

Nuclear Wallet Cards for Homeland Security

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Objective: Homeland Security personnel in the field to identify the source of observed radioactivity

Present the basic properties of various radioactive isotopes likely to be encountered in almost all foreseeable conditions, such as:

in a smuggled cargo

a naturally-occurring radioactive source, or in a dirty bomb.

Limit to radioactive nuclides with half-life >1 hour.

The properties presented limited to
Half-life
Principal radiations.

An energy-ordered gamma-ray table showing possible origin of the gamma radiation.

Better-known and naturally occurring radioactive nuclides.

Naturally-occurring decay Chains

NuDat Database

NuDat 2.0

NuDat 2.0 allows to search and plot nuclear structure and nuclear decay data interactively. [More...](#)

Search Options:

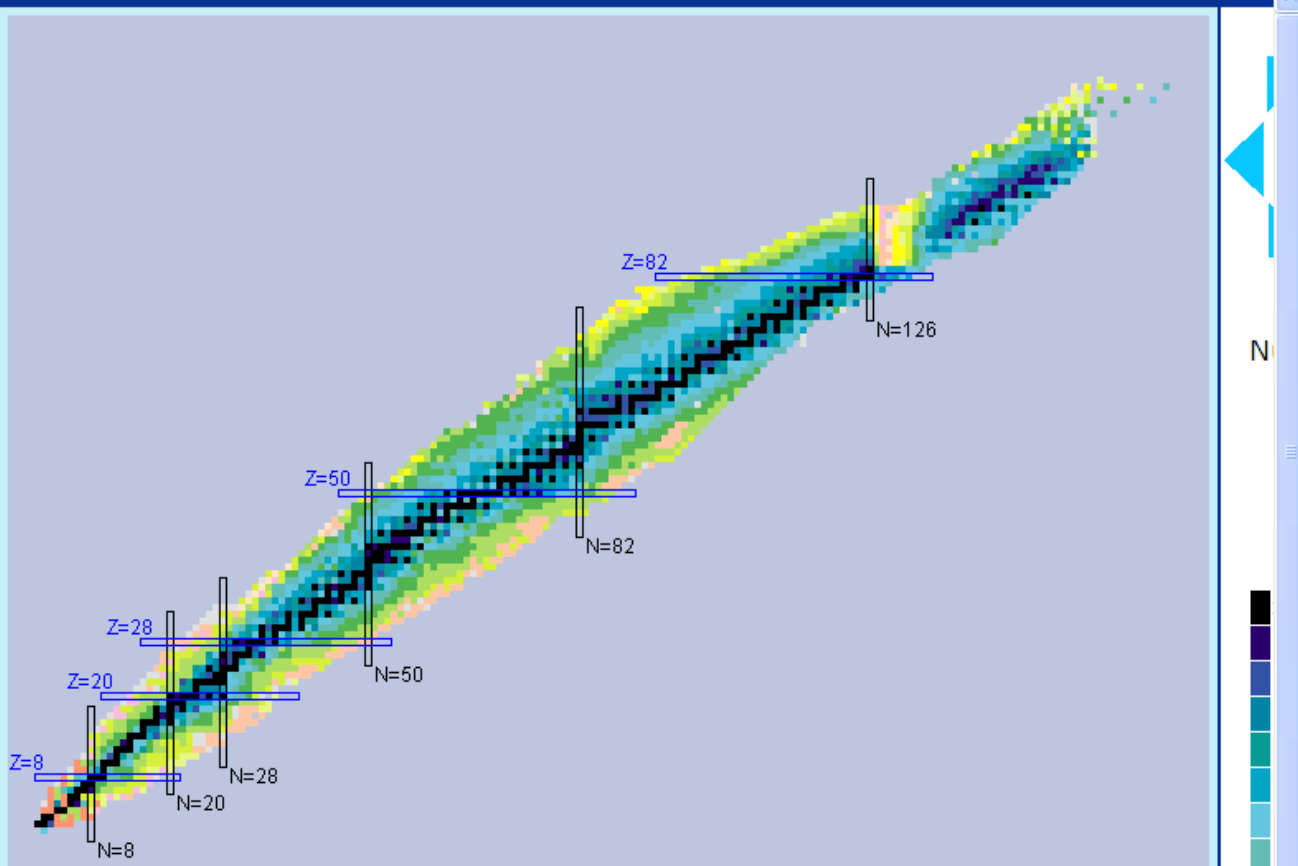
Levels and Gammas

Search on ground and excited states level properties (energy, half-life, spin and parity, decay modes) and gamma-ray information (energy, branching ratio, multipolarity)

Nuclear Wallet Cards

Search on ground and isomeric states level properties, neutron resonance parameters and thermal cross sections

Decay Radiation



Ground and isomeric state information for ^{128}Ba
 A full list of levels and a level scheme are available

Nucleus	E(level) (MeV)	$J\pi$	Δ (MeV)	$T_{1/2}$	Abundance	Decay Modes
$^{128}_{56}\text{Ba}$	0.0000	0+	-85.4097	2.43 d 5	ϵ : 100.00 %	

Nuclear Wallet Cards



To NNDC

Nuclear Wallet Cards for Radioactive Nuclides (Homeland Security)

This version of Nuclear Wallet Cards contains decay properties only of radioactive nuclides, with $T_{1/2} \geq 1\text{h}$ and $Z \leq 100$. There are two nuclear data tables ordered by isotope and by gamma-ray energy and produced as standard [hardcopy](#) and in PDA-adaptable format. PDA version of Nuclear Wallet Cards ordered by gamma-ray energy and isotope can be found [here](#).

Nuclear Wallet Cards for Radioactive Nuclides

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USA

General
Information

Current Version

Radioactive
Nuclides (Homeland
Security)

Nuclear Materials
Management &
Safeguards

Palm Pilot

Sixth Edition
2000

Last updated by [Boris Pritychenko](#) on April 22, 2004.

Nuclear Wallet Cards



To NNDC

Palm Pilot

PDA version requires Palm OS 3.0 or higher and [mobiledb](#) database program installed. The mobiledb database program can be substituted with a FreewarePalm [mobiledb-lite](#) program. All recent versions of Nuclear Wallet Cards such as [Nuclear Wallet Cards for Radioactive Isotopes](#) and the [sixth edition](#) are available in the PDA format.



Compact "Slider" Design

[General Information](#)

[Current Version](#)

[Radioactive Nuclides \(Homeland Security\)](#)

[Nuclear Materials Management & Safeguards](#)

[Palm Pilot](#)

[Sixth Edition 2000](#)

Last updated by [Boris Pritychenko](#) on April 22, 2004.

click on the periodic table below

0	1																	2
n	H																	He
	3	4											5	6	7	8	9	10
	Li	Be											B	C	N	O	F	Ne
	11	12											13	14	15	16	17	18
	Na	Mg											Al	Si	P	S	Cl	Ar
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
	55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
	Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
	87	88	89	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
	Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Uuu	Uub	Uut	Uuq	Uup	Uuh	Uus	Uuo
			58	59	60	61	62	63	64	65	66	67	68	69	70	71		
			Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu		
			90	91	92	93	94	95	96	97	98	99	100	101	102	103		
			Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr		

Choose: Hg

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Results for Z=80

Nucleus	E (level) (MeV)	J π	Δ (MeV)	T _{1/2}	Abundance	Decay Modes
¹⁷¹ ₈₀ Hg	0.0000			60 μ s <i>+40-15</i>		$\alpha \approx 100.00$ %
¹⁷² ₈₀ Hg		0+		0.25 ms <i>+35-9</i>		α
¹⁷³ ₈₀ Hg	0.0000			0.9 ms <i>+6-3</i>		$\alpha \approx 100.00$ %
¹⁷⁴ ₈₀ Hg	0.0000	0+		2.1 ms <i>+18-7</i>		$\alpha : 99.60$ %
¹⁷⁵ ₈₀ Hg	0.0000		-8.0000 Syst	8 ms <i>8</i>		$\alpha : 100.00$ %
¹⁷⁶ ₈₀ Hg	0.0000	0+	-11.7245	34 ms <i>+18-9</i>		$\alpha \approx 100.00$ %
¹⁷⁷ ₈₀ Hg	0.0000	(13/2+)	-12.7271	127.3 ms <i>18</i>		$\alpha : 85.00$ % $\epsilon : 15.00$ %
¹⁷⁸ ₈₀ Hg	0.0000	0+	-16.3232	0.287 s <i>23</i>		$\alpha \approx 70.00$ % $\epsilon \approx 30.00$ %
¹⁷⁹ ₈₀ Hg	0.0000		-16.9690 Syst	0.93 s <i>11</i>		$\alpha \approx 53.00$ % $\epsilon \approx 47.00$ % $\epsilon_p \approx 0.15$ %
¹⁸⁰ ₈₀ Hg	0.0000	0+	-20.2447	2.58 s <i>1</i>		$\epsilon : 52.00$ % $\alpha : 48.00$ %
¹⁸¹ ₈₀ Hg	0.0000	1/2(-)	-20.6740 Syst	3.6 s <i>1</i>		$\epsilon : 69.00$ % $\alpha : 31.00$ %

Summary

5000 copies produced

Distributed to 50 states' emergency
preparedness

Distributed to various Police and Fire
Departments

Web/Paper/Palm-Pilot modes

Propose 4-page true-wallet card

Acknowledgements

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