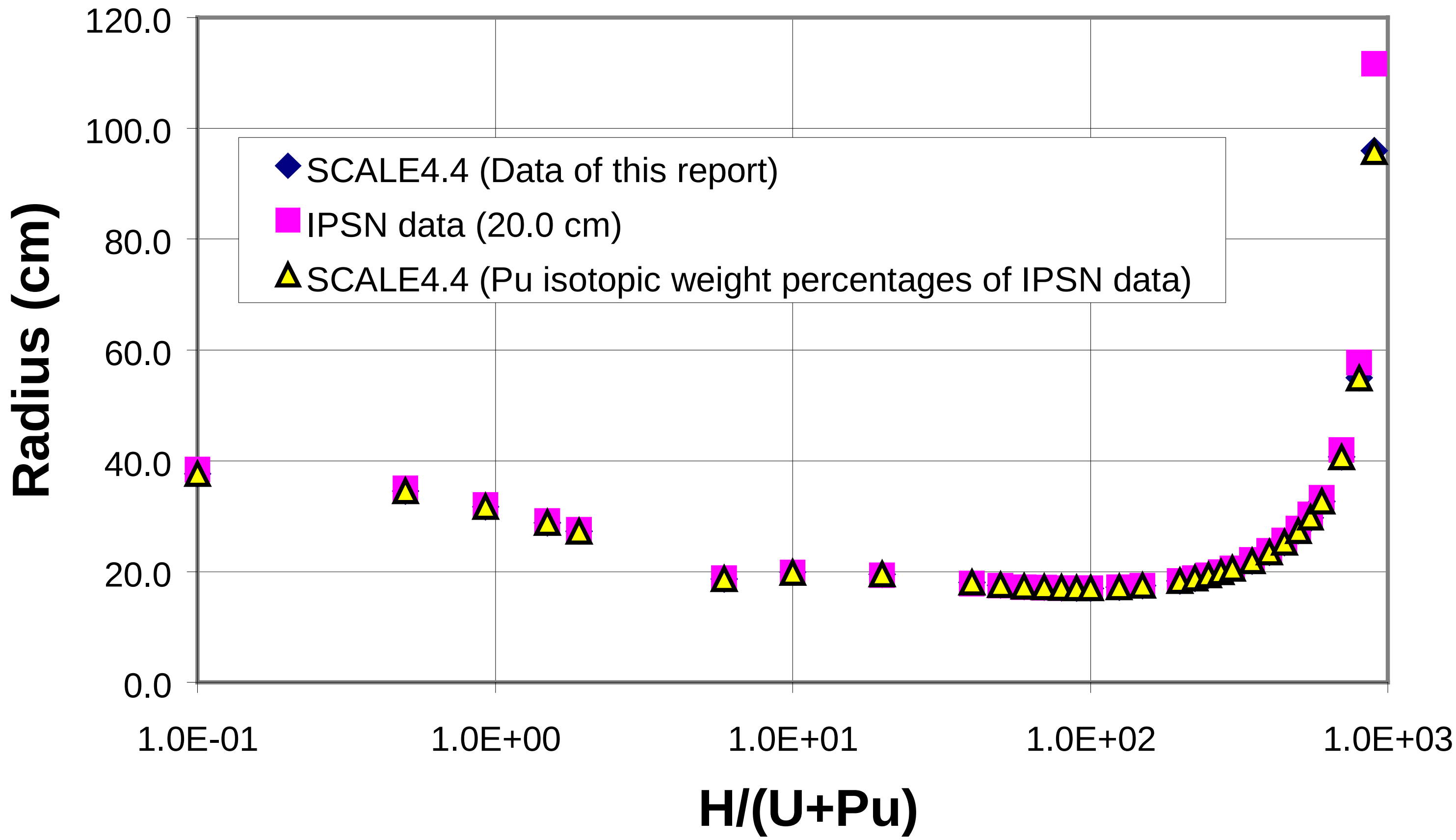

Fig. C.3. Comparison of sphere radius [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 30.0 cm].

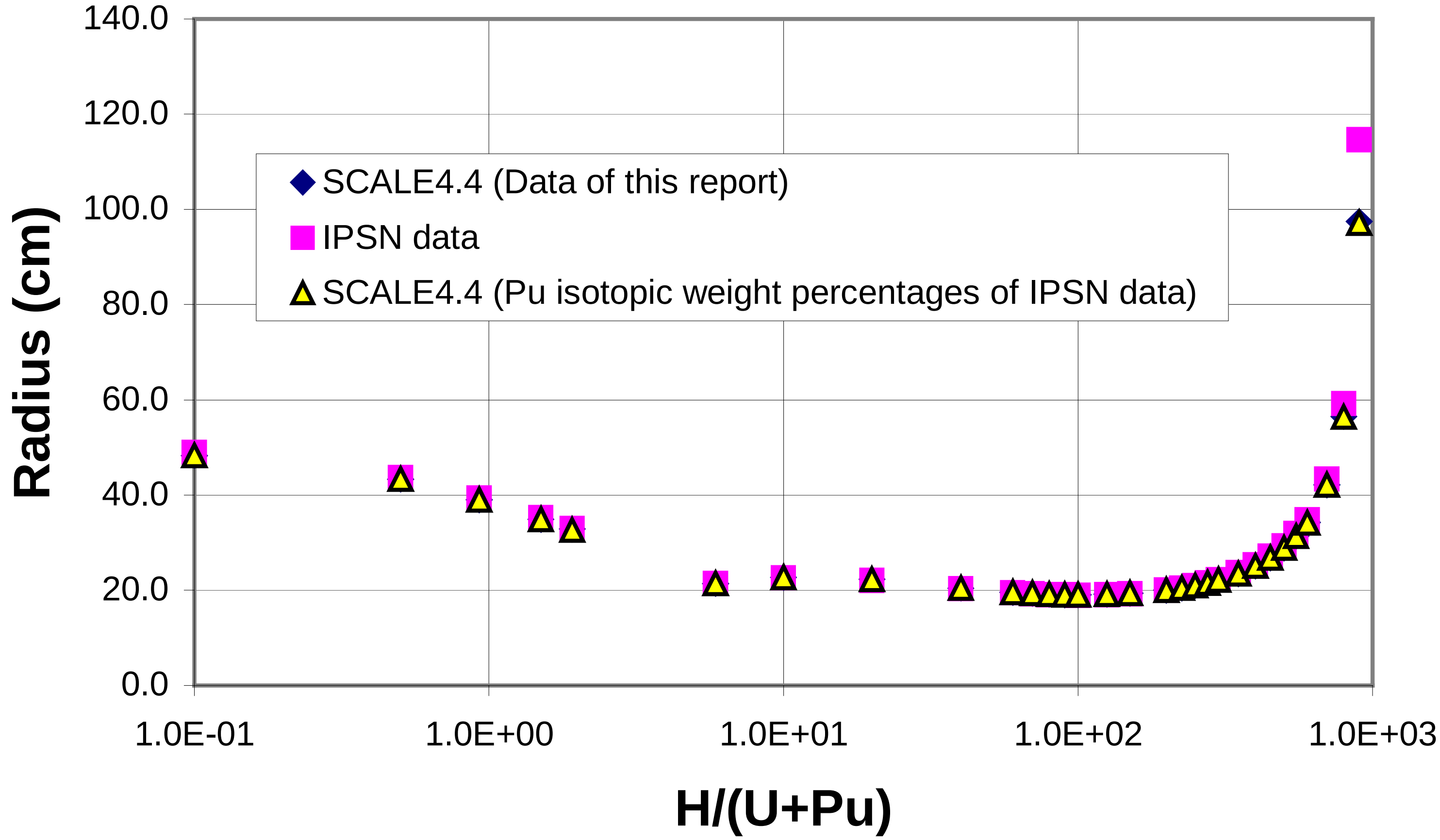

Fig. C.4. Comparison of sphere radius [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 2.5 cm].

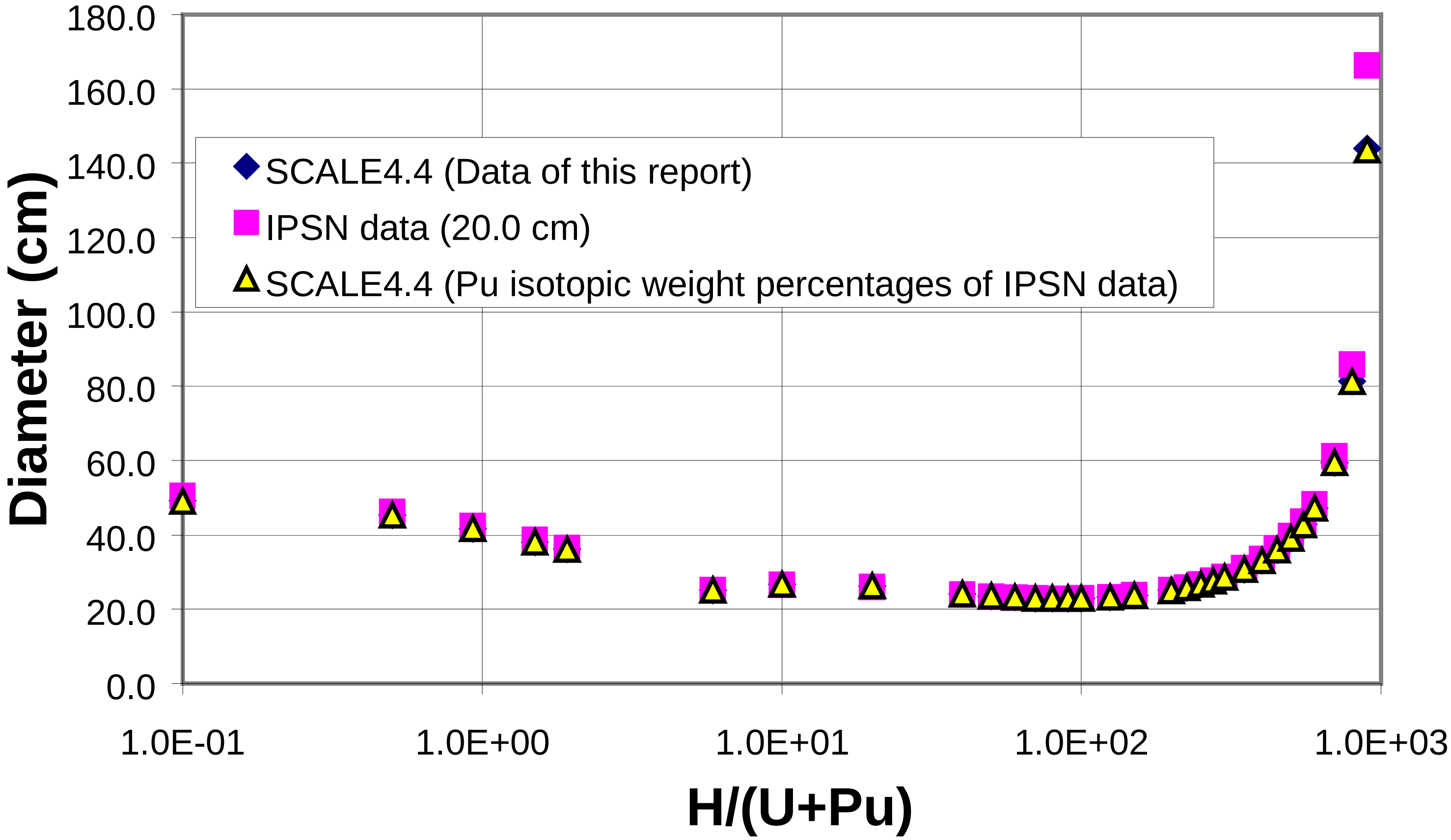

Fig. C.5. Comparison of cylinder diameter [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 30.0 cm].

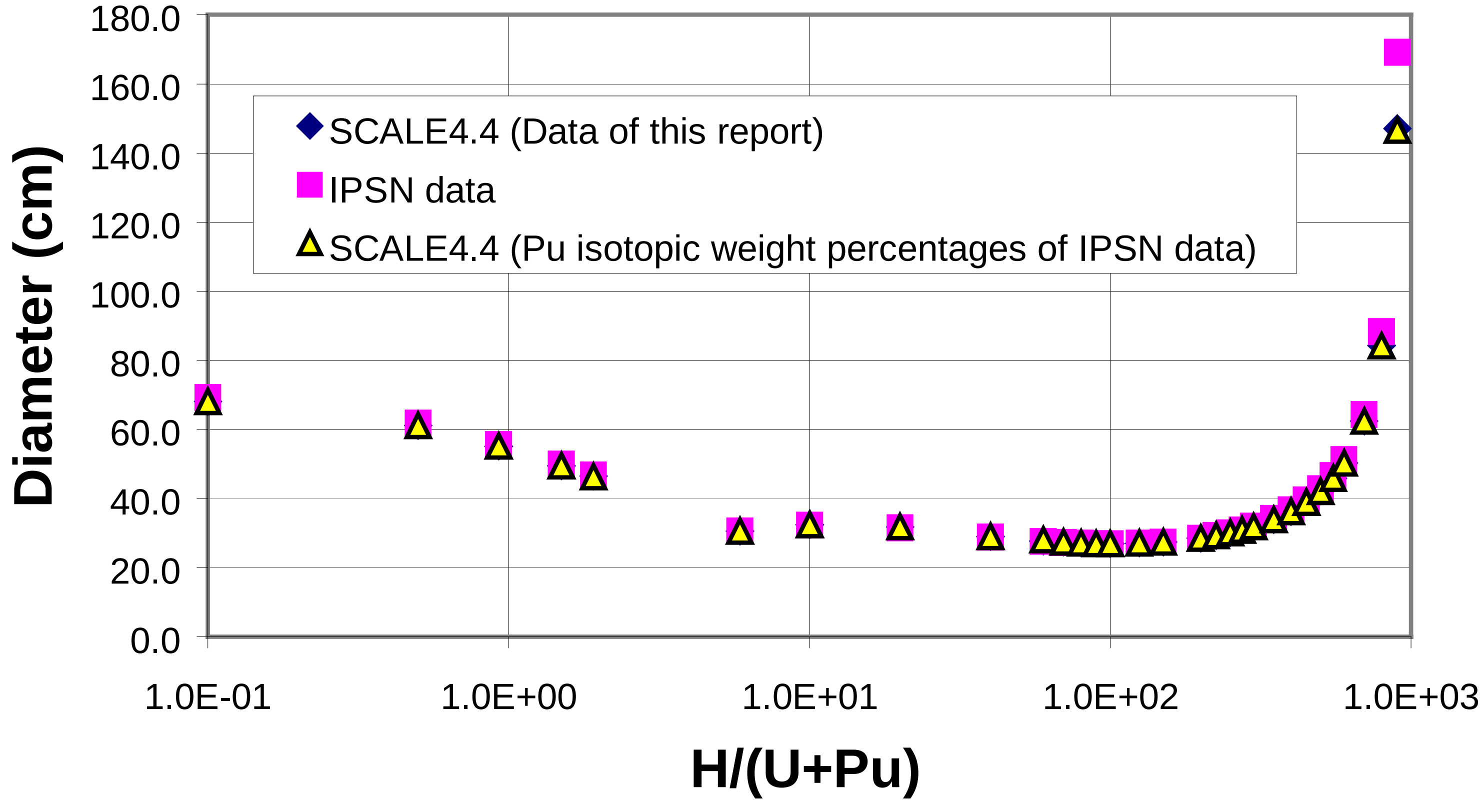

Fig. C.6. Comparison of cylinder diameter [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 2.5 cm].

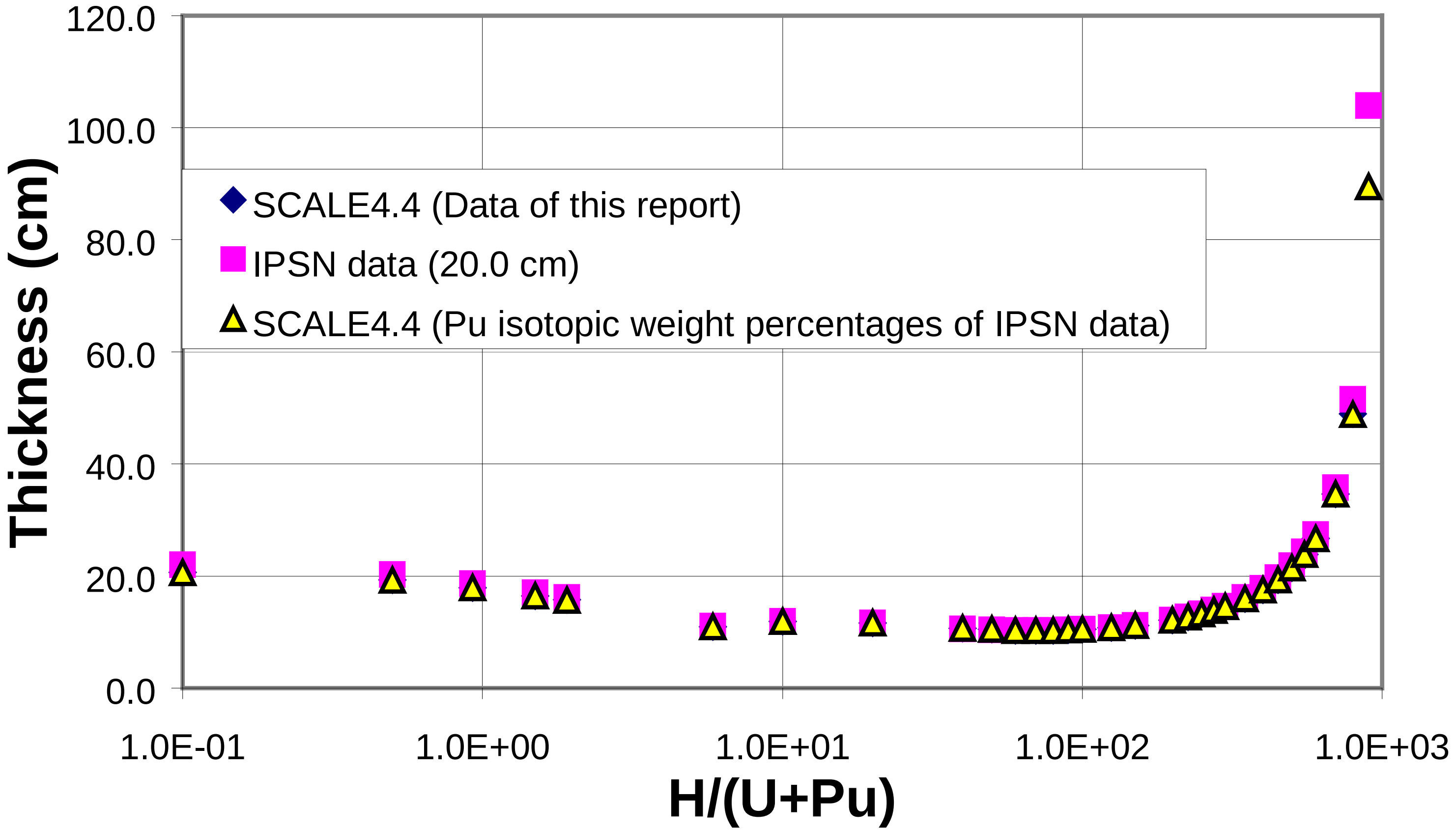

Fig. C.7. Comparison of slab thickness [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 30.0 cm].

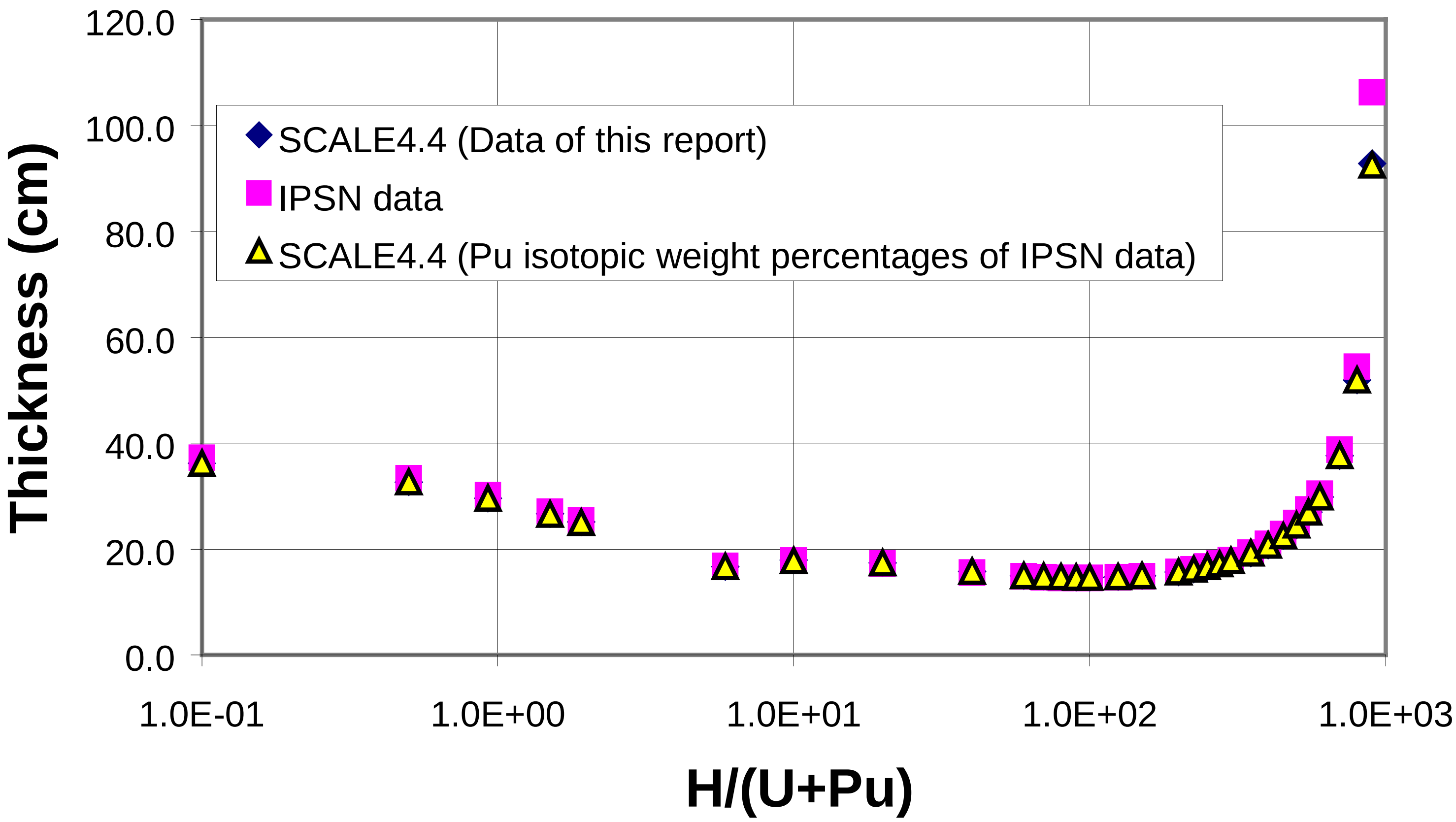

Fig. C.8. Comparison of slab thickness [^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 2.5 cm].

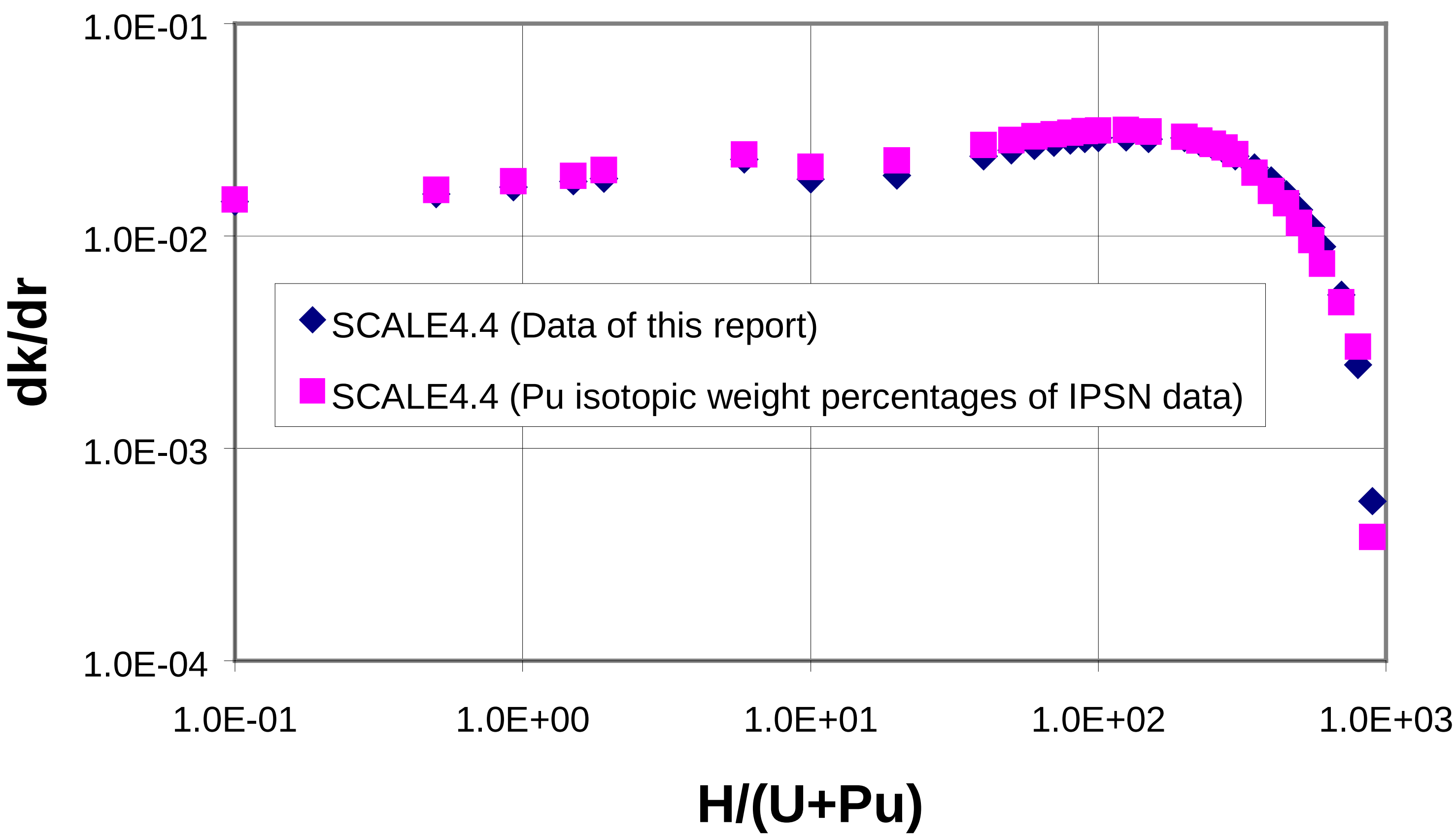

Fig. C.9. Comparison of dk/dr [sphere, ^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 30.0 cm].

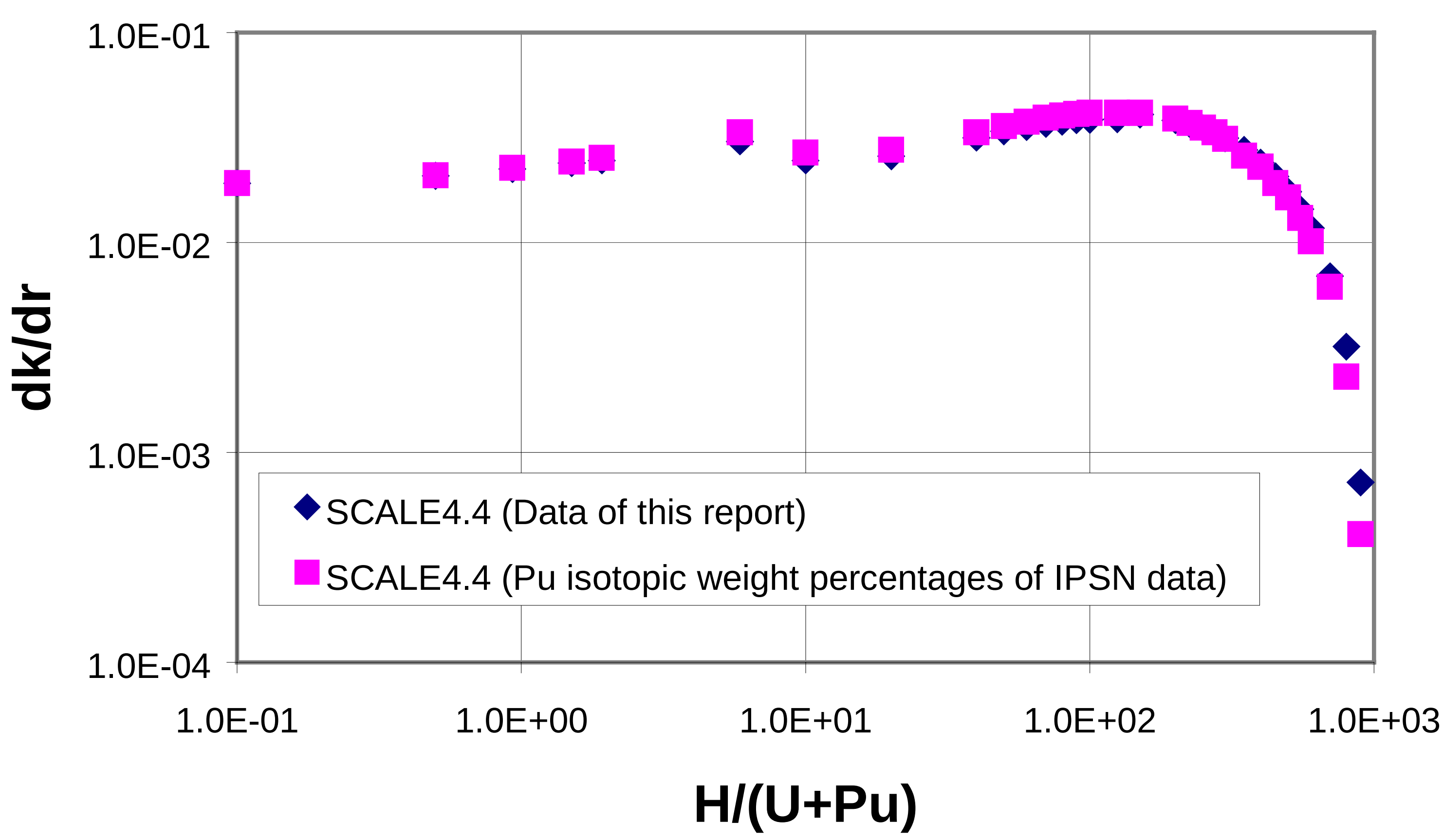

Fig. C.10. Comparison of dk/dr [sphere, $^{235}U/U$ = 0.718%, $^{240}Pu/Pu$ = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 2.5 cm].

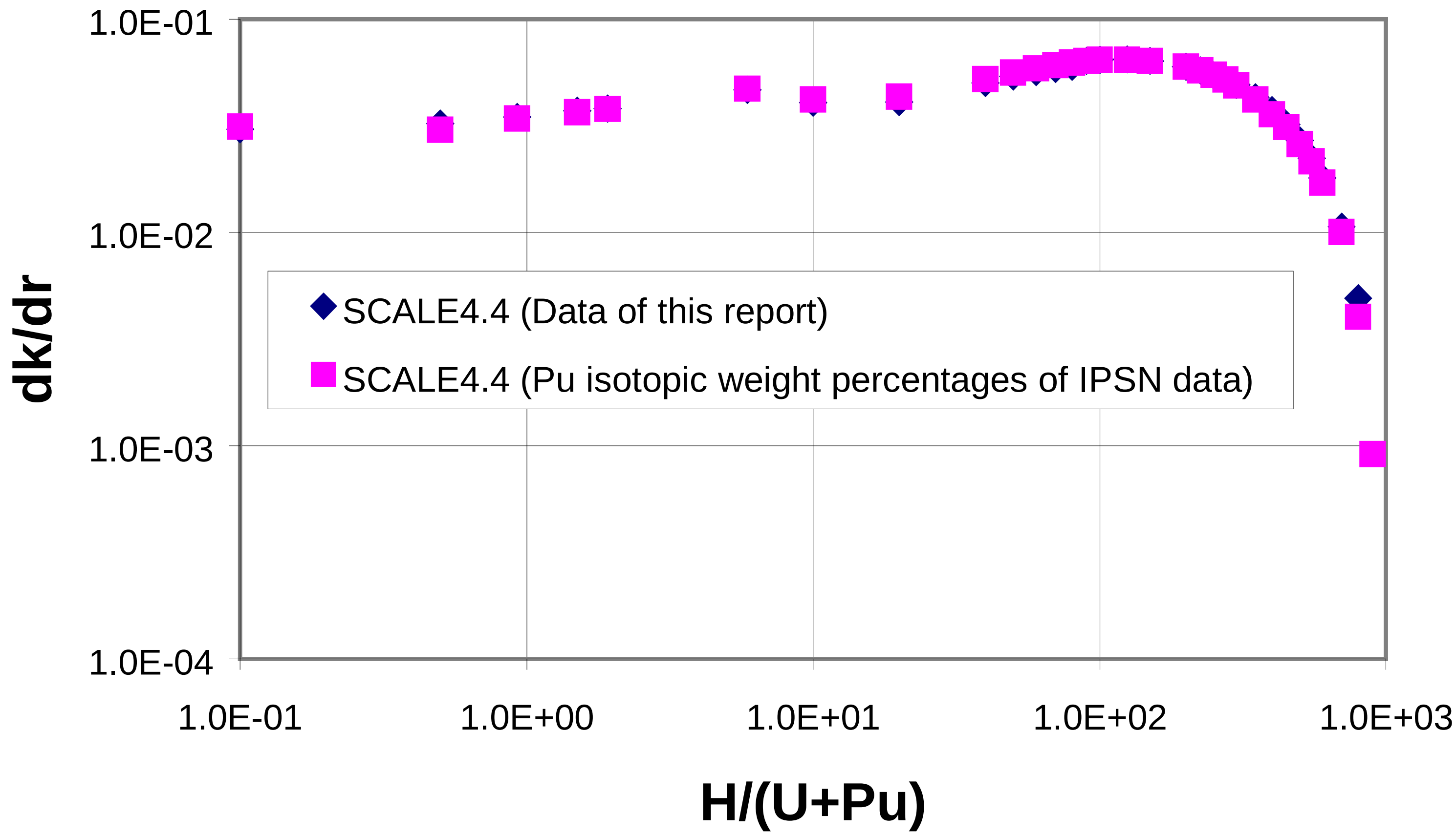

Fig. C.11. Comparison of dk/dr [cylinder, ^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 30.0 cm].

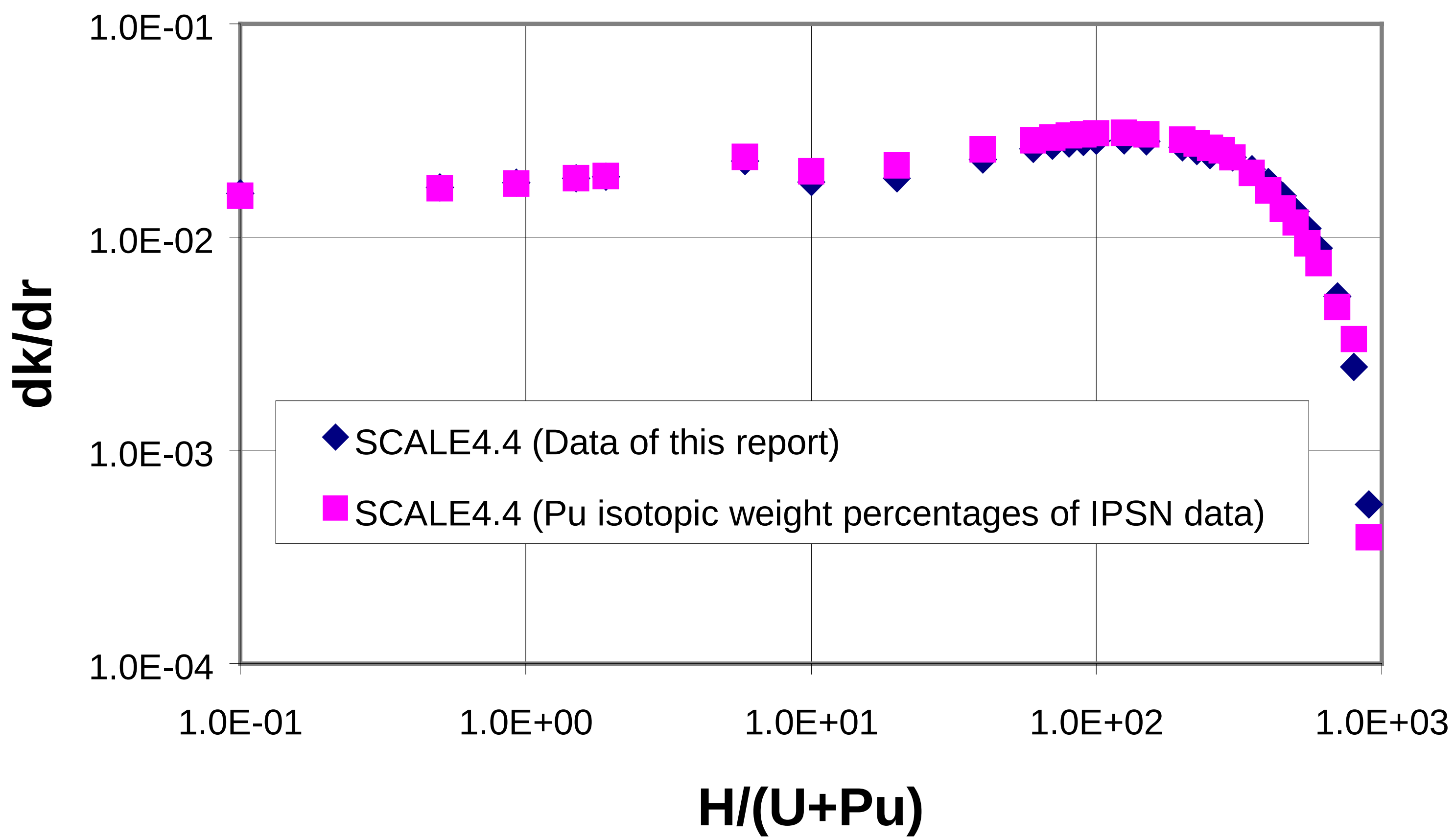

Fig. C.12. Comparison of dk/dr [cylinder, ^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 2.5 cm].

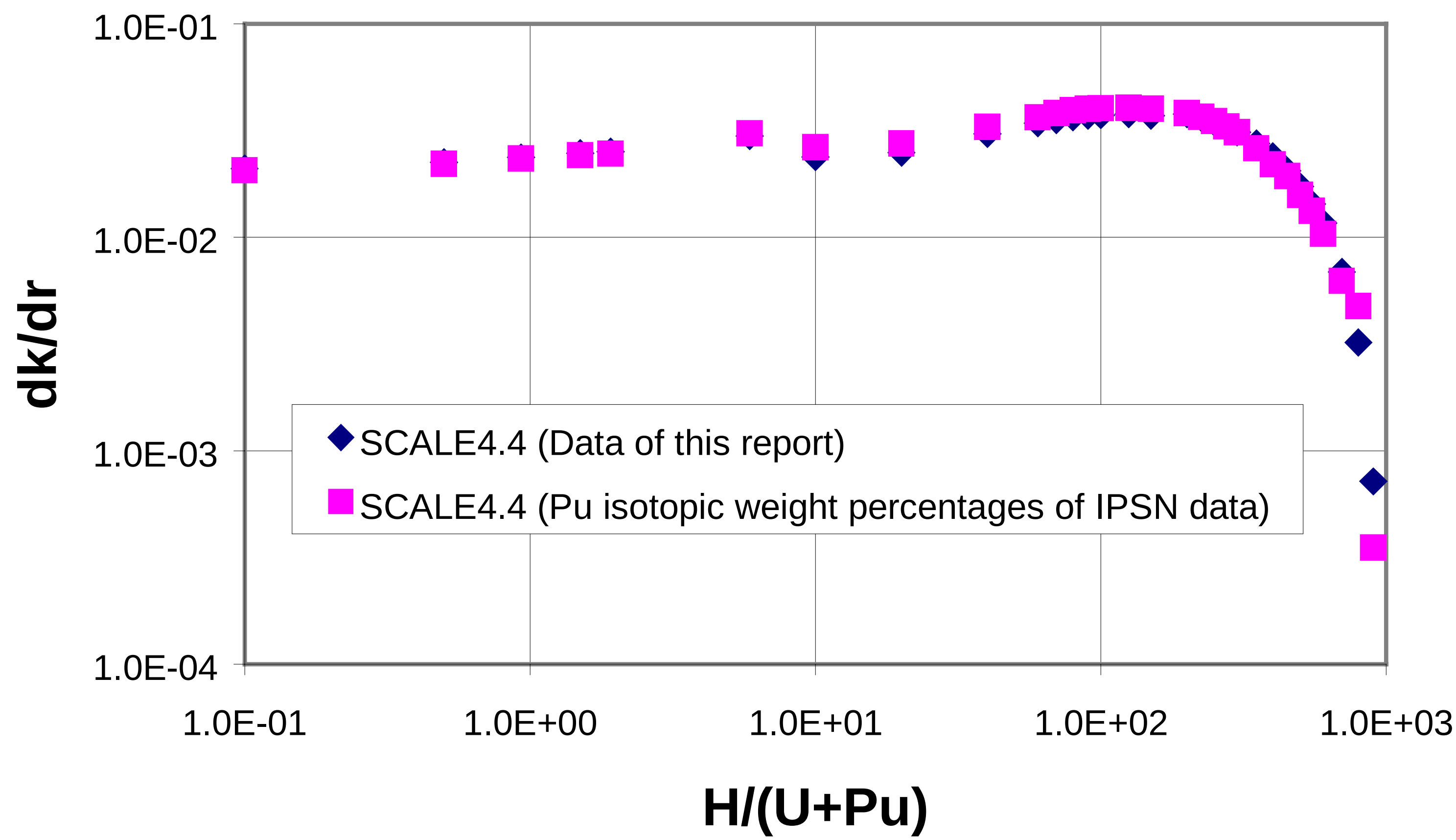

Fig. C.13. Comparison of dk/dr [slab, ^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 30.0 cm].

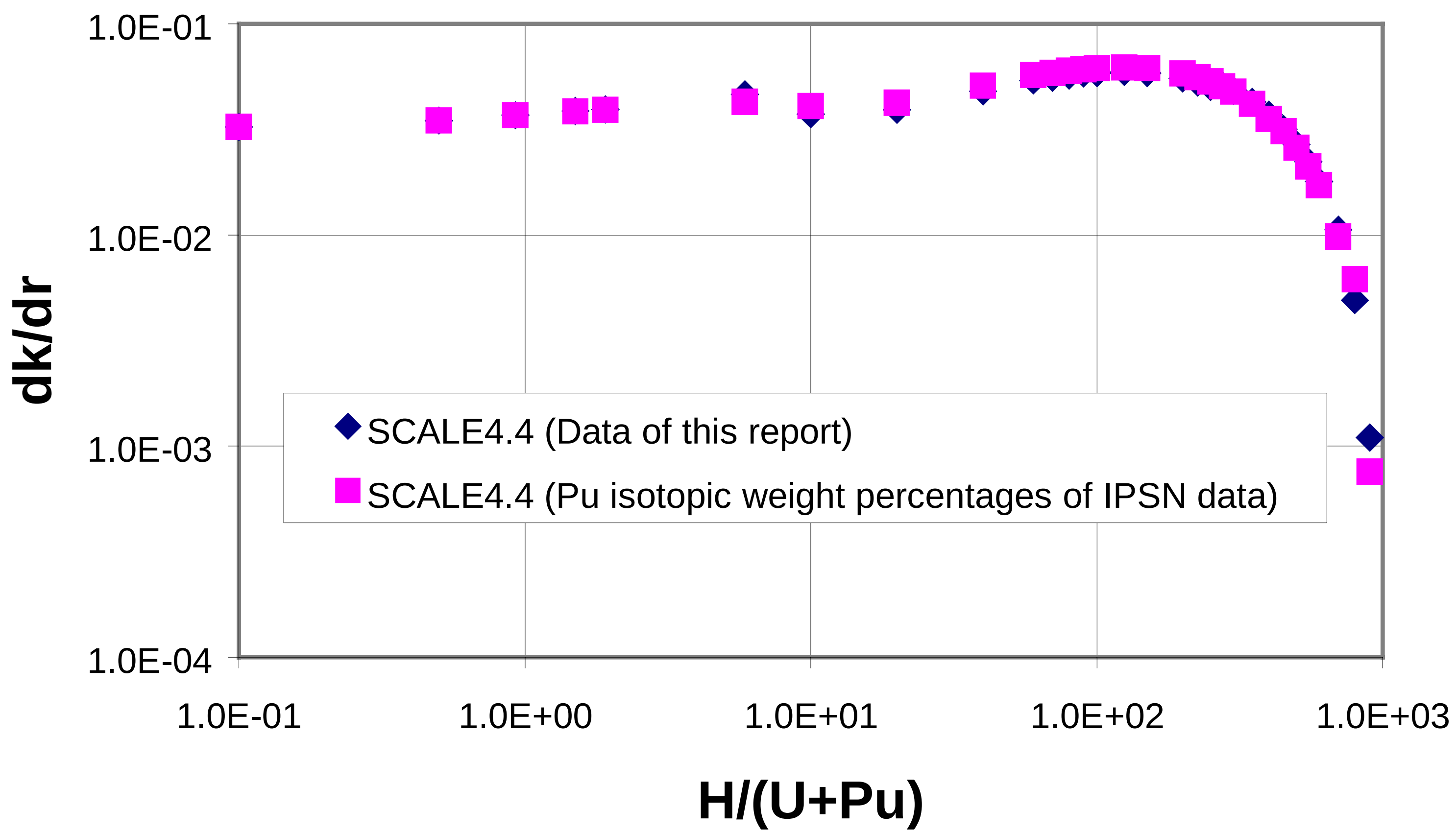

Fig. C.14. Comparison of dk/dr [slab, ^{235}U/U = 0.718%, ^{240}Pu/Pu = 20%, MOX density: 3.5 g/cm^3, Pu/(U + Pu): 35% and water reflector: 2.5 cm].

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