

ENDF/B-VII: Fission Product Evaluations

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New Evaluations for 29 FP Materials

■ 24 materials: KAERI-BNL

- ^{95}Mo , ^{99}Tc , ^{101}Ru , ^{103}Rh , ^{105}Pd , ^{109}Ag , ^{131}Xe , ^{133}Cs , ^{141}Pr , $^{143,145}\text{Nd}$, $^{147,149,150,151,152}\text{Sm}$, ^{153}Eu , $^{155,157}\text{Gd}$, $^{160,161,162,163,164}\text{Dy}$
- Energies: Low (thermal, RRR, URR), fast with Empire-2.17 and earlier versions
 - ^{99}Tc and ^{103}Rh thermal and resonance region under revision
- Problems:
 - Energy balance problematic (5 materials)
 - (n,n'_2) , (n,n'_3) , ... not calculated properly (all materials, bug in Empire)
 - Photon production missing (all materials, calculated but not formatted by Endver)
- Action on NNDC: Recalculate with EMPIRE-2.19 using the same input

■ 5 materials: BNL-JAERI-IAEA

- $^{70,72,73,74,76}\text{Ge}$
- Energies: Low (thermal, RRR, URR), fast with Empire-2.19
- Details: Presentation by Mike Herman (Thu am, Homeland Security Session)
- Problems: Minor formatting problems

Status of Other FP Evaluations

■ ENDF/B-VI, release 8 (October 2001)

- 200 FPs out of 328 materials
- Many deficiencies
 - 65% evaluations more than 25-30 years old
 - 55% evaluations use isotropic elastic angular distribution
 - 30% evaluations use outdated point-wise data in resonance region
 - 30% evaluations use outdated single-level Breit-Wigner formalism

■ WPEC Subgroup 21

- 211 FPs reviewed in 2001-2004
- Final recommendations by SG21 Workshop (BNL, April 2004)
 - 6 attendees:
 - ENDF Oblozinsky, Herman, Mughabghab
 - JENDL Nakagawa, Iwamoto
 - BROND Pronyaev
 - Input from JEFF (Jacqmin), CENDL (Ge Zhigang)

SG21 Recommendations: Best FP Evaluations

Library (Data Source)	Full File	Resonance Region	Fast Region	Comment
ENDF/B-VI	1	17	13	
ENDF/B-VII	27	-	2	Includes $^{70,72,73,74,76}\text{Ge}$; ^{99}Tc , ^{103}Rh thermal & resonances under revision
JEFF-3.0	1	-	-	
JENDL-3.3	44	7	66	
CENDL-3	10	-	27	CENDL-3.0 release for SG21
BROND-2	1	1	1	
New BNL-325	-	109	-	
EMPIRE	-	-	25	Initial calculations done
Total materials	84	134	134	211 existing + 7 new

WPEC SG23: Creation of FP Library

■ SG23 established in May 2004

- Chair Oblozinsky, monitor Jacqmin
- Members
 - ENDF Herman, Mughabghab, Dunn
 - JEFF Dean, Trkov
 - JENDL Nakagawa, Shibata
 - BROND Ignatyuk, Pronyaev
 - CENDL Ge Zhigang, Chen Guochang
- Objective
 - Create files based on SG21 recommendations → WPEC FP Library
 - Perform basic testing for all and validation for selected materials
- Informal meeting in Santa Fe, September 2004
 - Creation of files: NNDC & Chen Guochang, complex cases Nakagawa, Pronayev
 - Basic testing: NNDC
 - Validation: JEFF, partly ENDF (Dunn) and BROND (Ignatyuk)

WPEC FP Library: Progress to Date

- Evaluation of new BNL resonance parameters
 - $Z \geq 50$ all completed (94 materials)
 - $Z = 31 - 49$ partly completed (7 out of 15 materials)
- 57 Materials from ENDF/B-VI, JEFF, JENDL, CENDL and BROND converted to ENDF/B-VII
 - Remaining 27 materials already in ENDF/B-VII
- 109 Materials converted to ENDF/B-VII awaiting merging with new BNL resonance parameters
 - Chen Gouchang visiting NNDC for 6 weeks starting Nov 8, 2004
- 25 Materials require more complex merging