

Nuclear Wallet Cards for Radioactive Nuclides

October 2023

National Nuclear Data Center

<https://www.nndc.bnl.gov>

Elizabeth McCutchan

Shaofei Zhu

Christopher Morse

Benjamin Shu

Donnie Mason

Andrea Mattera

Shuya Ota

Jin Wu

Brookhaven National Laboratory

P.O. Box 5000

Upton, New York 11973-5000

U.S.A.

Disclaimer

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors, or their employees, make any warranty, express or implied, or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency, contractor, or subcontractor thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency, contractor, or subcontractor thereof.

Introduction

This booklet serves as a quick reference for gamma-rays produced following the decay of long-lived radionuclides. Table I is based on the 2023 Edition of the Nuclear Wallet Cards combined with September 2023 data from the Evaluated Nuclear Structure Data File (ENSDF). Table II and III make use of data solely from ENSDF (September 2023 version).

Explanation of Table I

All nuclides with $T_{1/2}$ longer than 1 hour are included. Those with $T_{1/2}$ shorter than 1 hour are decay products of the long-lived radioactive chains given on page 107.

Nuclide (A,EL): Nuclides are listed by increasing atomic number (Z) and within a given element, ordered by increasing mass number (A). Long-lived excited states are indicated with the symbol, “m”, “n” following the mass number, for example $^{156\text{m}}\text{Tb}$ corresponds to the first isomer in ^{156}Tb .

Half-life, $T_{1/2}$: Value is given followed by the unit (s: second, m: minute, h: hour, d: day, y: year).

The uncertainty follows the unit and is given in *italics*.

Decay Mode: The radiation branch is given, α , β^- , $\varepsilon+\beta^+$, ε , IT, and SF.

Major Gamma Radiation (E_γ, I_γ): The gamma-ray energies emitted in the decay are given in keV. A maximum of 10 gamma-rays with an intensity larger than 2% are provided.

Explanation of Table II

Table II provides the gamma-ray energies, ordered by increasing gamma-ray energy, and their associated parent. Only gamma-rays with intensities larger than 2% are included. *Note that only immediate parents are listed.*

Explanation of Table III

Table III provides the alpha energies, ordered by increasing alpha energy, and their associated parent. Only alpha radiations with intensities larger than 5% are included and only immediate parents are listed.

Acknowledgements

This research was supported by the Office of Nuclear Physics, Office of Science, US Department of Energy under Contract No. DE-AC02-98CH10886.

References

Evaluated Nuclear Structure Data File (ENSDF) – Maintained by the National Nuclear Data Center, Brookhaven National Laboratory, September 2023 version available at <https://www.nndc.bnl.gov/ensdfarchivals/>

Nuclear Wallet Cards - Maintained by the National Nuclear Data Center, Brookhaven National Laboratory, September 2023 version available at https://www.nndc.bnl.gov/nudat3/indx_sigma.jsp

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
3	H	12.322 y <i>11</i>	β ⁻		
7	Be	53.30 d <i>10</i>	ε	477.6035	10.4
10	Be	1.386×10 ⁶ y <i>12</i>	β ⁻		
14	C	5686 y <i>22</i>	β ⁻		
18	F	109.734 m <i>8</i>	ε+β ⁺		
22	Na	2.60188 y <i>46</i>	ε+β ⁺	1274.537	99.9
24	Na	14.9578 h <i>11</i>	β ⁻	1368.625	100.0
				2754.008	99.9
28	Mg	20.915 h <i>9</i>	β ⁻	30.6383	89.0
				400.6	35.9
				941.7	36.3
				1342.2	54.0
				1372.8	4.7
				1589.4	4.7
26	Al	7.17×10 ⁵ y <i>17</i>	ε+β ⁺	1129.67	2.5
				1808.65	99.8
31	Si	157.24 m <i>16</i>	β ⁻		
32	Si	163 y <i>6</i>	β ⁻		
32	P	14.267 d <i>6</i>	β ⁻		
33	P	25.35 d <i>11</i>	β ⁻		
35	S	87.35 d <i>7</i>	β ⁻		
38	S	170.3 m <i>7</i>	β ⁻	1745.77	2.5
				1941.945	86.5
36	Cl	3.013×10 ⁵ y <i>15</i>	ε+β ⁺		
			β ⁻		
37	Ar	35.01 d <i>2</i>	ε		
39	Ar	268 y <i>8</i>	β ⁻		
41	Ar	109.61 m <i>4</i>	β ⁻	1293.64	99.2
42	Ar	32.9 y <i>11</i>	β ⁻		
40	K	1.2480×10 ⁹ y <i>30</i>	ε+β ⁺	1460.820	10.7
			β ⁻		
42	K	12.359 h <i>4</i>	β ⁻	1524.6	18.1
43	K	22.28 h <i>11</i>	β ⁻	220.632	4.8
				372.760	86.8
				396.861	11.8
				593.390	11.3
				617.490	79.2
41	Ca	9.94×10 ⁴ y <i>15</i>	ε		
45	Ca	162.61 d <i>9</i>	β ⁻		
47	Ca	4.536 d <i>2</i>	β ⁻	489.23	5.9

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				807.86	5.9
				1297.09	67.0
43	Sc	3.891 h 12	ε+β ⁺	372.9	22.5
44	Sc	4.0420 h 24	ε+β ⁺	1157.022	99.9
44m	Sc	58.62 h 9	ε+β ⁺		
			IT	271.251	86.7
46	Sc	83.808 d 29	β ⁻	889.277	100.0
				1120.545	100.0
47	Sc	3.3491 d 6	β ⁻	159.381	68.3
48	Sc	43.71 h 8	β ⁻	175.361	7.5
				983.526	100.0
				1037.522	97.5
				1212.880	2.4
				1312.120	100.0
44	Ti	59.1 y 3	ε	67.8679	93.0
				78.3234	96.8
45	Ti	184.8 m 5	ε+β ⁺		
48	V	15.974 d 2	ε+β ⁺	944.129	7.9
				983.525	100.0
				1312.105	98.2
				2240.396	2.3
49	V	330 d 15	ε		
50	V	2.68×10 ¹⁷ y 11	ε+β ⁺	1553.77	99.3
			β ⁻		
48	Cr	21.56 h 3	ε+β ⁺	112.31	96.0
				308.24	100.0
51	Cr	27.7004 d 22	ε	320.0824	9.9
52	Mn	5.591 d 3	ε+β ⁺	744.233	90.0
				848.18	3.3
				935.544	94.5
				1246.278	4.2
				1333.649	5.1
				1434.092	100.0
53	Mn	3.62×10 ⁶ y 38	ε		
54	Mn	312.10 d 4	ε+β ⁺	834.848	100.0
			β ⁻		
56	Mn	2.5788 h 2	β ⁻	846.7638	98.8
				1810.726	26.9
				2113.092	14.2
52	Fe	8.273 h 9	ε+β ⁺	168.688	99.2
55	Fe	2.7558 y 14	ε		

A	El	T_{1/2}	Decay Mode	E_γ (keV)	I_γ ≥ 2%
59	Fe	44.495 d 9	β ⁻	192.343	3.1
				1099.245	56.5
				1291.590	43.2
60	Fe	2.609×10 ⁶ y 38	β ⁻	58.603	2.1
55	Co	17.53 h 2	ε+β ⁺	477.2	20.2
				931.1	75.0
				1316.6	7.1
				1370.0	2.9
				1408.5	16.9
56	Co	77.236 d 26	ε+β ⁺	846.770	99.9
				1037.843	14.0
				1238.288	66.5
				1360.212	4.3
				1771.357	15.4
				2015.215	3.0
				2034.791	7.8
				2598.500	17.0
				3202.029	3.2
				3253.503	7.9
57	Co	271.80 d 3	ε	14.4129	9.2
				122.06065	85.6
				136.47356	10.7
58	Co	70.883 d 22	ε+β ⁺	810.7593	99.4
58m	Co	8.856 h 23	IT		
			ε		
60	Co	5.2711 y 10	β ⁻	1173.228	99.8
				1332.492	100.0
61	Co	1.650 h 5	β ⁻	67.412	84.7
				917.5	3.6
56	Ni	6.081 d 15	ε+β ⁺	158.38	98.8
				269.50	36.5
				480.44	36.5
				749.95	49.5
				811.85	86.0
				1561.80	14.0
57	Ni	35.60 h 6	ε+β ⁺	127.164	16.7
				1377.63	81.7
				1757.55	5.8
				1919.52	12.3
59	Ni	8.1×10 ⁴ y 9	ε+β ⁺		
63	Ni	100.8 y 12	β ⁻		

A	El	T_{1/2}	Decay Mode	E_γ (keV)	I_γ ≥ 2%
65	Ni	2.5175 h 5	β ⁻	366.27	4.8
				1115.53	15.4
				1481.84	23.6
66	Ni	54.6 h 3	β ⁻		
61	Cu	3.339 h 7	ε+β ⁺	67.412	4.0
				282.956	12.7
				373.050	2.1
				656.008	10.4
				1185.234	3.6
64	Cu	12.7007 h 13	ε+β ⁺		
			β ⁻		
67	Cu	61.81 h 10	β ⁻	91.266	7.0
				93.311	16.1
				184.577	48.7
62	Zn	9.193 h 12	ε+β ⁺	40.85	25.5
				243.36	2.5
				394.03	2.2
				507.60	14.8
				548.35	15.3
				596.56	26.0
65	Zn	243.93 d 8	ε+β ⁺	1115.539	50.0
69m	Zn	13.748 h 10	β ⁻		
			IT	438.634	94.8
71m	Zn	4.137 h 31	β ⁻	121.591	2.3
				142.820	4.6
				386.371	89.0
				389.979	2.7
				487.402	61.9
				511.556	28.0
				595.916	28.0
				620.084	54.5
				753.395	3.2
				964.670	4.4
			IT		
72	Zn	46.5 h 1	β ⁻	16.4	8.3
				88.7	2.2
				102.8	2.3
				112.1	2.1
				144.7	82.8
				191.5	9.4
66	Ga	9.304 h 8	ε+β ⁺	833.5324	5.9
				1039.220	37.0

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥2%
				2189.616	5.3
				2751.835	22.7
				4295.187	3.8
67	Ga	3.2615 d 4	ε	91.265	3.1
				93.310	38.8
				184.576	21.4
				208.950	2.5
				300.217	16.6
				393.527	4.6
68	Ga	67.843 m 17	ε+β ⁺	1077.34	3.2
72	Ga	14.03 h 6	β ⁻	600.912	5.8
				629.967	26.1
				834.13	95.4
				894.327	10.1
				1050.794	7.0
				1596.733	4.4
				1861.996	5.4
				2201.586	26.9
				2491.026	7.7
				2507.718	13.3
73	Ga	4.87 h 2	β ⁻	53.45	10.5
				297.32	79.8
				325.70	11.2
				739.42	4.2
66	Ge	2.26 h 4	ε+β ⁺	43.89	29.2
				65.12	7.2
				108.85	10.6
				182.03	5.7
				190.20	5.7
				272.97	10.6
				338.05	8.8
				381.85	28.3
				470.62	7.5
				536.74	6.2
68	Ge	271.04 d 9	ε		
69	Ge	38.90 h 7	ε+β ⁺	574.11	13.3
				871.98	11.9
				1106.77	36.0
				1336.60	4.5
71	Ge	11.42 d 4	ε		
75	Ge	82.78 m 6	β ⁻	264.6	11.4
77	Ge	11.211 h 3	β ⁻	211.03	30.0

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				215.51	27.9
				264.450	53.3
				367.49	14.5
				416.35	22.6
				557.92	16.8
				631.85	7.4
				714.37	7.5
				1085.23	6.4
				1368.45	3.2
78	Ge	87 m 1	β ⁻	277.3	96.0
				293.9	4.0
71	As	65.30 h 7	ε+β ⁺	174.954	82.5
				326.785	3.0
				499.876	3.6
				1095.490	4.1
72	As	26.0 h 1	ε+β ⁺	629.92	8.1
				833.99	81.0
73	As	80.30 d 6	ε	53.437	10.6
74	As	17.78 d 4	ε+β ⁺	595.83	59.4
			β ⁻	634.78	15.4
76	As	26.24 h 9	β ⁻	559.10	45.0
				657.05	6.2
				1216.08	3.4
77	As	38.79 h 4	β ⁻		
78	As	90.7 m 2	β ⁻	545.3	3.0
				613.8	54.0
				694.9	16.7
				828.1	8.1
				888.7	2.1
				1240.3	5.9
				1308.7	13.0
				1373.5	4.8
				1530.0	2.5
72	Se	8.40 d 8	ε	45.89	57.2
73	Se	7.18 h 2	ε+β ⁺	67.07	69.8
				361.2	97.0
75	Se	119.779 d 11	ε	96.7340	3.4
				121.1155	17.2
				136.0001	58.6
				264.6576	58.9
				279.5422	25.0
				400.6572	11.4

A	El	$T_{1/2}$	Decay Mode	E_γ (keV)	$I_{\gamma \geq 2\%}$
79	Se	3.27×10^9 y 29	β^-		
75	Br	96.7 m 13	$\varepsilon + \beta^+$	141.19	6.6
				286.50	88.0
				292.85	2.7
				377.39	3.9
				427.79	4.4
				431.75	3.9
76	Br	16.16 h 17	$\varepsilon + \beta^+$	559.09	74.0
				563.20	3.6
				657.02	15.9
				1129.85	4.6
				1216.10	8.8
				1380.53	2.5
				1853.67	14.6
				2391.25	4.7
				2792.69	5.6
				2950.53	7.4
77	Br	57.04 h 12	$\varepsilon + \beta^+$	238.98	23.1
				249.77	3.0
				281.65	2.3
				297.23	4.2
				520.69	22.4
				578.91	3.0
				817.79	2.1
80m	Br	4.4204 h 9	IT	37.052	39.1
82	Br	35.284 h 7	β^-	221.478	2.3
				554.352	71.7
				619.105	43.7
				698.361	28.4
				776.511	83.6
				827.826	24.2
				1044.005	27.6
				1317.485	26.9
				1474.895	16.4
83	Br	2.374 h 4	β^-		
76	Kr	14.8 h 1	$\varepsilon + \beta^+$	45.5	19.5
				103.3	3.3
				252.0	6.2
				270.2	21.1
				271.6	4.3
				309.8	2.6
				315.7	39.0

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				355.3	4.7
				406.5	12.1
				451.9	9.8
77	Kr	71.25 m 42	ε+β ⁺	129.64	81.0
				146.59	37.3
				276.0	2.9
				311.9	3.7
79	Kr	34.96 h 3	ε+β ⁺	217.07	2.4
				261.29	12.7
				306.47	2.6
				397.54	9.3
				606.09	8.1
81	Kr	2.29×10 ⁵ y 11	ε		
83m	Kr	1.83 h 2	IT	9.4057	5.5
85	Kr	10.735 y 12	β ⁻		
85m	Kr	4.480 h 8	β ⁻	151.195	75.2
			IT	304.87	14.0
87	Kr	76.09 m 36	β ⁻	402.588	49.6
				845.44	7.3
				1740.51	2.0
				2011.88	2.9
				2554.75	9.2
				2558.08	4.0
88	Kr	2.803 h 9	β ⁻	165.98	3.1
				196.301	26.0
				362.226	2.2
				834.83	13.0
				1529.77	10.9
				2029.84	4.5
				2035.411	3.7
				2195.84	13.2
				2231.772	3.4
				2392.11	34.6
81	Rb	4.571 h 3	ε+β ⁺	190.46	64.9
				446.15	23.5
				456.73	3.1
				510.43	5.4
				537.60	2.3
82m	Rb	6.472 h 6	ε+β ⁺	183.27	2.1
				554.35	62.4
				619.11	38.0
				698.37	26.3

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				776.52	84.4
				827.83	21.0
				1007.59	7.2
				1044.08	32.1
				1317.43	23.7
				1474.88	15.5
			IT		
83	Rb	86.2 d 1	ε	9.4057	5.9
				520.3991	44.7
				529.5945	29.3
				552.5512	16.0
84	Rb	32.82 d 7	ε+β ⁺	881.6041	68.9
			β ⁻		
86	Rb	18.671 d 10	β ⁻	1077.0	8.6
			ε		
87	Rb	4.967×10 ¹⁰ y 32	β ⁻		
80	Sr	106.3 m 15	ε+β ⁺	175.0	10.1
				235.9	4.2
				378.8	4.2
				414.1	3.2
				553.4	6.9
				589.0	39.0
82	Sr	25.35 d 2	ε		
83	Sr	32.41 h 3	ε+β ⁺	381.53	14.0
				418.37	4.2
				762.65	26.7
85	Sr	64.849 d 4	ε	514.0048	95.7
85m	Sr	67.63 m 4	IT	231.860	83.9
			ε	151.194	12.8
87m	Sr	2.815 h 11	IT	388.531	82.2
			ε		
89	Sr	50.56 d 3	β ⁻		
90	Sr	28.905 y 23	β ⁻		
91	Sr	9.68 h 2	β ⁻	652.3	3.0
				652.9	8.0
				749.8	23.7
				925.8	3.8
				1024.3	33.5
92	Sr	2.610 h 20	β ⁻	241.56	2.9
				430.49	3.3
				953.31	3.5

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
85	Y	2.67 h 5	ε+β ⁺	1142.35	2.8
				1383.93	90.0
				231.65	84.0
				504.44	60.0
				913.89	9.0
85m	Y	4.9 h 1	ε+β ⁺	231.7	22.8
				535.6	3.5
				767.3	3.6
				1030.1	2.0
				1404.6	3.1
				2123.8	5.0
				2172.1	2.3
				443.13	16.9
				515.18	4.9
				627.72	32.6
				645.87	9.2
				703.33	15.4
				777.37	22.4
				1076.63	82.5
				1153.05	30.5
				1854.38	17.2
				1920.72	20.8
				388.5276	82.2
				484.805	89.8
87	Y	79.89 h 25	ε+β ⁺		
87m	Y	13.38 h 3	ε+β ⁺		
			IT	380.79	78.0
88	Y	106.626 d 20	ε+β ⁺	898.042	93.7
				1836.063	99.2
90	Y	64.046 h 49	β ⁻		
90m	Y	3.232 h 10	β ⁻		
			IT	202.53	97.0
				479.51	90.5
91	Y	58.56 d 9	β ⁻		
92	Y	3.54 h 1	β ⁻	448.5	2.3
				561.1	2.4
				934.47	13.9
				1405.4	4.8
				266.9	7.4
93	Y	10.17 h 8	β ⁻	947.1	2.1
86	Zr	16.5 h 1	ε+β ⁺	29.1	21.6
				242.8	95.8
				612.0	5.8

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
87	Zr	1.68 h 1	ε+β ⁺	1227	2.8
88	Zr	83.4 d 3	ε	392.87	97.3
89	Zr	78.364 h 15	ε+β ⁺	909.15	99.0
93	Zr	1.61×10 ⁶ y 5	β ⁻		
95	Zr	64.032 d 6	β ⁻	724.192	44.3
				756.725	54.4
97	Zr	16.749 h 8	β ⁻	355.40	2.1
				507.64	5.0
				743.36	93.1
				1147.97	2.6
89	Nb	2.03 h 7	ε+β ⁺	1127	2.1
				1627.2	3.5
				1833.4	3.3
				2572.3	2.7
				3092.7	3.0
89m	Nb	66 m 2	ε+β ⁺	507.4	81.2
				588.0	95.6
				769.6	6.2
90	Nb	14.60 h 5	ε+β ⁺	132.716	4.1
				141.178	66.8
				1129.224	92.7
				1611.76	2.4
				2186.242	18.0
				2318.959	82.0
91	Nb	6.8×10 ² y 13	ε+β ⁺		
91m	Nb	60.86 d 22	ε+β ⁺	1204.67	2.0
			IT		
92	Nb	3.47×10 ⁷ y 24	ε+β ⁺	561.1	99.8
				934.5	74.3
92m	Nb	10.12 d 2	ε+β ⁺	934.44	99.2
93m	Nb	16.12 y 12	IT		
94	Nb	2.038×10 ⁴ y 39	β ⁻	702.65	99.8
				871.091	99.8
95	Nb	34.991 d 10	β ⁻	765.803	99.8
95m	Nb	3.61 d 3	β ⁻	204.1161	2.3
			IT	235.690	24.8
96	Nb	23.35 h 5	β ⁻	241.377	3.5
				460.040	26.6
				480.705	5.8
				568.871	58.0
				719.562	6.8

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				778.224	96.4
				810.330	11.1
				849.929	20.4
				1091.349	48.5
				1200.231	20.0
97	Nb	72.1 m 4	β ⁻	657.94	98.2
90	Mo	5.56 h 9	ε+β ⁺	42.70	2.2
				122.370	64.2
				162.93	6.0
				203.13	6.4
				257.34	77.4
				323.20	6.3
				445.37	6.0
				941.5	5.5
				1271.3	4.1
93	Mo	4.0×10 ³ y 8	ε		
93m	Mo	6.85 d 7	ε+β ⁺		
			IT	263.049	57.4
				684.693	99.9
				1477.138	99.1
99	Mo	65.936 h 9	β ⁻	181.068	6.0
				739.500	12.2
				777.921	4.3
93	Tc	2.78 h 5	ε+β ⁺	1362.94	66.2
				1477.14	8.7
				1520.28	24.4
94	Tc	293 m 1	ε+β ⁺	449.2	3.3
				532.1	2.4
				702.67	99.6
				849.74	95.7
				871.05	99.9
				916.10	7.6
				1592.1	2.2
95	Tc	19.258 h 26	ε+β ⁺	765.789	93.8
				1073.71	3.7
95m	Tc	61.94 d 7	ε+β ⁺	204.117	63.2
				582.082	30.0
				786.198	8.7
				820.624	4.7
				835.149	26.6
				1039.264	2.8
			IT		

A	El	T_{1/2}	Decay Mode	E_γ (keV)	I_γ ≥ 2%
96	Tc	4.27 d 5	ε+β ⁺	314.27	2.4
				778.22	99.8
				812.54	82.0
				849.86	97.6
				1126.85	15.2
97	Tc	4.21×10 ⁶ y 16	ε		
97m	Tc	91.0 d 6	IT		
			ε		
98	Tc	4.20×10 ⁶ y 30	β ⁻	652.41	100.0
				745.35	102.0
99	Tc	2.111×10 ⁵ y 12	β ⁻		
99m	Tc	6.0073 h 7	β ⁻		
			IT	140.511	89.0
95	Ru	1.607 h 9	ε+β ⁺	290.38	3.7
				301.01	2.1
				336.40	69.9
				626.83	17.8
				806.28	4.0
				1050.68	2.6
				1096.80	20.9
				1178.7	5.1
				1410.63	2.5
				1459.32	2.1
97	Ru	2.8376 d 10	ε+β ⁺	215.70	85.6
				324.49	10.8
103	Ru	39.247 d 11	β ⁻	497.085	91.0
				610.333	5.8
105	Ru	4.44 h 1	β ⁻	129.782	5.4
				262.828	6.9
				316.496	11.0
				393.378	4.1
				413.538	2.5
				469.347	18.3
				499.210	2.4
				676.355	15.8
				724.211	47.8
				875.728	2.7
106	Ru	371.8 d 18	β ⁻		
99	Rh	16.1 d 2	ε+β ⁺	89.76	33.4
				175.43	2.0
				322.45	6.2

A	El	$T_{1/2}$	Decay Mode	E_γ (keV)	$I_{\gamma \geq 2\%}$
99m	Rh	4.7 h 1	$\varepsilon + \beta^+$	353.05	34.5
				442.8	2.2
				528.24	37.9
				618.13	4.2
				340.8	72.2
				617.8	12.3
				936.6	2.3
				1261.2	11.4
100	Rh	20.5 h 3	IT $\varepsilon + \beta^+$	446.153	12.0
				539.512	80.6
				588.343	5.0
				822.654	21.1
				1107.223	13.6
				1341.515	5.3
				1362.152	15.4
				1553.348	20.7
				1929.811	11.6
				2375.976	32.6
101	Rh	4.07 y 5	ε	127.226	68.0
				198.01	73.0
				325.23	11.8
101m	Rh	4.34 d 1	IT ε		
				306.857	80.6
				545.117	4.3
102	Rh	207.3 d 12	$\varepsilon + \beta^+$	468.58	2.9
				475.06	45.9
				628.05	4.5
				1103.16	2.9
102m	Rh	3.47 y 4	β^- $\varepsilon + \beta^+$	556.60	2.0
				418.52	9.4
				420.4	3.2
				475.06	95.0
				628.05	8.3
				631.29	56.0
				697.49	44.0
				766.84	34.0
				1046.59	34.0
				1103.16	4.6
				1112.84	19.0
105	Rh	35.341 h 22	IT β^-		
				306.311	4.7

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥2%
106m	Rh	131 m 2	β ⁻	319.231	16.9
				429.4	13.2
				450.8	24.2
				511.7	85.5
				616.1	20.2
				717.2	28.9
				748.5	19.3
				825.0	13.6
				1046.7	30.4
				1127.7	13.7
100	Pd	3.63 d 9	ε	1529.4	17.5
				32.66	2.6
				42.08	7.0
				74.78	47.8
				84.00	52.0
101	Pd	8.47 h 6	ε+β ⁺	126.15	7.8
				24.46	3.9
				269.67	6.4
				296.29	19.2
				565.98	3.4
				590.44	12.1
				1289.05	2.3
103	Pd	17.000 d 33	ε		
107	Pd	6.50×10 ⁶ y 30	β ⁻		
109	Pd	13.437 h 13	β ⁻	88.0336	3.7
111m	Pd	5.565 h 12	β ⁻	70.44	7.9
				391.3	5.6
				575.0	3.3
				580.00	2.1
				632.8	3.7
				694.2	2.1
				IT	
				172.18	34.0
				18.5	27.0
				112	Pd
103	Ag	65.8 m 6	ε+β ⁺	148.20	28.3
				243.96	8.5
				266.86	13.4
				531.92	8.8
				742.11	2.5
				1007.08	3.2
				1155.27	3.0
				1273.83	9.4

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
104	Ag	69.3 m 9	$\varepsilon + \beta^+$	555.8	92.6
				740.5	7.2
				767.6	65.8
				785.7	9.5
				857.9	10.4
				923.3	7.0
				925.9	12.5
				941.6	25.0
				1341.8	7.3
				1526.6	7.1
105	Ag	41.29 d 7	$\varepsilon + \beta^+$	64.072	11.3
				280.54	31.2
				319.24	4.4
				331.58	4.1
				344.61	42.0
				392.73	2.0
				443.44	10.9
				644.63	10.2
				650.78	2.5
				1088.05	3.6
106m	Ag	8.28 d 2	$\varepsilon + \beta^+$	406.182	13.4
				429.646	13.2
				450.976	28.2
				511.85	87.7
				616.17	21.6
				717.34	28.9
				748.36	20.6
				824.69	15.4
				1045.83	29.6
				1527.65	16.3
108m	Ag	435.9 y 37	$\varepsilon + \beta^+$	433.937	90.5
				614.276	89.8
				722.907	90.8
110m	Ag	249.86 d 5	IT β^-	79.131	6.6
				657.7600	95.6
				677.6217	10.7
				687.0091	6.5
				706.6760	16.7
				763.9424	22.6
				818.0244	7.4
				884.6781	75.0
				937.485	35.0

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				1384.2931	25.0
				1505.0280	13.3
			IT		
111	Ag	7.421 d 10	β ⁻	342.13	6.7
112	Ag	3.15 h 1	β ⁻	606.821	3.1
				617.517	42.5
				694.872	2.9
				1387.68	5.3
				1613.66	2.8
				2106.31	2.4
113	Ag	5.37 h 5	β ⁻		
107	Cd	6.52 h 2	ε+β ⁺	93.124	4.7
109	Cd	461.98 d 31	ε	88.0336	3.6
113	Cd	8.04×10 ¹⁵ y 5	β ⁻		
113m	Cd	13.89 y 16	β ⁻		
			IT		
115	Cd	53.40 h 4	β ⁻	336.241	46.0
				492.351	8.0
				527.901	27.4
115m	Cd	44.6 d 3	β ⁻	933.838	2.0
117	Cd	2.503 h 5	β ⁻	89.73	3.3
				273.349	27.9
				344.459	17.9
				434.190	9.8
				831.80	2.3
				880.710	4.0
				1051.7	3.8
				1303.27	18.4
				1576.62	11.2
				1723.06	2.0
117m	Cd	3.437 h 13	β ⁻	564.397	14.7
				748.06	4.4
				860.41	7.9
				1029.06	11.7
				1065.98	23.1
				1234.59	11.0
				1432.91	13.4
				1997.33	26.2
				2096.40	7.4
				2322.75	7.9
109	In	4.159 h 10	ε+β ⁺	74.8	2.2
				84.1	3.0

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥2%
				203.3	74.2
				347.5	2.0
				426.3	4.0
				613.6	2.2
				623.8	5.6
				650.0	3.0
				1148.5	4.7
				1622.3	2.1
110	In	4.9 h 1	ε+β ⁺	461.80	4.7
				581.93	8.6
				584.21	6.5
				641.68	26.0
				657.750	98.3
				677.6	4.5
				707.40	29.5
				884.667	92.9
				937.478	68.4
				997.16	10.5
110m	In	69.0 m 5	ε+β ⁺	657.75	97.7
				2129.40	2.2
111	In	2.8048 d 1	ε	171.28	90.6
				245.35	94.1
113m	In	99.48 m 2	IT	391.698	64.9
114m	In	49.51 d 1	ε+β ⁺	558.43	3.2
				725.24	3.2
			IT	190.27	15.6
115	In	4.41×10 ¹⁴ y 25	β ⁻		
115m	In	4.485 h 4	β ⁻		
			IT	336.241	45.8
117m	In	116.1 m 2	β ⁻	158.6	15.9
			IT	315.302	19.1
110	Sn	4.154 h 4	ε		
113	Sn	115.08 d 3	ε+β ⁺	255.134	2.1
				391.698	65.0
117m	Sn	13.94 d 3	IT	156.02	2.1
				158.56	86.4
119m	Sn	293.0 d 13	IT	23.875	16.5
121	Sn	27.05 h 4	β ⁻		
121m	Sn	43.9 y 5	β ⁻		
			IT		
123	Sn	129.2 d 4	β ⁻		

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
125	Sn	9.634 d 15	β ⁻	822.48	4.3
				915.55	4.1
				1067.10	9.7
				1089.15	4.6
126	Sn	1.98×10 ⁵ y 6	β ⁻	23.280	6.3
				64.281	7.8
				86.938	8.6
				87.567	36.5
127	Sn	2.10 h 3	β ⁻	438.2	6.1
				490.9	5.3
				805.9	8.2
				823.1	10.6
				824.7	6.1
				859.5	8.0
				979.2	7.2
				1095.6	19.4
				1114.3	38.0
				2003.4	5.3
116m	Sb	60.4 m 6	ε+β ⁺	99.802	28.3
				135.511	28.5
				407.351	38.8
				436.666	3.6
				542.867	48.1
				844.001	11.2
				972.573	74.2
				1072.373	25.5
				1293.557	100.0
117	Sb	2.80 h 1	ε+β ⁺	158.562	85.9
118m	Sb	5.01 h 3	ε+β ⁺	40.8	30.0
				253.678	98.9
				1050.69	96.9
				1091.51	3.6
				1229.65	99.9
119	Sb	38.2 h 3	ε	23.870	16.5
120m	Sb	5.76 d 2	ε+β ⁺		
122	Sb	2.69413 d 32	ε+β ⁺		
			β ⁻	564.24	70.7
				692.65	3.8
124	Sb	60.209 d 10	β ⁻	602.7260	97.8
				645.8520	7.4
				713.776	2.3
				722.782	10.8

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
125	Sb	2.7577 y 8	β ⁻	1368.157	2.6
				1690.971	47.6
				2090.930	5.5
				35.489	4.4
				176.314	6.8
				427.874	29.6
				463.365	10.5
				600.597	17.6
				606.713	5.0
				635.950	11.2
126	Sb	12.3 d 1	β ⁻	296.5	4.5
				414.7	83.3
				573.9	6.7
				593.2	7.5
				666.5	99.6
				695.0	99.6
				697.0	31.9
				720.7	53.8
				856.8	17.6
				989.6	6.8
127	Sb	3.84 d 3	β ⁻	252.4	8.5
				290.8	2.0
				412.1	3.8
				445.1	4.3
				473.0	25.8
				543.3	2.9
				603.5	4.4
				685.7	36.8
				698.5	3.6
				783.7	15.1
128	Sb	9.05 h 4	β ⁻	314.00	88.7
				314.1	61.0
				526.5	45.0
				628.7	31.0
				636.2	36.0
				654.2	17.0
				743.24	96.4
				743.3	100.0
				753.90	96.4
				754.0	100.0
129	Sb	4.40 h 2	β ⁻	180.42	2.8
				544.56	15.4

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				654.28	3.0
				682.77	5.8
				761.12	4.3
				812.97	48.2
				914.96	23.3
				966.78	9.0
				1030.65	15.1
				1738.16	7.4
116	Te	2.49 h 4	ε+β ⁺	93.7	33.1
				628.7	3.2
117	Te	62 m 1	ε+β ⁺	719.7	64.7
				923.9	6.2
				996.7	4.0
				1090.7	6.9
				1716.4	15.8
				2300.0	11.2
118	Te	6.00 d 2	ε		
119	Te	16.05 h 5	ε+β ⁺	644.01	84.1
				699.85	10.1
				1749.65	4.0
119m	Te	4.69 d 4	ε+β ⁺	153.59	66.1
				270.53	28.0
				912.60	6.2
				942.21	5.1
				976.37	2.7
				979.29	3.0
				1048.44	3.2
				1136.75	7.6
				1212.73	66.1
				2089.57	4.7
121	Te	19.27 d 8	ε+β ⁺	507.591	17.7
				573.139	80.4
121m	Te	164.7 d 5	ε+β ⁺	1102.149	2.5
			IT	212.189	81.5
123m	Te	119.3 d 1	IT	159.00	84.2
125m	Te	57.40 d 15	IT	35.504	7.3
127	Te	9.35 h 6	β ⁻		
127m	Te	106.1 d 7	β ⁻		
			IT		
129	Te	69.5 m 4	β ⁻	27.81	16.3
				459.60	7.7

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥2%
129m	Te	33.48 d <i>13</i>	β ⁻ IT	695.88	3.0
131m	Te	32.86 h <i>39</i>	β ⁻	102.06	7.7
				200.63	7.3
				240.93	7.3
				334.27	9.2
				773.67	36.8
				782.49	7.5
				793.75	13.4
				852.21	19.9
				1125.46	11.0
				1206.60	9.4
			IT		
132	Te	3.204 d <i>13</i>	β ⁻	49.72	15.0
				228.16	88.0
120	I	81.7 m <i>2</i>	ε+β ⁺	560.4	69.6
				601.1	5.5
				641.1	8.4
				1201.6	2.5
				1523.0	10.9
				2564.4	2.5
121	I	2.12 h <i>1</i>	ε+β ⁺	212.20	84.3
				532.08	6.1
123	I	13.2229 h <i>14</i>	ε+β ⁺	159.00	83.6
124	I	4.1760 d <i>3</i>	ε+β ⁺	602.73	62.9
				722.78	10.4
				1509.36	3.2
				1690.96	11.2
125	I	59.398 d <i>12</i>	ε	35.4925	6.7
126	I	12.93 d <i>5</i>	ε+β ⁺	666.331	32.9
				753.819	4.2
			β ⁻	388.633	35.6
				491.243	2.9
129	I	1.613×10 ⁷ y <i>18</i>	β ⁻	39.578	7.5
130	I	12.36 h <i>1</i>	β ⁻	417.932	34.2
				536.066	99.0
				668.536	96.0
				739.512	82.2
				1157.43	11.3
131	I	8.0247 d <i>15</i>	β ⁻	80.185	2.6
				284.305	6.1

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
132	I	2.2839 h 17	β ⁻	364.489	81.5
				636.989	7.2
				505.79	4.9
				522.65	16.0
				630.19	13.3
				667.714	98.7
				669.8	4.6
				671.4	3.4
				772.60	75.6
				812.0	5.5
132m	I	1.387 h 15	β ⁻	954.55	17.6
				1398.57	7.0
				175.0	8.8
				599.8	14.0
				614.0	2.5
				667.714	13.9
				772.60	14.0
133	I	20.8 h 1	IT	98.0	3.7
			β ⁻	529.872	87.0
				875.329	4.5
				1298.223	2.4
135	I	6.55 h 3	β ⁻	546.557	7.2
				836.804	6.7
				1038.760	8.0
				1124.00	3.6
				1131.511	22.6
				1260.409	28.7
				1457.56	8.7
				1678.027	9.6
				1706.459	4.1
				1791.196	7.7
122	Xe	20.1 h 1	ε	148.612	2.6
123	Xe	2.050 h 14	ε+β ⁺	350.065	7.8
				148.9	49.1
				178.1	15.0
				330.2	8.6
125	Xe	16.96 h 6	ε+β ⁺	899.6	2.5
				1093.4	2.8
				54.968	6.8
				188.418	53.8
				243.378	30.0
				453.796	4.7

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
127	Xe	36.344 d 5	ε	145.252	4.3
				172.132	25.7
				202.860	68.7
				374.991	17.3
129m	Xe	8.88 d 2	IT	39.578	7.5
				196.56	4.6
131m	Xe	11.931 d 16	IT		
133	Xe	5.2474 d 5	β ⁻	80.9979	36.9
133m	Xe	2.191 d 26	IT	233.221	10.1
135	Xe	9.168 h 7	β ⁻	249.794	90.0
				608.185	2.9
127	Cs	6.25 h 10	ε+β ⁺	124.70	11.4
				287.16	3.8
				411.95	62.9
				462.31	5.1
				587.01	4.2
129	Cs	32.13 h 10	ε+β ⁺	39.578	3.0
				318.180	2.4
				371.918	30.6
				411.490	22.3
				548.945	3.4
131	Cs	9.688 d 4	ε		
132	Cs	6.480 d 6	ε+β ⁺	667.714	97.6
			β ⁻		
134	Cs	2.06562 y 49	β ⁻	563.246	8.3
				569.331	15.4
				604.721	97.6
				795.864	85.5
				801.953	8.7
				1365.185	3.0
			ε		
134m	Cs	2.912 h 2	IT	127.502	12.6
135	Cs	1.33×10 ⁶ y 19	β ⁻		
136	Cs	13.01 d 5	β ⁻	66.881	4.8
				86.36	5.9
				153.246	7.7
				163.920	4.7
				176.602	13.7
				273.646	12.7
				340.547	46.8
				818.514	99.7
				1048.073	79.8

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				1235.362	20.0
137	Cs	30.007 y 23	β ⁻	661.657	85.1
126	Ba	98.6 m 15	ε+β ⁺	217.9	4.1
				233.6	19.7
				241.0	6.0
				257.6	7.6
				281.2	3.1
				328.3	2.1
				489.3	2.9
				681.8	4.4
				993.4	2.4
				1293.0	3.7
128	Ba	2.43 d 5	ε	273.44	14.5
129	Ba	2.23 h 10	ε+β ⁺	129.14	5.5
				214.30	13.4
				220.83	8.5
				554.0	2.9
129m	Ba	2.142 h 8	ε+β ⁺		
131	Ba	11.52 d 1	ε+β ⁺	123.804	29.8
				133.617	2.2
				216.088	20.4
				239.621	2.5
				249.435	3.0
				373.256	14.4
				486.507	2.2
				496.321	48.0
133	Ba	10.5358 y 42	ε	53.1622	2.1
				79.6142	2.6
				80.9979	33.0
				276.3989	7.2
				302.8508	18.3
				356.0129	62.0
				383.8485	8.9
133m	Ba	38.87 h 7	IT	275.925	17.7
			ε		
135m	Ba	28.12 h 6	IT	268.218	16.0
139	Ba	82.89 m 14	β ⁻	165.8575	23.7
140	Ba	12.7526 d 14	β ⁻	29.966	14.1
				162.660	6.2
				304.849	4.3
				423.722	3.1
				537.261	24.4

A	El	$T_{1/2}$	Decay Mode	E_γ (keV)	$I_\gamma \geq 2\%$
132	La	4.58 h 9	$\varepsilon + \beta^+$	464.55	76.0
				515.78	5.0
				540.363	7.7
				567.14	15.7
				663.07	9.0
				899.32	4.6
				1031.70	7.8
				1604.03	3.6
				1909.91	9.0
				2102.84	5.5
133	La	3.89 h 3	$\varepsilon + \beta^+$	278.835	2.4
135	La	18.95 h 13	$\varepsilon + \beta^+$		
137	La	6.0×10^4 y 20	ε		
138	La	1.028×10^{11} y 11	$\varepsilon + \beta^+$	1435.795	65.5
			β^-	788.742	34.5
140	La	40.284 h 3	β^-	328.762	20.3
				432.493	2.9
				487.021	45.5
				751.637	4.3
				815.772	23.3
				867.846	5.5
				919.550	2.7
				925.189	6.9
				1596.21	95.4
				2521.40	3.5
141	La	3.93 h 3	β^-		
142	La	91.8 m 5	β^-	641.285	47.4
				894.9	8.3
				1011.4	3.9
				1043.7	2.7
				1545.8	3.0
				1901.3	7.2
				2187.2	3.7
				2397.8	13.3
				2542.7	10.0
				2971.0	3.1
132	Ce	3.51 h 11	$\varepsilon + \beta^+$	155.37	10.5
				182.11	77.4
				190.04	2.7
				216.83	5.0
				251.46	2.2
				303.12	2.1

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				329.64	2.3
				451.44	2.2
133	Ce	97 m <i>4</i>	ε+β ⁺	76.9	15.9
				97.261	45.5
				557.7	11.4
133m	Ce	5.326 h <i>11</i>	ε+β ⁺	58.39	19.3
				87.939	5.2
				130.803	18.0
				346.39	4.2
				432.55	3.5
				477.22	39.3
				510.36	20.8
				689.48	4.1
				784.55	9.7
				1500.41	4.8
134	Ce	3.22 d <i>4</i>	ε		
135	Ce	17.7 h <i>2</i>	ε+β ⁺	206.50	7.8
				265.56	41.8
				300.07	23.5
				518.05	13.6
				572.26	10.4
				577.09	5.1
				606.76	18.8
				783.59	10.6
				828.38	5.1
				871.35	3.3
137	Ce	9.11 h <i>3</i>	ε+β ⁺		
137m	Ce	34.80 h <i>3</i>	ε+β ⁺		
			IT ¹	254.29	11.1
139	Ce	137.64 d <i>2</i>	ε	165.8575	79.9
141	Ce	32.504 d <i>11</i>	β ⁻	145.4433	48.3
143	Ce	33.037 h <i>8</i>	β ⁻	57.356	11.7
				231.550	2.0
				293.266	42.8
				350.619	3.2
				490.368	2.2
				664.571	5.7
				721.929	5.4
144	Ce	284.886 d <i>30</i>	β ⁻	133.515	11.1
137	Pr	1.28 h <i>3</i>	ε+β ⁺		
138m	Pr	2.03 h <i>2</i>	ε+β ⁺	302.7	80.0
				354.2	4.0

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				390.9	5.9
				547.5	5.2
				788.9	100.0
				1038.0	101.0
139	Pr	4.41 h 4	ε+β ⁺		
142	Pr	19.12 h 4	β ⁻	1575.6	3.7
			ε		
143	Pr	13.57 d 2	β ⁻		
145	Pr	5.982 h 9	β ⁻		
138	Nd	5.11 h 8	ε+β ⁺	325.76	2.9
139m	Nd	5.5 h 2	ε+β ⁺	113.87	39.7
				708.1	26.3
				738.2	35.2
				796.5	4.2
				802.0	7.0
				809.6	6.3
				827.8	10.3
				910.1	7.6
				982.2	26.3
				2060.9	4.8
			IT		
140	Nd	3.37 d 2	ε		
141	Nd	2.49 h 3	ε+β ⁺		
144	Nd	2.29×10 ¹⁵ y 16	α		
147	Nd	11.12 d 7	β ⁻	91.1050	29.0
				531.012	13.1
149	Nd	1.728 h 2	β ⁻	114.314	19.2
				155.873	6.0
				211.309	26.0
				240.220	4.0
				267.693	6.1
				270.166	10.8
				326.554	4.6
				423.553	7.5
				540.509	6.6
				654.831	8.0
143	Pm	265 d 7	ε+β ⁺	741.98	38.5
144	Pm	363 d 14	ε	476.78	43.8
				618.01	98.5
				696.49	99.5
145	Pm	17.7 y 4	ε	72.4	2.2

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
146	Pm	5.53 y 5	α		
			β ⁻	747.24	11.7
			ε	453.83	42.5
				735.90	15.0
147	Pm	2.62344 y 22	β ⁻		
148	Pm	5.368 d 7	β ⁻	550.27	22.0
				914.85	11.5
				1465.12	22.2
148m	Pm	41.29 d 11	β ⁻	288.11	12.6
				414.07	18.7
				501.26	6.8
				550.27	94.9
				599.74	12.5
				611.26	5.5
				629.97	89.0
				725.70	32.8
				915.33	17.2
				1013.81	20.3
			IT		
149	Pm	53.08 h 5	β ⁻	285.95	3.1
150	Pm	2.698 h 15	β ⁻	333.92	68.0
				406.51	5.6
				712.22	4.4
				831.85	11.9
				859.95	3.4
				876.41	7.3
				1165.77	15.8
				1193.87	4.8
				1324.51	17.5
				1736.40	6.9
151	Pm	28.40 h 4	β ⁻	100.02	2.5
				104.84	3.5
				167.75	8.3
				177.16	3.8
				240.09	3.8
				275.21	6.8
				340.08	22.5
				344.90	2.1
				445.68	4.0
				717.72	4.0
142	Sm	72.48 m 4	ε+β ⁺		
145	Sm	340 d 3	ε	61.2265	12.2

A	El	$T_{1/2}$	Decay Mode	E_γ (keV)	$I_{\gamma \geq 2\%}$
146	Sm	6.8×10^7 y 7	α		
147	Sm	1.068×10^{11} y 7	α		
148	Sm	6.8×10^{15} y 10	α		
151	Sm	94.6 y 6	β^-		
153	Sm	46.283 h 2	β^-	69.67300 103.18012	4.7 29.1
156	Sm	9.4 h 2	β^-	22.6 38.1 65.0 87.6 165.8 204.0 244.0 268.5 291.0	2.6 3.0 2.3 24.2 13.1 21.2 2.1 2.4 2.8
145	Eu	5.93 d 3	$\varepsilon + \beta^+$	542.57 653.512 893.73 1658.53 1997.00	4.5 15.0 65.7 14.9 7.2
146	Eu	4.61 d 3	$\varepsilon + \beta^+$	430.386 633.083 634.137 665.424 702.099 703.089 747.159 1058.71 1297.028 1533.711	4.7 35.7 44.8 10.3 3.8 3.7 98.1 3.9 5.4 6.0
147	Eu	24.1 d 6	ε	121.220 197.299 601.450 677.516 798.729 856.929 933.005 955.832 1077.043	20.7 24.1 5.8 9.8 4.4 2.5 3.1 3.5 6.3
148	Eu	54.4 d 4	α $\varepsilon + \beta^+$	414.028 414.057	10.3 10.1

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				550.284	98.5
				553.231	12.9
				571.962	9.6
				611.293	20.5
				629.987	71.9
				725.673	12.6
				869.891	5.5
				1033.986	7.8
			α		
149	Eu	93.1 d 4	ε	22.5002	2.7
				277.089	4.2
				327.526	4.8
150	Eu	36.6 y 7	ε+β ⁺	333.971	95.2
				439.401	79.6
				505.521	4.8
				584.274	52.2
				737.455	9.5
				748.057	5.1
				751.068	2.1
				1049.043	5.3
				1343.777	2.6
150m	Eu	12.8 h 1	ε+β ⁺	333.9	4.0
				406.5	2.8
			β ⁻		
151	Eu	4.6×10 ¹⁸ y 12	α		
152	Eu	13.517 y 9	ε+β ⁺	121.7817	28.5
				244.6974	7.6
				443.9606	2.8
				867.380	4.2
				964.057	14.5
				1085.837	10.1
				1112.076	13.7
				1408.013	20.9
			β ⁻	344.2785	26.6
				411.1165	2.2
				778.9045	12.9
152m	Eu	9.3116 h 13	ε+β ⁺	121.77	7.0
				841.63	14.2
				963.38	11.6
			β ⁻	344.29	2.4
152n	Eu	95.8 m 4	IT	89.849	69.7
154	Eu	8.5911 y 36	ε+β ⁺		

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥2%
			β ⁻	123.0706	40.4
				247.9290	6.9
				591.755	5.0
				723.3014	20.1
				756.8020	4.5
				873.1834	12.1
				996.29	10.5
				1004.76	18.0
				1274.429	34.8
155	Eu	4.742 y 8	β ⁻	86.5463	30.7
				105.3087	21.1
156	Eu	15.16 d 2	β ⁻	88.97	8.4
				646.29	6.3
				723.47	5.4
				811.77	9.7
				1065.14	4.9
				1079.16	4.6
				1153.67	6.8
				1154.08	4.7
				1230.71	8.0
				1242.42	6.6
157	Eu	15.18 h 3	β ⁻	54.548	3.8
				63.929	23.4
				318.710	3.0
				370.509	11.2
				409.135	2.7
				410.723	17.8
				474.625	2.6
				619.303	3.6
146	Gd	48.27 d 9	ε+β ⁺	114.71	44.3
				115.51	44.3
				154.57	46.9
147	Gd	38.06 h 12	ε+β ⁺	229.32	60.1
				370.0	16.3
				396.00	32.7
				559.07	6.1
				765.81	10.8
				778.04	4.7
				893.5	7.7
				929.01	19.2
				1069.35	6.8
				1130.9	6.1

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥2%
148	Gd	86.9 y 39	α		
149	Gd	9.28 d 9	ε+β ⁺	149.730	48.4
				272.320	3.2
				298.633	27.9
				346.650	23.7
				516.550	2.7
				534.294	3.1
				748.604	8.3
				788.875	7.3
				938.616	2.4
			α		
150	Gd	1.79×10 ⁶ y 8	α		
151	Gd	124.5 d 9	ε	21.517	2.8
				153.60	6.2
				174.70	3.0
				243.29	5.6
			α		
152	Gd	1.08×10 ¹⁴ y 8	α		
153	Gd	240.4 d 9	ε	69.67300	2.4
				97.43100	30.0
				103.18012	22.0
159	Gd	18.479 h 4	β ⁻	58.0000	2.5
				363.5430	11.8
147	Tb	1.64 h 3	ε+β ⁺	119.73	6.8
				139.89	31.1
				347.65	2.4
				546.96	2.0
				554.65	5.2
				694.54	37.8
				1152.53	91.3
				1627.91	2.9
				1947.58	2.0
				2680.77	3.6
148	Tb	60 m 1	ε+β ⁺		
149	Tb	4.12 h 2	ε+β ⁺	164.98	26.7
				187.22	4.4
				352.24	29.8
				388.57	18.6
				464.85	5.7
				652.12	16.5
				817.1	11.8
				853.43	15.7

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
150	Tb	3.48 h 16	α $\varepsilon + \beta^+$	861.86	7.6
				1175.4	3.3
				496.242	14.6
				511	44.9
				569.083	2.5
				638.050	72.0
				650.36	4.0
				792.385	4.4
				880.27	3.0
				1453.55	3.9
				1518.34	2.7
				3383.6	5.8
				108.088	24.3
				180.186	11.5
				251.863	26.3
151	Tb	17.609 h 14	$\varepsilon + \beta^+$	287.357	28.3
				395.444	10.8
				443.879	10.8
				479.357	15.4
				587.46	15.6
				616.561	10.4
				731.227	7.7
				271.09	9.5
				344.2785	63.5
				411.1165	3.6
				586.27	9.2
152	Tb	17.48 h 9	$\varepsilon + \beta^+$	764.89	2.7
				778.9045	5.5
				974.05	3.0
				1109.20	2.6
				1299.140	2.1
				41.56	4.0
				82.86	5.4
				102.255	5.8
				109.758	6.2
				170.42	5.8
153	Tb	2.34 d 1	$\varepsilon + \beta^+$	212.00	28.5
				249.55	2.1
				123.07	43.2
				123.07	30.3

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				123.07	25.8
				225.94	26.8
				247.94	78.8
				247.94	22.1
				346.70	69.1
				426.78	17.3
				540.18	19.6
				1419.81	46.2
				123.07	30.3
				247.94	22.1
154m	Tb	9.994 h 39	ε+β ⁺	518.04	6.1
				540.18	19.6
				649.44	11.0
				676.55	3.2
				692.41	3.3
				873.21	9.2
				996.24	8.6
				1004.73	11.0
				IT	
				123.07	43.2
154n	Tb	22.7 h 5	ε+β ⁺	141.33	7.3
				225.94	26.8
				247.94	78.8
				346.70	69.1
				426.78	17.3
				649.44	8.6
				992.92	16.2
				1004.73	7.1
				1419.81	46.2
				IT	
155	Tb	5.32 d 6	ε	86.55	32.0
				105.318	25.1
				148.64	2.6
				161.29	2.8
				163.28	4.4
				180.08	7.4
				262.27	5.3
156	Tb	5.35 d 10	ε+β ⁺	88.97	17.7
				199.19	40.9
				356.38	13.6
				422.34	8.0
				534.29	66.6

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				1065.11	10.8
				1154.07	10.4
				1159.03	7.2
				1222.44	31.0
				1421.67	12.2
156m	Tb	24.4 h 10	IT	49.630	74.1
156n	Tb	5.2 h 2	ε+β ⁺		
			IT		
157	Tb	71 y 7	ε		
158	Tb	180 y 11	ε+β ⁺	79.513	11.8
				181.944	10.0
				780.183	9.7
				944.189	44.4
				962.126	20.5
				1107.626	2.2
			β ⁻	98.918	4.3
160	Tb	72.3 d 2	β ⁻	86.7877	13.2
				197.0341	5.2
				215.6452	4.0
				298.5783	26.1
				879.378	30.1
				962.311	9.8
				966.166	25.1
				1177.954	14.9
				1271.873	7.4
				1312.14	2.9
161	Tb	6.958 d 5	β ⁻	25.65135	23.2
				48.91533	17.0
				74.56669	10.2
152	Dy	2.38 h 2	ε+β ⁺	256.93	97.5
			α		
153	Dy	6.42 h 12	ε+β ⁺	80.723	11.2
				99.659	10.6
				147.560	3.9
				213.754	11.0
				244.249	4.3
				254.259	8.7
				274.673	3.1
				274.673	2.0
			α		
154	Dy	2.8×10 ⁶ y 15	α		
155	Dy	9.92 h 14	ε+β ⁺	184.564	3.4

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				226.918	68.7
				664.173	2.2
				905.515	2.5
				999.68	2.4
				1089.8	2.8
				1090.0	2.8
				1155.47	2.1
157	Dy	8.14 h 4	ε+β ⁺	326.336	93.0
159	Dy	145.3 d 14	ε	58.0	2.3
165	Dy	2.331 h 4	β ⁻	94.700	3.8
166	Dy	81.63 h 17	β ⁻	82.470	13.8
160m	Ho	4.98 h 7	ε+β ⁺		
			IT		
161	Ho	2.48 h 5	ε	25.655	27.3
				103.05	3.9
162m	Ho	67.1 m 8	ε+β ⁺	80.67	4.5
				184.99	23.9
				282.86	10.3
				937.17	10.4
				1220.04	23.7
			IT	38.34	7.9
				57.74	4.4
163	Ho	4570 y 25	ε		
166	Ho	26.808 h 8	β ⁻	80.576	6.6
166m	Ho	1132.6 y 39	β ⁻	80.574	12.0
				184.4113	72.0
				280.464	29.4
				410.949	11.2
				529.807	9.5
				570.976	5.4
				711.681	54.1
				752.313	12.1
				810.293	56.9
				830.585	9.4
167	Ho	2.968 h 36	β ⁻	79.3219	2.1
				207.801	4.9
				237.873	5.0
				321.336	23.5
				346.547	56.0
				386.2	3.4
				403.0	3.2
				460.0	2.1

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
158	Er	2.26 h 6	ε	71.903	10.8
				248.580	2.9
				386.82	7.6
160	Er	28.58 h 9	ε	7.133	5.4
161	Er	3.21 h 3	ε+β ⁺	211.15	12.2
				314.77	2.5
				592.6	3.7
				826.6	64.0
163	Er	75.0 m 4	ε+β ⁺		
165	Er	10.36 h 4	ε		
169	Er	9.39 d 2	β ⁻		
171	Er	7.516 h 2	β ⁻	111.621	20.5
				116.656	2.3
				124.017	9.1
				295.901	28.9
				308.291	64.4
172	Er	49.3 h 3	β ⁻	59.692	2.7
				68.107	3.3
				127.805	2.1
				383.501	2.4
				407.338	42.1
				446.025	3.0
				610.062	44.2
163	Tm	1.810 h 5	ε+β ⁺	69.229	11.6
				104.320	18.6
				239.585	4.4
				241.305	10.9
				299.667	4.6
				471.330	4.0
				1265.116	5.2
				1374.34	4.3
				1397.52	7.0
				1434.45	8.0
165	Tm	30.06 h 3	ε+β ⁺	47.155	16.9
				54.415	7.2
				218.859	3.3
				242.917	35.5
				296.119	3.9
				297.369	12.7
				346.933	2.9
				460.263	4.1
				806.372	9.5

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
166	Tm	7.70 h 3	ε+β ⁺	1184.45	3.0
				80.585	11.5
				184.405	16.2
				691.250	7.5
				705.333	11.1
				778.814	19.1
				785.904	10.0
				1176.704	9.6
				1273.540	15.0
				2052.36	17.4
167	Tm	9.28 d 4	ε	2079.53	6.4
				57.0723	4.6
				207.801	41.3
168	Tm	93.1 d 2	ε+β ⁺	79.804	11.0
				184.295	18.2
				198.251	54.5
				447.515	24.0
				631.705	9.3
				720.392	12.2
				741.355	12.8
				815.989	51.0
				821.162	12.0
170	Tm	128.4 d 3	β ⁻	829.948	7.0
171	Tm	701.5 d 33	β ⁻		
172	Tm	63.6 h 2	β ⁻	78.750	6.5
				181.520	2.8
				1093.59	6.0
				1387.093	5.6
				1465.86	4.5
				1529.64	5.1
				1608.37	4.1
173	Tm	8.24 h 8	β ⁻	398.9	87.9
				461.4	6.9
164	Yb	75.8 m 17	ε		
166	Yb	56.7 h 1	ε	82.29	15.6
169	Yb	32.015 d 9	ε	63.01	2.2
				63.12044	43.6
				93.61447	2.6
				109.77924	17.4

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				130.52293	11.4
				177.21307	22.3
				197.95675	35.9
				307.73586	10.0
175	Yb	4.1615 d 30	β ⁻	113.805	3.9
				282.522	6.1
				396.329	13.2
177	Yb	1.911 h 3	β ⁻	121.6211	3.0
				150.399	18.0
				1080.204	5.1
				1241.8	3.1
178	Yb	74 m 3	β ⁻		
169	Lu	34.06 h 5	ε+β ⁺	87.377	2.2
				191.217	18.7
				889.753	4.8
				960.622	21.2
				1184.875	2.0
				1449.74	9.0
				1466.84	3.0
170	Lu	2.01 d 2	ε+β ⁺	84.262	8.7
				985.10	5.4
				1003.20	3.4
				1054.28	4.6
				1138.65	3.5
				1225.65	4.8
				1280.25	7.9
				1364.60	4.5
				2041.88	5.9
				2126.11	5.0
171	Lu	8.25 d 2	ε+β ⁺	19.394	14.0
				66.731	2.5
				72.380	2.0
				75.889	6.2
				667.422	11.2
				689.286	2.4
				739.793	48.7
				780.711	4.4
				839.961	3.1
				853.091	2.6
172	Lu	6.702 d 17	ε+β ⁺	78.7426	10.6
				90.6440	4.5
				181.525	20.6

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥2%
				203.433	5.0
				697.300	6.1
				810.064	16.6
				900.724	29.8
				912.079	15.2
				1002.74	5.2
				1093.63	62.5
173	Lu	1.37 y 1	ε	78.63	11.9
				100.724	5.2
				171.393	2.9
				272.105	21.2
174	Lu	3.31 y 5	ε+β ⁺	76.468	5.9
				1241.847	5.1
174m	Lu	142 d 2	IT	44.683	12.4
				67.058	7.2
			ε		
176	Lu	3.714×10 ¹⁰ y 19	β ⁻	88.34	14.5
				201.83	78.0
				306.78	93.6
176m	Lu	3.675 h 6	β ⁻	88.361	8.9
			ε		
177	Lu	6.6472 d 16	β ⁻	112.9498	6.2
				208.3662	10.4
177m	Lu	160.35 d 28	β ⁻	112.9498	21.4
				128.5027	16.0
				153.2842	16.5
				204.1050	13.5
				208.3662	55.4
				228.4838	35.9
				281.7868	14.0
				327.6829	18.4
				378.5036	29.4
				418.5388	21.7
			IT	121.6211	6.3
				147.1637	3.6
				171.8574	4.8
				218.1038	3.4
				268.7847	3.5
				319.0210	10.5
				367.4174	3.1
				413.6637	17.6
179	Lu	4.59 h 6	β ⁻	214.33	11.8

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
170	Hf	16.01 h 15	ε	47.80	2.9
				98.55	3.3
				120.19	15.1
				164.71	26.3
				208.1	2.7
				481.3	3.7
				501.6	3.7
				540.7	2.4
				572.9	14.5
				620.7	18.0
171	Hf	12.1 h 4	ε+β ⁺		
172	Hf	1.87 y 3	ε	23.9331	20.3
				67.35	5.3
				81.7513	4.5
				114.061	2.6
				125.812	11.3
173	Hf	23.6 h 1	ε+β ⁺	123.675	83.0
				134.965	4.7
				139.635	12.7
				162.010	6.5
				296.974	33.9
				306.568	6.4
				311.239	10.8
174	Hf	7.0×10 ¹⁶ y 12	α		
175	Hf	70.67 d 19	ε	89.36	2.4
				343.40	84.0
178n	Hf	31 y 1	IT	88.873	63.9
				93.193	17.6
				213.434	80.7
				216.668	64.9
				257.645	16.7
				325.560	94.1
				426.360	96.6
				454.048	16.6
				495.013	70.1
				574.219	88.6
179n	Hf	24.86 d 20	IT	122.70	27.7
				146.15	27.0
				169.78	19.4
				192.66	21.5
				236.48	18.8
				268.85	11.2

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				315.93	20.3
				362.55	39.6
				409.72	21.5
				453.59	67.8
180m	Hf	5.528 h 16	β ⁻ IT	57.538	48.0
				93.324	16.5
				215.426	81.6
				332.274	94.1
				443.162	81.7
				500.697	14.2
181	Hf	42.39 d 6	β ⁻	133.021	43.3
				136.260	5.8
				345.93	15.1
				482.18	80.5
182	Hf	8.90×10 ⁶ y 9	β ⁻	114.32	3.0
				156.09	7.0
				270.408	79.0
182m	Hf	61.5 m 15	β ⁻	59.1	5.0
				97.8	4.4
				114.3	7.1
				143.2	4.9
				146.8	5.4
				171.5	4.4
				339.6	6.5
				603.2	6.0
				799.6	10.8
				942.8	21.6
			IT	50.8	13.2
				97.8	9.2
				224.4	37.7
				344.1	45.6
				455.8	20.0
				506.6	23.4
183	Hf	1.019 h 3	β ⁻	73.160	38.0
				397.86	2.9
				459.073	29.8
				783.73	65.5
				1470.2	2.7
184	Hf	4.12 h 5	β ⁻	41.4	9.4
				43.9	5.8
				139.1	45.6

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
173	Ta	3.14 h 13	ε+β ⁺	181.0	14.1
				344.9	35.2
				69.70	6.0
				90.3	5.0
				160.4	4.9
174	Ta	1.08 h 3	ε+β ⁺	172.2	17.5
				180.6	2.2
				1208.2	2.7
				91.00	15.7
				206.50	60.0
175	Ta	10.5 h 2	ε+β ⁺	1205.92	4.9
				81.5	6.0
				104.3	3.1
				125.9	5.8
				125.9	2.6
176	Ta	8.08 h 7	ε+β ⁺	207.4	14.0
				266.9	10.8
				348.5	12.0
				436.4	3.8
				857.7	3.2
177	Ta	56.56 h 6	ε+β ⁺	1793.1	4.6
				88.35	11.9
				201.84	5.7
				710.50	5.4
				1159.30	24.7
178	Ta	2.41 h 7	ε+β ⁺	1190.22	4.5
				1224.96	5.7
				1584.02	5.3
				1696.55	4.6
				1823.70	4.5
179	Ta	1.815 y 30	ε	2832.00	4.4
				112.9498	11.6
180	Ta	8.154 h 6	β ⁻		
182	Ta	114.80 d 11	β ⁻	93.324	4.5
				67.74970	42.9
				100.10595	14.2
				152.42991	7.0
				222.1085	7.6
				229.3207	3.6
				264.0740	3.6

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				1121.290	35.2
				1189.040	16.5
				1221.395	27.2
				1231.004	11.6
183	Ta	5.1 d 1	β ⁻	46.4838	5.2
				52.5952	5.3
				99.0793	6.8
				107.9310	11.2
				161.3439	9.1
				162.3211	5.0
				244.263	8.8
				246.059	27.2
				313.276	5.2
				353.989	11.6
184	Ta	8.7 h 1	β ⁻	111.192	23.7
				215.34	11.4
				252.85	43.9
				318.04	22.8
				384.28	12.5
				414.01	72.0
				536.71	12.7
				792.07	14.5
				903.29	15.0
				920.93	32.0
176	W	2.5 h 1	ε		
177	W	132 m 2	ε+β ⁺	70.45	6.0
				115.05	8.1
				115.65	47.1
				186.2	15.2
				186.42	7.4
				417.16	5.8
				426.98	12.4
				611.8	5.6
				1014.9	4.5
				1036.4	9.6
178	W	21.6 d 3	ε		
180	W	1.59×10 ¹⁸ y 5	α		
181	W	120.96 d 2	ε		
185	W	74.9 d 4	β ⁻		
187	W	23.80 h 3	β ⁻	72.002	13.6
				134.247	10.4
				479.53	26.6

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				551.55	6.1
				618.37	7.6
				685.81	33.2
				772.87	5.0
188	W	69.77 d 5	β ⁻		
181	Re	19.95 h 37	ε+β ⁺	65.0	2.4
				109.9	2.7
				360.7	19.8
				365.5	56.5
				639.0	6.4
				661.8	3.0
				805.2	3.1
				953.6	3.6
				1000.2	3.3
				1009.4	2.4
182	Re	64.2 h 4	ε+β ⁺	67.75	38.4
				67.85	22.2
				100.10	16.5
				229.32	25.8
				1121.3	22.1
				1121.4	32.0
				1189.2	15.1
				1221.4	17.5
				1221.5	25.0
				1231.0	14.9
182m	Re	14.14 h 38	ε+β ⁺		
183	Re	70.0 d 14	ε	46.484	8.0
				52.596	2.4
				99.080	2.9
				107.933	2.3
				109.731	3.1
				162.330	25.1
				208.812	3.2
				291.723	3.4
184	Re	35.43 d 16	ε+β ⁺	111.2174	17.2
				252.845	3.0
				792.067	37.7
				894.760	15.7
				903.282	38.1
184m	Re	168 d 6	IT	104.7395	13.6
			ε	111.2174	5.8
				161.269	6.6

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				216.547	9.5
				252.845	10.8
				318.008	5.8
				384.250	3.2
				536.674	3.3
				792.067	3.7
				903.282	3.7
				920.933	8.2
186	Re	3.71847 d 44	β ⁻	137.15	9.5
			ε		
186m	Re	≈200000 y	IT	40.350	5.1
				59.009	18.1
187	Re	4.12×10 ¹⁰ y 11	β ⁻		
188	Re	17.004 h 2	β ⁻	155.044	15.5
189	Re	24.2 h 4	β ⁻	216.69	5.5
				219.40	4.5
				245.09	3.5
190m	Re	3.3 h 2	β ⁻	186.68	28.2
				361.09	12.1
				371.24	10.5
				397.36	6.0
				407.22	8.2
				518.55	6.7
				557.95	14.1
				569.30	13.9
				605.14	14.7
				673.10	9.4
			IT	119.12	11.7
181	Os	106 m 3	ε+β ⁺	118.01	12.7
				167.23	3.0
				238.75	43.8
				242.74	6.0
				751.4	3.2
				787.6	5.2
				827.0	19.9
				831.5	7.6
				955.0	5.0
				1060.4	5.6
182	Os	22.04 h 16	ε	55.50	5.8
				130.80	3.3
				180.20	34.1
				263.29	6.8

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥2%
183	Os	13.0 h 5	ε+β ⁺	510.04	52.4
				114.43	21.1
				167.85	9.0
				236.41	3.5
				381.74	91.6
183m	Os	9.9 h 3	ε+β ⁺	851.46	4.7
				484.49	2.2
				1034.68	6.0
				1101.93	49.2
				1107.93	22.5
			IT		
184	Os	1.12×10 ¹³ y 23	α		
185	Os	92.95 d 9	ε	646.116	78.0
				717.424	3.9
				874.813	6.3
				880.523	5.2
186	Os	2.0×10 ¹⁵ y 11	α		
189m	Os	5.81 h 11	IT		
191	Os	15.00 d 4	β ⁻	129.431	26.5
191m	Os	13.12 h 7	IT		
193	Os	29.830 h 18	β ⁻	73.029	3.1
				138.92	3.8
				460.541	3.9
				43.119	5.4
194	Os	6.0 y 2	β ⁻		
184	Ir	3.09 h 3	ε+β ⁺	119.79	30.8
				263.98	64.4
				390.36	26.1
				493.0	5.8
				539.69	6.4
				841.33	8.4
				961.26	10.2
				1044.55	5.5
				1105.28	5.7
				2063.0	4.3
				37.4	3.4
185	Ir	14.4 h 1	ε+β ⁺	60.0	5.7
				97.4	4.2
				100.75	2.4
				158.2	2.4
				254.2	13.3
				1668.3	3.6
				1732.2	2.8

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
186	Ir	16.64 h 3	ε+β ⁺	1738.4	2.4
				1828.8	10.1
				137.14	17.2
				137.15	41.7
				296.90	62.8
				296.93	6.4
				434.84	34.1
				630.32	11.7
				767.46	13.8
				773.24	8.8
186m	Ir	1.87 h 4	ε+β ⁺	773.28	8.9
				987.03	7.1
				137.14	17.2
				296.93	6.4
				630.32	11.7
				712.57	2.1
				767.46	13.8
				773.24	8.8
				987.03	7.1
				1617.21	2.7
IT				1754.4	3.0
187	Ir	10.5 h 3	ε+β ⁺		
188	Ir	41.5 h 5	ε+β ⁺	155.044	29.5
				478.00	14.6
				633.03	17.8
				634.97	5.0
				829.47	5.1
				1209.80	6.9
				1715.67	6.1
				2059.65	7.0
				2096.9	5.7
				2214.59	18.5
189	Ir	13.2 d 1	ε	69.52	3.5
				245.1	6.0
190	Ir	11.78 d 10	ε+β ⁺	186.68	49.7
				294.75	6.3
				361.09	12.3
				371.24	21.6
				397.36	6.2
				407.22	22.7
				518.55	32.2

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				557.95	28.5
				569.30	27.0
				605.14	37.8
190m	Ir	1.120 h <i>3</i>	IT		
190n	Ir	3.087 h <i>12</i>	ε+β ⁺	186.7	64.2
				361.2	86.7
				502.5	89.4
				616.5	90.1
			IT	36.184	2.7
				135.348	3.0
192	Ir	73.826 d <i>11</i>	β ⁻	295.95650	28.7
				308.45507	29.7
				316.50618	82.9
				468.06885	47.8
				588.5810	4.5
				604.41105	8.2
				612.46215	5.3
			ε	205.79430	3.3
				484.5751	3.2
192n	Ir	241 y <i>9</i>	IT		
193m	Ir	10.54 d <i>4</i>	IT		
194	Ir	19.20 h <i>2</i>	β ⁻	293.544	2.5
				328.467	13.1
194m	Ir	171 d <i>11</i>	β ⁻	111.7	8.9
				328.5	93.0
				338.8	55.0
				390.8	35.0
				482.6	97.0
				562.4	35.0
				562.4	35.0
				600.5	62.0
				687.8	59.0
				1011.8	3.6
195	Ir	2.29 h <i>13</i>	β ⁻	98.83	10.0
				211.30	2.5
195m	Ir	3.74 h <i>14</i>	β ⁻	98.85	10.7
				172.78	5.1
				319.90	9.8
				359.31	4.7
				364.94	9.7
				432.86	9.8
				481.17	2.7

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				684.88	9.8
			IT		
196m	Ir	1.40 h 2	β ⁻	103.3	18.4
				355.9	94.1
				393.5	97.0
				420.9	2.5
				447.1	94.1
				521.4	96.0
				647.3	91.2
				693.9	4.2
				727.3	2.6
				835.6	6.3
			IT		
185	Pt	70.9 m 24	ε+β ⁺		
			α		
186	Pt	2.08 h 5	ε+β ⁺		
			α		
187	Pt	2.35 h 3	ε+β ⁺	106.44	8.3
				110.06	6.2
				186.25	2.8
				201.68	5.1
				247.61	2.7
				285.07	4.0
				304.72	3.7
				629.44	2.9
				709.04	4.3
				819.16	3.0
188	Pt	10.2 d 2	ε+β ⁺	140.35	2.3
				187.59	19.1
				195.05	18.3
				381.43	7.4
				423.34	4.3
			α		
189	Pt	10.89 h 11	ε+β ⁺	94.34	6.5
				113.82	2.5
				141.18	3.6
				243.50	5.9
				300.51	3.2
				317.65	2.8
				544.91	4.9
				568.85	6.0
				607.60	4.7

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				721.38	7.9
190	Pt	4.90 × 10 ¹¹ y <i>11</i>	α		
191	Pt	2.860 d <i>20</i>	ε+β ⁺	82.398	4.8
				96.517	3.1
				129.400	3.0
				172.19	3.4
				351.17	3.4
				359.88	5.8
				409.44	7.9
				456.47	3.3
				538.87	14.3
193	Pt	50 y <i>6</i>	ε		
193m	Pt	4.33 d <i>3</i>	IT		
195m	Pt	4.010 d <i>8</i>	IT	30.89	2.4
				98.90	11.7
				129.79	2.9
197	Pt	19.8915 h <i>19</i>	β ⁻	77.35	17.0
				191.437	3.7
197m	Pt	95.41 m <i>18</i>	β ⁻	279	2.4
			IT	346.5	11.1
200	Pt	12.6 h <i>3</i>	β ⁻		
202	Pt	44 h <i>15</i>	β ⁻		
191	Au	3.18 h <i>6</i>	ε+β ⁺		
192	Au	4.94 h <i>9</i>	ε+β ⁺	295.95650	22.8
				308.45507	3.5
				316.50618	59.0
				582.70	2.7
				612.4621	4.4
				1422.91	3.4
				1723.00	3.5
				1832.83	2.8
				1921.05	2.8
				2237.3	4.7
193	Au	17.65 h <i>15</i>	ε+β ⁺	293.549	10.9
194	Au	38.06 h <i>23</i>	ε+β ⁺	328.470	63.0
				645.164	2.3
				948.323	2.3
				1104.056	2.2
				1175.360	2.2
				1468.904	6.8
				1887.030	2.1

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				1924.273	2.1
				2043.719	3.8
195	Au	186.01 d 6	ε	98.857	11.2
195m	Au	30.5 d 2	IT	261.75	68.7
196	Au	6.156 d 11	ε+β ⁺	333.03	22.9
				355.73	87.0
			β ⁻	426.10	6.6
196n	Au	9.607 h 34	IT	147.81	43.5
				168.37	7.8
				188.27	30.0
				285.49	4.4
				316.19	3.0
198	Au	2.69469 d 25	β ⁻	411.80205	95.6
198m	Au	2.28 d 2	IT	97.21	68.8
				180.31	49.5
				204.10	38.6
				214.89	77.3
				333.82	17.8
199	Au	3.135 d 3	β ⁻	158.37851	40.0
				208.20481	8.7
200m	Au	18.7 h 5	β ⁻	181.18	54.1
				255.87	72.4
				367.942	79.3
				497.77	81.8
				579.300	82.4
				759.50	74.6
				904.23	8.8
			IT	332.82	2.2
192	Hg	4.85 h 20	ε	157.2	7.2
				186.4	3.4
				274.8	51.8
				306.5	5.5
193	Hg	3.80 h 15	ε+β ⁺	218.07	2.7
				258.00	8.7
				381.60	15.4
				580.97	4.0
				789.21	4.4
				827.81	3.8
				861.11	12.1
				1080.7	3.6
				1118.84	7.8
				1276.38	2.6

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
193m	Hg	11.1 h 5	ε+β ⁺ IT		
194	Hg	4.5×10 ² y 5	ε		
195	Hg	10.68 h 16	ε+β ⁺	61.46	6.4
				585.13	2.0
				779.80	7.0
195m	Hg	41.6 h 2	ε+β ⁺	261.75	31.3
				387.87	2.2
				560.27	7.1
			IT		
197	Hg	64.96 h 7	ε+β ⁺	77.351	18.7
197m	Hg	23.82 h 4	ε+β ⁺	130.2	3.2
				279.0	70.9
			IT	133.98	33.5
203	Hg	46.612 d 11	β ⁻	279.1952	81.6
195	Tl	1.15 h 4	ε+β ⁺	37.09	2.5
				242.15	4.6
				279.19	4.0
				300.60	2.6
				558.38	2.7
				563.52	11.2
				884.47	10.6
				1100.33	2.5
				1269.51	2.6
				1363.88	9.0
196	Tl	1.84 h 3	ε+β ⁺	425.7	82.6
				610.5	11.8
				635.2	9.7
				964.6	3.5
				1495.8	8.1
				1553.0	4.8
				1621.4	4.8
				1696.7	3.0
				2011.3	3.7
				2212.0	3.3
196m	Tl	1.41 h 2	ε+β ⁺	222.9	5.4
				301.5	8.1
				426.3	92.2
				505.2	12.7
				588.8	3.4
				635.3	94.0

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				695.4	90.4
				723.5	5.4
			IT		
197	Tl	2.83 h 4	ε+β ⁺	133.99	2.0
				152.22	7.3
				308.6	2.2
				425.84	13.0
				433.14	2.5
				577.97	4.5
				857.18	2.1
				1411.34	4.6
198	Tl	5.3 h 5	ε+β ⁺	411.8	79.5
				636.7	9.9
				675.8	10.6
				1200.6	9.4
				1312.2	4.6
				1420.6	7.7
				1435.4	3.4
				1447.0	4.1
				1832.6	4.1
				2040.2	8.2
198m	Tl	1.87 h 3	ε+β ⁺	226.2	5.5
				411.8	59.1
				441.8	2.3
				489.6	4.7
				519.2	3.7
				587.2	54.2
				636.7	59.1
			IT	259.6	2.8
				282.8	27.1
199	Tl	7.42 h 8	ε+β ⁺	158.359	5.0
				208.20	12.3
				247.26	9.3
				284.09	2.2
				455.46	12.4
200	Tl	26.1 h 1	ε+β ⁺	144.639	2.6
				367.942	88.5
				579.300	14.0
				661.36	2.3
				828.27	11.0
				1205.75	30.4
				1225.44	3.4

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				1273.43	3.4
				1363.2	3.4
				1514.90	4.1
201	Tl	3.0421 d 15	ε	135.34	2.6
				167.43	10.0
202	Tl	12.471 d 6	ε	439.510	91.5
204	Tl	3.783 y 7	ε+β ⁺		
			β ⁻		
206	Tl	4.202 m 13	β ⁻		
207	Tl	4.77 m 1	β ⁻		
208	Tl	3.053 m 3	β ⁻	277.371	6.6
				510.77	22.6
				583.187	85.0
				860.557	12.5
				2614.511	99.8
210	Tl	1.30 m 3	β ⁻	296	79.2
				799.6	99.0
				860	6.9
				1070	11.9
				1110	6.9
				1210	16.8
				1316	20.8
				2010	6.9
				2360	7.9
				2430	8.9
198	Pb	2.4 h 1	ε+β ⁺	173.4	18.2
				259.5	5.8
				290.3	36.4
				365.4	19.5
				382.0	5.6
				397.7	2.9
				575.0	3.1
				865.3	6.0
199	Pb	90 m 10	ε+β ⁺	353.39	9.5
				366.90	44.2
				720.24	6.5
				761.98	2.2
				1135.04	7.8
				1239.12	2.1
				1382.71	2.9
				1502.04	2.1
				1658.43	5.6

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
200	Pb	21.5 h 4	ε	1749.70	2.3
				142.28	3.2
				147.63	38.1
				235.62	4.3
				257.19	4.5
				268.36	4.0
201	Pb	9.33 h 3	ε+β ⁺	450.56	3.4
				331.15	78.7
				361.25	9.7
				405.96	2.1
				584.60	3.6
				692.41	4.4
202m	Pb	3.54 h 2	ε+β ⁺	767.26	3.4
				826.26	2.4
				907.67	6.3
				945.96	7.3
202m	Pb	3.54 h 2	ε+β ⁺	389.94	6.6
				459.72	9.2
				490.47	9.8
				IT	84.5
				657.49	31.7
				786.99	48.5
203	Pb	51.93 h 2	ε	960.70	89.8
				279.1952	80.9
204m	Pb	66.9 m 1	IT	401.320	3.4
				374.76	94.2
205	Pb	1.70×10 ⁷ y 9	ε	899.15	99.2
				911.74	91.5
209	Pb	3.235 h 5	β ⁻		
210	Pb	22.20 y 17	β ⁻	46.539	4.2
211	Pb	36.1648 m 15	β ⁻	α	
				404.853	3.8
212	Pb	10.628 h 6	β ⁻	832.01	3.5
				238.632	43.6
214	Pb	27.06 m 7	β ⁻	300.087	3.3
				241.995	7.3
201	Bi	111 m 4	ε+β ⁺	295.224	18.5
				351.9320	35.7
201	Bi	111 m 4	ε+β ⁺	629.1	24.7

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				786.4	9.8
				818.9	7.6
				902.0	8.6
				936.2	11.6
				990.6	3.3
				1014.1	11.0
				1108.1	4.0
				1325.2	6.3
				1650.9	6.0
202	Bi	1.71 h 4	ε+β ⁺	168.11	4.8
				240.18	4.5
				346.47	4.6
				422.13	83.7
				569.27	4.8
				578.56	7.4
				657.49	60.6
				927.28	7.2
				954.47	7.8
				960.67	99.3
203	Bi	11.76 h 5	ε+β ⁺	264.2	5.3
				820.2	29.7
				825.2	14.6
				847.2	8.5
				896.9	13.1
				1033.7	8.8
				1536.5	7.6
				1679.6	8.8
				1847.3	11.5
				1893.0	8.2
204	Bi	11.28 h 9	ε+β ⁺	289.30	2.9
				374.76	82.4
				670.72	11.4
				791.20	3.3
				899.15	99.2
				911.74	13.6
				911.96	11.2
				918.26	10.9
				983.98	59.2
				1211.72	3.0
205	Bi	14.91 d 7	ε+β ⁺	549.84	3.0
				570.60	4.3
				579.80	5.4

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				703.45	31.1
				987.66	16.1
				1043.75	7.5
				1764.30	32.4
				1775.80	4.0
				1861.70	6.2
				1903.45	2.5
206	Bi	6.243 d 3	ε+β ⁺	183.977	15.8
				343.51	23.5
				497.06	15.3
				516.18	40.8
				537.45	30.5
				803.10	99.0
				881.01	66.2
				895.12	15.7
				1098.26	13.5
				1718.70	31.9
207	Bi	31.22 y 17	ε+β ⁺	569.698	97.8
				1063.656	74.5
				1770.228	6.9
208	Bi	3.680×10 ⁵ y 40	ε+β ⁺	2614.5	99.8
209	Bi	2.01×10 ¹⁹ y 8	α		
210	Bi	5.012 d 5	β ⁻		
			α		
210m	Bi	3.14×10 ⁶ y 15	α		
211	Bi	2.14 m 3	β ⁻		
			α	351.07	13.0
212	Bi	60.55 m 6	β ⁻	727.330	6.7
			α		
214	Bi	19.71 m 2	β ⁻	609.321	45.4
				768.360	4.9
				934.056	3.1
				1120.294	14.9
				1238.122	5.8
				1377.669	4.0
				1407.988	2.4
				1729.595	2.9
				1764.491	15.3
				2204.10	4.9
			α		
215	Bi	7.6 m 2	β ⁻	271.1	4.0
				293.5	48.9

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
204	Po	3.518 h 13	ε+β ⁺	517.5	2.1
				1104.5	3.1
				63.185	12.3
				137.023	11.1
				270.068	31.9
				317.016	4.9
				534.92	15.2
				680.39	8.7
				762.52	13.2
				883.960	34.3
205	Po	1.79 h 11	ε+β ⁺	1016.29	27.6
				1040.01	11.0
				α	
				212.0	3.6
				261.0	4.0
				511.0	7.0
				599.8	2.6
				836.8	19.1
				849.8	25.4
				872.4	36.8
206	Po	8.8 d 1	ε+β ⁺	1001.2	28.7
				1239.1	4.6
				1551.8	2.9
				α	
				286.410	22.9
				311.56	4.1
				338.44	18.5
				511.36	23.2
				522.47	15.1
				807.38	21.8
207	Po	5.80 h 2	ε+β ⁺	860.93	3.4
				980.23	6.8
				1007.15	3.0
				1032.26	31.7
				α	
				345.32	2.0
				405.78	9.7
				742.72	28.4
				911.77	17.0
				992.39	59.2
			α	1148.47	5.8

A	El	$T_{1/2}$	Decay Mode	E_γ (keV)	$I_\gamma \geq 2\%$
208	Po	2.898 y 2	$\epsilon + \beta^+$ α		
209	Po	124.0 y 29	$\epsilon + \beta^+$ α		
210	Po	138.378 d 4	α		
211	Po	0.516 s 3	α		
212	Po	295.0 ns 4	α		
214	Po	163.48 μ s 4	α		
215	Po	1.781 ms 3	β^- α		
216	Po	144.0 ms 6	α		
218	Po	3.097 m 10	β^- α		
207	At	1.81 h 3	$\epsilon + \beta^+$	300.648 467.116 588.333 648.095 658.40 675.154 721.14 814.41 907.08 1115.196	12.9 7.2 19.5 4.3 6.5 6.8 6.1 45.1 6.7 4.9
208	At	1.63 h 3	α $\epsilon + \beta^+$	177.595 205.40 517.055 660.040 686.527 807.137 845.044 896.66 989.94 1027.662	48.6 6.3 6.0 88.8 97.6 5.9 19.7 5.4 10.7 16.8
209	At	5.42 h 5	α $\epsilon + \beta^+$	104.187 195.0 239.190 545.0 551.0 781.9 790.2	2.4 23.5 12.6 90.9 4.9 83.3 63.5

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				903.0	3.7
				1103.4	5.4
				1170.6	3.0
			α		
210	At	8.1 h 4	ε+β ⁺	245.3	79.5
				1181.4	99.3
				1436.7	29.0
				1483.3	46.5
				1599.5	13.4
			α		
211	At	7.216 h 6	ε		
			α		
215	At	37 μs 3	α		
218	At	1.28 s 5	β ⁻		
			α		
219	At	56 s 3	β ⁻		
			α		
210	Rn	2.42 h 4	ε+β ⁺		
			α		
211	Rn	14.7 h 2	ε	168.7	6.8
				250.2	6.0
				442.2	23.1
				674.1	45.4
				678.4	29.0
				866.0	7.9
				946.7	5.0
				947.4	16.3
				1126.7	22.2
				1362.9	32.7
			α		
219	Rn	3.96 s 1	α	271.23	10.8
				401.81	6.6
220	Rn	55.6 s 1	α		
222	Rn	3.82146 d 16	α		
224	Rn	114 m 6	β ⁻		
223	Fr	21.99 m 7	β ⁻	49.80	2.8
				50.094	33.9
				79.651	8.7
				234.75	3.0
			α		
223	Ra	11.4352 d 10	α	144.235	3.5
				154.208	6.0

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
				269.463	13.3
				323.871	3.6
				338.282	2.6
224	Ra	3.6313 d 12	α	240.986	4.1
225	Ra	14.8 d 2	β ⁻	40.09	30.0
226	Ra	1600 y 7	α	186.211	3.6
228	Ra	5.75 y 3	β ⁻		
230	Ra	93 m 2	β ⁻	63.0	3.4
				72.0	9.7
				202.8	2.6
				469.7	2.5
				478.7	2.1
224	Ac	2.78 h 17	ε+β ⁺	131.35	26.9
				215.75	52.3
			α		
225	Ac	9.9190 d 21	α		
226	Ac	29.37 h 12	α		
			ε	185.60	4.8
				253.5	5.7
			β ⁻	158.05	17.5
				230.00	26.9
227	Ac	21.7725 y 26	β ⁻		
			α		
228	Ac	6.15 h 2	β ⁻	209.253	3.9
				270.245	3.5
				328.000	3.0
				338.320	11.3
				463.004	4.4
				794.947	4.2
				911.204	25.8
				964.766	5.0
				968.971	15.8
				1588.20	3.2
229	Ac	62.7 m 5	β ⁻	164.5240	2.7
				569.30	2.3
227	Th	18.6936 d 36	α	50.13	8.4
				235.96	12.9
				256.23	7.0
				299.98	2.2
				329.85	2.9
228	Th	1.9116 y 10	α		
229	Th	7908 y 20	α	11.1	12.3

A	El	$T_{1/2}$	Decay Mode	E_γ (keV)	$I_{\gamma \geq 2\%}$
				86.40	2.6
				193.52	4.4
				210.853	2.8
230	Th	7.540×10^4 y	30α		
231	Th	25.52 h	$1 \beta^-$	25.65	13.7
				84.2140	6.8
232	Th	1.407×10^{10} y	23 SF		
			α		
234	Th	24.107 d	$23 \beta^-$	63.29	3.7
				92.38	2.1
				92.80	2.1
228	Pa	19.8 h	$9 \epsilon + \beta^+$	463.02	2.1
				911.20	2.3
			α		
229	Pa	1.55 d	5ϵ		
			α		
230	Pa	17.4 d	$4 \epsilon + \beta^+$	443.74	5.8
				454.92	6.8
				508.15	4.1
				518.54	2.2
				728.13	2.0
				898.66	5.8
				918.50	8.3
				951.88	29.6
			α		
			β^-		
231	Pa	3.274×10^4 y	21α	27.36	10.4
				300.066	2.4
				302.667	2.3
232	Pa	1.31 d	$2 \beta^-$	150.059	10.4
				387.884	6.6
				453.655	8.3
				472.390	4.0
				515.607	5.4
				581.398	6.2
				819.187	7.3
				866.760	5.6
				894.351	19.6
				969.315	42.3
233	Pa	26.975 d	$13 \beta^-$	86.591	2.0
				300.128	6.5
				311.901	38.2

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥2%
234	Pa	6.671 h 22	β ⁻	340.477	4.4
				131.30	18.9
				152.71	6.3
				227.25	6.0
				569.5	8.6
				733.39	7.2
				880.5	6.5
				883.24	10.0
239	Pa	1.8 h 5	β ⁻	925.0	8.2
				926.72	7.6
				946.00	14.0
230	U	20.23 d 2	α		
231	U	4.2 d 1	ε	25.65	14.6
232	U	68.90 y 28	SF	84.2140	7.3
233	U	1.5919×10 ⁵ y 12	α		
234	U	2.455×10 ⁵ y 6	SF		
235	U	7.040×10 ⁸ y 10	SF		
236	U	2.3430×10 ⁷ y 30	SF	143.765	10.9
				163.357	5.1
				185.713	57.2
				205.311	5.0
237	U	6.752 d 5	β ⁻	26.3446	2.4
238	U	4.463×10 ⁹ y 5	SF	59.5409	34.5
				208.005	21.2
240	U	14.1 h 1	β ⁻		
234	Np	4.4 d 1	ε+β ⁺	742.78	5.2
				786.28	3.2
				1193.78	6.0
				1237.22	2.3
				1391.87	2.2
				1435.36	6.3
				1527.21	11.1

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥2%
				1558.31	18.5
				1570.68	5.0
				1601.80	9.0
235	Np	396.1 d <i>12</i>	ε		
			α		
236	Np	1.550×10 ⁵ y <i>10</i>	α		
			ε	104.237	7.3
				160.308	31.6
			β ⁻		
236m	Np	22.5 h <i>4</i>	β ⁻		
			ε		
237	Np	2.144×10 ⁶ y <i>7</i>	α	29.374	14.5
				86.484	12.2
238	Np	2.0993 d <i>12</i>	β ⁻	923.99	2.6
				984.45	25.2
				1025.87	8.8
				1028.53	18.2
239	Np	2.3558 d <i>31</i>	β ⁻	106.123	25.3
				209.753	3.4
				228.183	10.7
				277.599	14.5
				334.310	2.1
240	Np	61.9 m <i>2</i>	β ⁻	152.7	7.3
				448.01	13.4
				554.60	20.9
				566.34	27.6
				597.40	11.7
				600.57	20.0
				867.2	8.8
				895.8	14.8
				973.9	25.9
				987.7	7.3
234	Pu	8.8 h <i>1</i>	ε		
			α		
236	Pu	2.858 y <i>7</i>	SF		
			α		
237	Pu	45.64 d <i>4</i>	ε	59.5409	3.3
			α		
238	Pu	87.7 y <i>1</i>	SF		
			α		
239	Pu	24109 y <i>15</i>	SF		
			α		

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
240	Pu	6562 y 6	SF		
			α		
241	Pu	14.329 y 29	β ⁻		
			α		
242	Pu	3.750×10 ⁵ y 20	SF		
			α		
243	Pu	4.955 h 2	β ⁻		
244	Pu	8.130×10 ⁷ y 30	SF		
			α		
245	Pu	10.54 h 7	β ⁻	308.222	5.1
				327.428	26.4
				376.676	3.3
				491.591	2.8
				560.134	5.6
				630.102	2.8
246	Pu	10.84 d 2	β ⁻	27.58	3.5
				43.81	25.0
				179.94	9.7
				223.75	23.5
247	Pu	2.27 d 23	β ⁻		
237	Am	73 m 1	ε+β ⁺	280.23	47.3
				438.4	8.3
				473.5	4.3
				908.8	2.6
			α		
238	Am	97.4 m 15	ε+β ⁺	357.7	2.1
				561.0	10.9
				605.1	7.6
				918.7	23.0
				941.4	2.2
				962.8	28.0
				1577.3	2.9
			α		
239	Am	11.9 h 1	ε	209.8	3.5
				226.383	3.3
				228.184	11.3
				277.604	15.0
			α		
240	Am	50.9 h 2	ε+β ⁺	888.85	24.8
				987.79	72.2
			α		
241	Am	432.6 y 6	SF		

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
			α	26.3446	2.3
				59.5409	35.9
242	Am	16.02 h 2	β ⁻		
			ε		
242m	Am	141.9 y 17	IT		
			α		
243	Am	7345 y 14	SF		
			α	43.53	5.9
				74.66	67.2
244	Am	10.02 h 3	β ⁻	99.383	4.6
				153.863	16.4
				743.971	66.0
				897.848	28.0
245	Am	2.047 h 8	β ⁻	252.8	5.6
238	Cm	2.2 h 4	SF		
			α		
			ε		
239	Cm	2.5 h 4	ε+β ⁺	146.4	11.9
				188	36.0
			α		
240	Cm	30.4 d 37	SF		
			α		
			ε		
241	Cm	32.8 d 2	ε	132.413	3.9
				165.049	3.0
				205.879	2.7
				430.634	4.1
				471.805	71.3
			α		
242	Cm	162.88 d 6	SF		
			α		
243	Cm	29.18 y 12	SF		
			α	209.753	3.3
				228.183	10.6
				277.599	14.0
			ε		
244	Cm	18.112 y 25	SF		
			α		
245	Cm	8.25×10 ³ y 7	SF		
			α	133.08	2.8
				175.01	9.8
246	Cm	4757 y 33	SF		

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
			α		
247	Cm	1.56×10 ⁷ y 5	α	278.0	3.4
				287.5	2.0
				402.4	72.0
248	Cm	3.48×10 ⁵ y 6	SF		
			α		
249	Cm	64.15 m 3	β ⁻		
250	Cm	≈8300 y	SF		
243	Bk	4.6 h 2	ε+β ⁺		
			α		
244	Bk	5.02 h 3	ε+β ⁺		
			α		
245	Bk	4.96 d 3	ε	252.85	30.6
				380.8	2.5
			α		
246	Bk	1.80 d 2	ε+β ⁺		
247	Bk	1.38×10 ³ y 25	α	84	40.0
				265	30.0
248m	Bk	23.7 h 2	β ⁻		
			ε		
249	Bk	327.2 d 3	SF		
			α		
			β ⁻		
250	Bk	3.212 h 5	β ⁻	989.125	45.0
				1028.654	4.9
				1031.852	35.6
246	Cf	35.7 h 5	SF		
			α		
247	Cf	3.11 h 3	ε		
			α		
248	Cf	333.5 d 28	SF		
			α		
249	Cf	350.7 y 20	SF		
			α	252.82	2.6
				333.37	14.8
				388.15	66.0
250	Cf	13.08 y 9	SF		
			α		
251	Cf	898 y 43	α	177.52	17.3
				227.38	6.8
252	Cf	2.647 y 3	SF		

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
253	Cf	17.78 d 7	α		
			β ⁻		
254	Cf	60.5 d 2	α		
			SF		
255	Cf	85 m 18	α		
			β ⁻		
249	Es	102.2 m 6	ε+β ⁺	375.1	3.3
				379.5	40.8
				813.2	9.2
250	Es	8.5 h 1	α		
			ε+β ⁺	140.694	4.6
				303.41	22.0
				349.4	20.1
				383.7	13.8
				810.2	9.0
				828.9	5.5
				829.00	72.5
				863.2	5.0
				989.1	13.3
250m	Es	2.21 h 5	α		
			ε+β ⁺		
251	Es	33 h 1	ε		
252	Es	471.7 d 19	α		
			ε	139.03	11.7
				785.1	15.4
253	Es	20.466 d 23	α		
			SF		
			α		
254	Es	275.7 d 5	SF		
			α	63	2.0
			β ⁻		
254m	Es	39.2 h 3	SF		
			α		
			ε		
			β ⁻	584.18	2.9
				648.69	29.0
				688.52	12.5
				693.67	24.8
255	Es	39.8 d 12	IT		
			SF		

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥ 2%
			α		
			β ⁻		
256m	Es	7.6 h	β ⁻		
257	Es	7.7 d 2	β ⁻		
251	Fm	5.30 h 8	ε+β ⁺	880.8	2.2
			α		
252	Fm	25.38 h 12	SF		
			α		
253	Fm	3.00 d 12	ε		
			α	271.8	2.6
254	Fm	3.240 h 2	SF		
			α		
255	Fm	20.07 h 7	SF		
			α		
256	Fm	157.1 m 12	SF		
			α		
257	Fm	100.5 d 2	SF		
			α	179.4	8.1
				241.0	10.2
256	Md	77.7 m 15	SF		
			ε+β ⁺	634.1	6.2
				644.0	7.1
				677.3	3.1
				682.1	6.5
				692.0	4.8
				1312.3	2.2
				1326.1	2.4
				1326.1	2.4
				1357.1	2.2
				1374.1	2.5
			α		
257	Md	5.52 h 5	SF		
			α	325.1	2.5
				371.4	11.7
			ε		
258	Md	51.52 d 29	α	71.1	3.0
				276.8	7.7
				296.7	2.1
				367.8	38.1
				447.9	13.9
259	Md	1.61 h 6	SF		
			α		

A	El	T _{1/2}	Decay Mode	E _γ (keV)	I _γ ≥2%
260	Md	31.8 d	5	ε	
				β ⁻	
				α	
				SF	

Gamma Ray Energy Table

E(γ) (keV)	Parent Nuclides
7	¹⁶⁰ Er
9	^{83m} Kr, ⁸³ Rb
11	²²⁹ Th
14	⁵⁷ Co
16	⁷² Zn
18	¹¹² Pd
19	¹⁷¹ Lu
21	¹⁵¹ Gd
22	¹⁵⁶ Sm, ¹⁴⁹ Eu
23	^{119m} Sn, ¹²⁶ Sn, ¹¹⁹ Sb, ¹⁷² Hf
24	¹⁰¹ Pd
25	¹⁶¹ Tb, ¹⁶¹ Ho, ²³¹ Th, ²³¹ U
26	²³⁷ U, ²⁴¹ Am
27	¹²⁹ Te, ²³¹ Pa, ²⁴⁶ Pu
29	⁸⁶ Zr, ¹⁴⁰ Ba, ²³⁷ Np
30	²⁸ Mg, ^{195m} Pt
32	¹⁰⁰ Pd
35	¹²⁵ Sb, ^{125m} Te, ¹²⁵ I
36	¹⁹⁰ⁿ Ir
37	^{80m} Br, ¹⁸⁵ Ir, ¹⁹⁵ Tl
38	¹⁵⁶ Sm, ^{162m} Ho
39	¹²⁹ I, ^{129m} Xe, ¹²⁹ Cs
40	⁶² Zn, ^{118m} Sb, ^{186m} Re, ²²⁵ Ra
41	¹⁵³ Tb, ¹⁸⁴ Hf
42	⁹⁰ Mo, ¹⁰⁰ Pd
43	⁶⁶ Ge, ¹⁸⁴ Hf, ¹⁹⁴ Os, ²⁴⁶ Pu, ²⁴³ Am
44	^{174m} Lu
45	⁷² Se, ⁷⁶ Kr
46	¹⁸³ Ta, ¹⁸³ Re, ²¹⁰ Pb
47	¹⁶⁵ Tm, ¹⁷⁰ Hf
48	¹⁶¹ Tb
49	¹³² Te, ^{156m} Tb, ²²³ Fr
50	^{182m} Hf, ²²³ Fr, ²²⁷ Th
52	¹⁸³ Ta, ¹⁸³ Re
53	⁷³ Ga, ⁷³ As, ¹³³ Ba
54	¹²⁵ Xe, ¹⁵⁷ Eu, ¹⁶⁵ Tm

$E(\gamma)$ (keV)	Parent Nuclides
55	^{182}Os
57	^{143}Ce , $^{162\text{m}}\text{Ho}$, ^{167}Tm , $^{180\text{m}}\text{Hf}$
58	^{60}Fe , $^{133\text{m}}\text{Ce}$, ^{159}Gd , ^{159}Dy
59	^{172}Er , $^{182\text{m}}\text{Hf}$, $^{186\text{m}}\text{Re}$, ^{237}U , ^{237}Pu , ^{241}Am
60	^{185}Ir
61	^{145}Sm , ^{195}Hg
63	^{157}Eu , ^{169}Yb , ^{169}Yb , ^{204}Po , ^{230}Ra , ^{234}Th , ^{254}Es
64	^{105}Ag , ^{126}Sn
65	^{66}Ge , ^{156}Sm , ^{181}Re
66	^{136}Cs , ^{171}Lu
67	^{44}Ti , ^{61}Co , ^{61}Cu , ^{73}Se , $^{174\text{m}}\text{Lu}$, ^{172}Hf , ^{182}Ta , ^{182}Re , ^{182}Re
68	^{172}Er
69	^{153}Sm , ^{153}Gd , ^{163}Tm , ^{173}Ta , ^{189}Ir
70	$^{111\text{m}}\text{Pd}$, ^{177}W
71	^{158}Er , ^{258}Md
72	^{145}Pm , ^{171}Lu , ^{187}W , ^{230}Ra
73	^{183}Hf , ^{193}Os
74	^{100}Pd , ^{109}In , ^{161}Tb , ^{243}Am
75	^{171}Lu
76	^{133}Ce , ^{174}Lu
77	^{197}Pt , ^{197}Hg
78	^{44}Ti , ^{172}Tm , ^{172}Lu , ^{173}Lu
79	$^{108\text{m}}\text{Ag}$, ^{133}Ba , ^{158}Tb , ^{167}Ho , ^{168}Tm , ^{223}Fr
80	^{131}I , ^{133}Xe , ^{133}Ba , ^{153}Dy , $^{162\text{m}}\text{Ho}$, ^{166}Ho , $^{166\text{m}}\text{Ho}$, ^{166}Tm
81	^{172}Hf , ^{175}Ta
82	^{153}Tb , ^{166}Dy , ^{166}Yb , ^{191}Pt
84	^{100}Pd , ^{109}In , ^{170}Tm , ^{170}Lu , ^{231}Th , ^{231}U , ^{247}Bk
86	^{126}Sn , ^{136}Cs , ^{155}Eu , ^{155}Tb , ^{160}Tb , ^{229}Th , ^{233}Pa , ^{237}Np
87	^{126}Sn , $^{133\text{m}}\text{Ce}$, ^{156}Sm , ^{169}Lu
88	^{72}Zn , ^{109}Pd , ^{109}Cd , ^{156}Eu , ^{156}Tb , ^{176}Lu , $^{176\text{m}}\text{Lu}$, $^{178\text{n}}\text{Hf}$, ^{176}Ta
89	^{99}Rh , ^{117}Cd , $^{152\text{n}}\text{Eu}$, ^{175}Hf
90	^{172}Lu , ^{173}Ta
91	^{67}Cu , ^{67}Ga , ^{147}Nd , ^{174}Ta
92	^{234}Th , ^{234}Th
93	^{67}Cu , ^{67}Ga , ^{107}Cd , ^{116}Te , ^{169}Yb , $^{178\text{n}}\text{Hf}$, $^{180\text{m}}\text{Hf}$, ^{180}Ta
94	^{165}Dy , ^{189}Pt
96	^{75}Se , ^{191}Pt
97	^{133}Ce , ^{153}Gd , $^{182\text{m}}\text{Hf}$, $^{182\text{m}}\text{Hf}$, ^{185}Ir , $^{198\text{m}}\text{Au}$

$E(\gamma)$ (keV)	Parent Nuclides
98	$^{132\text{m}}\text{I}$, ^{158}Tb , ^{170}Hf , ^{195}Ir , $^{195\text{m}}\text{Ir}$, $^{195\text{m}}\text{Pt}$, ^{195}Au
99	$^{116\text{m}}\text{Sb}$, ^{153}Dy , ^{183}Ta , ^{183}Re , ^{244}Am
100	^{151}Pm , ^{173}Lu , ^{182}Ta , ^{182}Re , ^{185}Ir
102	^{72}Zn , $^{131\text{m}}\text{Te}$, ^{153}Tb
103	^{76}Kr , ^{153}Sm , ^{153}Gd , ^{161}Ho , $^{196\text{m}}\text{Ir}$
104	^{151}Pm , ^{163}Tm , ^{175}Ta , $^{184\text{m}}\text{Re}$, ^{209}At , ^{236}Np
105	^{155}Eu , ^{155}Tb
106	^{187}Pt , ^{239}Np
107	^{183}Ta , ^{183}Re
108	^{66}Ge , ^{151}Tb
109	^{153}Tb , ^{169}Yb , ^{181}Re , ^{183}Re
110	^{187}Pt
111	^{171}Er , ^{184}Ta , ^{184}Re , $^{184\text{m}}\text{Re}$, $^{194\text{m}}\text{Ir}$
112	^{48}Cr , ^{72}Zn , ^{177}Lu , $^{177\text{m}}\text{Lu}$, ^{177}Ta
113	$^{139\text{m}}\text{Nd}$, ^{175}Yb , ^{189}Pt
114	^{149}Nd , ^{146}Gd , ^{172}Hf , ^{182}Hf , $^{182\text{m}}\text{Hf}$, ^{183}Os
115	^{146}Gd , ^{177}W , ^{177}W
116	^{171}Er
118	^{103}Ag , ^{181}Os
119	^{147}Tb , $^{190\text{m}}\text{Re}$, ^{184}Ir
120	^{170}Hf
121	$^{71\text{m}}\text{Zn}$, ^{75}Se , ^{147}Eu , ^{152}Eu , $^{152\text{m}}\text{Eu}$, ^{177}Yb , $^{177\text{m}}\text{Lu}$
122	^{57}Co , ^{90}Mo , $^{179\text{n}}\text{Hf}$
123	^{131}Ba , ^{154}Eu , ^{154}Tb , ^{154}Tb , ^{154}Tb , $^{154\text{m}}\text{Tb}$, $^{154\text{n}}\text{Tb}$, ^{173}Hf
124	^{127}Cs , ^{171}Er
125	^{172}Hf , ^{175}Ta , ^{175}Ta
126	^{100}Pd
127	^{57}Ni , ^{101}Rh , $^{134\text{m}}\text{Cs}$, ^{172}Er
128	$^{177\text{m}}\text{Lu}$
129	^{77}Kr , ^{105}Ru , ^{129}Ba , ^{191}Os , ^{191}Pt , $^{195\text{m}}\text{Pt}$
130	$^{133\text{m}}\text{Ce}$, ^{169}Yb , ^{182}Os , $^{197\text{m}}\text{Hg}$
131	^{224}Ac , ^{234}Pa
132	^{90}Nb , ^{241}Cm
133	^{131}Ba , ^{144}Ce , ^{181}Hf , $^{197\text{m}}\text{Hg}$, ^{197}Tl , ^{245}Cm
134	^{173}Hf , ^{187}W
135	$^{116\text{m}}\text{Sb}$, $^{190\text{m}}\text{Ir}$, ^{201}Tl
136	^{57}Co , ^{75}Se , ^{181}Hf
137	^{186}Re , ^{186}Ir , ^{186}Ir , $^{186\text{m}}\text{Ir}$, ^{204}Po

E(γ) (keV)	Parent Nuclides
138	^{193}Os
139	^{147}Tb , ^{173}Hf , ^{184}Hf , ^{252}Es
140	$^{99\text{m}}\text{Tc}$, ^{188}Pt , ^{250}Es
141	^{75}Br , ^{90}Nb , $^{154\text{n}}\text{Tb}$, ^{189}Pt
142	$^{71\text{m}}\text{Zn}$, ^{200}Pb
143	$^{182\text{m}}\text{Hf}$, ^{235}U
144	^{72}Zn , ^{200}Tl , ^{223}Ra
145	^{127}Xe , ^{141}Ce
146	^{77}Kr , $^{179\text{n}}\text{Hf}$, $^{182\text{m}}\text{Hf}$, ^{239}Cm
147	^{153}Dy , $^{177\text{m}}\text{Lu}$, $^{196\text{n}}\text{Au}$, ^{200}Pb
148	^{103}Ag , ^{122}Xe , ^{123}Xe , ^{155}Tb
149	^{149}Gd
150	^{177}Yb , ^{232}Pa
151	$^{85\text{m}}\text{Kr}$, $^{85\text{m}}\text{Sr}$
152	^{182}Ta , ^{197}Tl , ^{234}Pa , ^{240}Np
153	$^{119\text{m}}\text{Te}$, ^{136}Cs , ^{151}Gd , $^{177\text{m}}\text{Lu}$, ^{244}Am
154	^{146}Gd , ^{223}Ra
155	^{132}Ce , ^{149}Nd , ^{188}Re , ^{188}Ir
156	$^{117\text{m}}\text{Sn}$, ^{182}Hf
157	^{192}Hg
158	^{56}Ni , $^{117\text{m}}\text{In}$, $^{117\text{m}}\text{Sn}$, ^{117}Sb , ^{185}Ir , ^{199}Au , ^{199}Tl , ^{226}Ac
159	^{47}Sc , $^{123\text{m}}\text{Te}$, ^{123}I
160	^{173}Ta , ^{236}Np
161	^{155}Tb , ^{183}Ta , $^{184\text{m}}\text{Re}$
162	^{90}Mo , ^{140}Ba , ^{173}Hf , ^{183}Ta , ^{183}Re
163	^{136}Cs , ^{155}Tb , ^{235}U
164	^{149}Tb , ^{170}Hf , ^{229}Ac
165	^{88}Kr , ^{139}Ba , ^{139}Ce , ^{156}Sm , ^{241}Cm
167	^{151}Pm , ^{181}Os , ^{183}Os , ^{201}Tl
168	^{52}Fe , $^{196\text{n}}\text{Au}$, ^{202}Bi , ^{211}Rn
169	$^{179\text{n}}\text{Hf}$
170	^{153}Tb
171	^{111}In , ^{173}Lu , $^{177\text{m}}\text{Lu}$, $^{182\text{m}}\text{Hf}$
172	$^{111\text{m}}\text{Pd}$, ^{127}Xe , ^{173}Ta , $^{195\text{m}}\text{Ir}$, ^{191}Pt
173	^{198}Pb
174	^{71}As , ^{151}Gd
175	^{48}Sc , ^{80}Sr , ^{99}Rh , $^{132\text{m}}\text{I}$, ^{245}Cm
176	^{125}Sb , ^{136}Cs

E(γ) (keV)	Parent Nuclides
177	¹⁵¹ Pm, ¹⁶⁹ Yb, ²⁰⁸ At, ²⁵¹ Cf
178	¹²³ Xe
179	²⁴⁶ Pu, ²⁵⁷ Fm
180	¹²⁹ Sb, ¹⁵¹ Tb, ¹⁵⁵ Tb, ¹⁷³ Ta, ¹⁸² Os, ^{198m} Au
181	⁹⁹ Mo, ¹⁵⁸ Tb, ¹⁷² Tm, ¹⁷² Lu, ¹⁸⁴ Hf, ^{200m} Au
182	⁶⁶ Ge, ¹³² Ce
183	^{82m} Rb, ²⁰⁶ Bi
184	⁶⁷ Cu, ⁶⁷ Ga, ¹⁵⁵ Dy, ^{162m} Ho, ^{166m} Ho, ¹⁶⁶ Tm, ¹⁶⁸ Tm
185	²²⁶ Ac, ²³⁵ U
186	¹⁷⁷ W, ¹⁷⁷ W, ^{190m} Re, ¹⁹⁰ Ir, ¹⁹⁰ⁿ Ir, ¹⁸⁷ Pt, ¹⁹² Hg, ²²⁶ Ra
187	¹⁴⁹ Tb, ¹⁸⁸ Pt
188	¹²⁵ Xe, ¹⁹⁶ⁿ Au, ²³⁹ Cm
190	⁶⁶ Ge, ⁸¹ Rb, ^{114m} In, ¹³² Ce
191	⁷² Zn, ¹⁶⁹ Lu, ¹⁹⁷ Pt
192	⁵⁹ Fe, ¹⁷⁹ⁿ Hf
193	²²⁹ Th
195	¹⁸⁸ Pt, ²⁰⁹ At
196	⁸⁸ Kr, ^{129m} Xe
197	¹⁴⁷ Eu, ¹⁶⁰ Tb, ¹⁶⁹ Yb
198	¹⁰¹ Rh, ¹⁶⁸ Tm
199	¹⁵⁶ Tb
200	^{131m} Te
201	¹⁷⁶ Lu, ¹⁷⁶ Ta, ¹⁸⁷ Pt
202	^{90m} Y, ¹²⁷ Xe, ²³⁰ Ra
203	⁹⁰ Mo, ¹⁰⁹ In, ¹⁷² Lu
204	^{95m} Nb, ^{95m} Tc, ¹⁵⁶ Sm, ^{177m} Lu, ^{198m} Au
205	¹⁹² Ir, ²⁰⁸ At, ²³⁵ U, ²⁴¹ Cm
206	¹³⁵ Ce, ¹⁷⁴ Ta
207	¹⁶⁷ Ho, ¹⁶⁷ Tm, ¹⁷⁵ Ta
208	⁶⁷ Ga, ¹⁷⁷ Lu, ^{177m} Lu, ¹⁷⁰ Hf, ¹⁸³ Re, ¹⁹⁹ Au, ¹⁹⁹ Tl, ²³⁷ U
209	²²⁸ Ac, ²³⁹ Np, ²³⁹ Am, ²⁴³ Cm
210	²²⁹ Th
211	⁷⁷ Ge, ¹⁴⁹ Nd, ¹⁶¹ Er, ¹⁹⁵ Ir
212	^{121m} Te, ¹²¹ I, ¹⁵³ Tb, ²⁰⁵ Po
213	¹⁵³ Dy, ¹⁷⁸ⁿ Hf
214	¹²⁹ Ba, ¹⁷⁹ Lu, ^{198m} Au
215	⁷⁷ Ge, ⁹⁷ Ru, ¹⁶⁰ Tb, ^{180m} Hf, ¹⁸⁴ Ta, ²²⁴ Ac
216	¹³¹ Ba, ¹³² Ce, ¹⁷⁸ⁿ Hf, ^{184m} Re, ¹⁸⁹ Re

E(γ) (keV)	Parent Nuclides
217	⁷⁹ Kr, ¹²⁶ Ba
218	¹⁶⁵ Tm, ^{177m} Lu, ¹⁹³ Hg
219	¹⁸⁹ Re
220	⁴³ K, ¹²⁹ Ba
221	⁸² Br
222	¹⁸² Ta, ^{196m} Tl
223	²⁴⁶ Pu
224	^{182m} Hf
225	¹⁵⁴ Tb, ¹⁵⁴ⁿ Tb
226	¹⁵⁵ Dy, ^{198m} Tl, ²³⁹ Am
227	²³⁴ Pa, ²⁵¹ Cf
228	¹³² Te, ^{177m} Lu, ²³⁹ Np, ²³⁹ Am, ²⁴³ Cm
229	¹⁴⁷ Gd, ¹⁸² Ta, ¹⁸² Re
230	²²⁶ Ac
231	^{85m} Sr, ⁸⁵ Y, ^{85m} Y, ¹⁴³ Ce
233	^{133m} Xe, ¹²⁶ Ba
234	²²³ Fr
235	⁸⁰ Sr, ^{95m} Nb, ²⁰⁰ Pb, ²²⁷ Th
236	¹⁷⁹ⁿ Hf, ¹⁸³ Os
237	¹⁶⁷ Ho
238	⁷⁷ Br, ¹⁸¹ Os, ²¹² Pb
239	¹³¹ Ba, ¹⁶³ Tm, ²⁰⁹ At
240	^{131m} Te, ¹⁴⁹ Nd, ¹⁵¹ Pm, ²⁰² Bi, ²²⁴ Ra
241	⁹² Sr, ⁹⁶ Nb, ¹²⁶ Ba, ¹⁶³ Tm, ²¹⁴ Pb, ²⁵⁷ Fm
242	⁸⁶ Zr, ¹⁶⁵ Tm, ¹⁸¹ Os, ¹⁹⁵ Tl
243	⁶² Zn, ¹⁰³ Ag, ¹²⁵ Xe, ¹⁵¹ Gd, ¹⁸⁹ Pt
244	¹⁵⁶ Sm, ¹⁵² Eu, ¹⁵³ Dy, ¹⁸³ Ta
245	¹¹¹ In, ¹⁸⁹ Re, ¹⁸⁹ Ir, ²¹⁰ At
246	¹⁸³ Ta
247	¹⁵⁴ Eu, ¹⁵⁴ Tb, ¹⁵⁴ Tb, ^{154m} Tb, ¹⁵⁴ⁿ Tb, ¹⁸⁷ Pt, ¹⁹⁹ Tl
248	¹⁵⁸ Er
249	⁷⁷ Br, ¹³⁵ Xe, ¹³¹ Ba, ¹⁵³ Tb
250	²¹¹ Rn
251	¹³² Ce, ¹⁵¹ Tb
252	⁷⁶ Kr, ¹²⁷ Sb, ¹⁸⁴ Ta, ¹⁸⁴ Re, ^{184m} Re, ²⁴⁵ Am, ²⁴⁵ Bk, ²⁴⁹ Cf
253	^{118m} Sb, ²²⁶ Ac
254	^{137m} Ce, ¹⁵³ Dy, ¹⁸⁵ Ir
255	¹¹³ Sn, ^{200m} Au

E(γ) (keV)	Parent Nuclides
256	¹⁵² Dy, ²²⁷ Th
257	⁹⁰ Mo, ¹²⁶ Ba, ¹⁷⁸ⁿ Hf, ²⁰⁰ Pb
258	¹⁹³ Hg
259	^{198m} Tl, ¹⁹⁸ Pb
261	⁷⁹ Kr, ^{195m} Au, ^{195m} Hg, ²⁰⁵ Po
262	¹⁰⁵ Ru, ¹⁵⁵ Tb
263	^{93m} Mo, ¹⁸² Os, ¹⁸⁴ Ir
264	⁷⁵ Ge, ⁷⁷ Ge, ⁷⁵ Se, ¹⁸² Ta, ²⁰³ Bi
265	¹³⁵ Ce, ²⁴⁷ Bk
266	⁹³ Y, ¹⁰³ Ag, ¹⁷⁵ Ta
267	¹⁴⁹ Nd
268	^{135m} Ba, ¹⁵⁶ Sm, ^{177m} Lu, ¹⁷⁹ⁿ Hf, ²⁰⁰ Pb
269	⁵⁶ Ni, ¹⁰¹ Pd, ²²³ Ra
270	⁷⁶ Kr, ^{119m} Te, ¹⁴⁹ Nd, ¹⁸² Hf, ²⁰⁴ Po, ²²⁸ Ac
271	^{44m} Sc, ⁷⁶ Kr, ¹⁵² Tb, ²¹⁵ Bi, ²¹⁹ Rn, ²⁵³ Fm
272	⁶⁶ Ge, ¹⁴⁹ Gd, ¹⁷³ Lu
273	¹¹⁷ Cd, ¹³⁶ Cs, ¹²⁸ Ba
274	¹⁵³ Dy, ¹⁵³ Dy, ¹⁹² Hg
275	^{133m} Ba, ¹⁵¹ Pm
276	⁷⁷ Kr, ¹³³ Ba, ²⁵⁸ Md
277	⁷⁸ Ge, ¹⁴⁹ Eu, ²⁰⁸ Tl, ²³⁹ Np, ²³⁹ Am, ²⁴³ Cm
278	¹³³ La, ²⁴⁷ Cm
279	⁷⁵ Se, ^{197m} Pt, ^{197m} Hg, ²⁰³ Hg, ¹⁹⁵ Tl, ²⁰³ Pb
280	¹⁰⁵ Ag, ^{166m} Ho, ²³⁷ Am
281	⁷⁷ Br, ¹²⁶ Ba, ^{177m} Lu
282	⁶¹ Cu, ^{162m} Ho, ¹⁷⁵ Yb, ^{198m} Tl
284	¹³¹ I, ¹⁹⁹ Tl
285	¹⁴⁹ Pm, ¹⁸⁷ Pt, ¹⁹⁶ⁿ Au
286	⁷⁵ Br, ²⁰⁶ Po
287	¹²⁷ Cs, ¹⁵¹ Tb, ²⁴⁷ Cm
288	^{148m} Pm
289	²⁰⁴ Bi
290	⁹⁵ Ru, ¹²⁷ Sb, ¹⁹⁸ Pb
291	¹⁵⁶ Sm, ¹⁸³ Re
292	⁷⁵ Br
293	⁷⁸ Ge, ¹⁴³ Ce, ¹⁹⁴ Ir, ¹⁹⁴ Au, ²¹⁵ Bi
294	¹⁹⁰ Ir
295	¹⁷¹ Er, ¹⁹² Ir, ¹⁹² Au, ²¹⁴ Pb

$E(\gamma)$ (keV)	Parent Nuclides
296	^{101}Pd , ^{126}Sb , ^{165}Tm , ^{173}Hf , ^{186}Ir , ^{186}Ir , $^{186\text{m}}\text{Ir}$, ^{210}Tl , ^{258}Md
297	^{73}Ga , ^{77}Br , ^{165}Tm
298	^{149}Gd , ^{160}Tb
299	^{163}Tm , ^{227}Th
300	^{67}Ga , ^{135}Ce , ^{189}Pt , ^{195}Tl , ^{212}Pb , ^{207}At , ^{231}Pa , ^{233}Pa
301	^{95}Ru , $^{196\text{m}}\text{Tl}$
302	^{133}Ba , $^{138\text{m}}\text{Pr}$, ^{231}Pa
303	^{132}Ce , ^{250}Es
304	$^{85\text{m}}\text{Kr}$, ^{140}Ba , ^{187}Pt
306	^{79}Kr , $^{101\text{m}}\text{Rh}$, ^{105}Rh , ^{176}Lu , ^{173}Hf , ^{192}Hg
307	^{169}Yb
308	^{48}Cr , ^{171}Er , ^{192}Ir , ^{192}Au , ^{197}Tl , ^{245}Pu
309	^{76}Kr
311	^{77}Kr , ^{173}Hf , ^{206}Po , ^{233}Pa
313	^{183}Ta
314	^{96}Tc , ^{128}Sb , ^{128}Sb , ^{161}Er
315	^{76}Kr , $^{117\text{m}}\text{In}$, $^{179\text{n}}\text{Hf}$
316	^{105}Ru , ^{192}Ir , ^{192}Au , $^{196\text{n}}\text{Au}$
317	^{189}Pt , ^{204}Po
318	^{129}Cs , ^{157}Eu , ^{184}Ta , $^{184\text{m}}\text{Re}$
319	^{105}Rh , ^{105}Ag , $^{177\text{m}}\text{Lu}$, $^{195\text{m}}\text{Ir}$
320	^{51}Cr
321	^{167}Ho
322	^{99}Rh
323	^{90}Mo , ^{223}Ra
324	^{97}Ru
325	^{73}Ga , ^{101}Rh , ^{138}Nd , $^{178\text{n}}\text{Hf}$, ^{257}Md
326	^{71}As , ^{149}Nd , ^{157}Dy
327	^{149}Eu , $^{177\text{m}}\text{Lu}$, ^{245}Pu
328	^{126}Ba , ^{140}La , ^{194}Ir , $^{194\text{m}}\text{Ir}$, ^{194}Au , ^{228}Ac
329	^{132}Ce , ^{227}Th
330	^{123}Xe
331	^{105}Ag , ^{201}Pb
332	$^{180\text{m}}\text{Hf}$, $^{200\text{m}}\text{Au}$
333	^{150}Pm , ^{150}Eu , $^{150\text{m}}\text{Eu}$, ^{196}Au , $^{198\text{m}}\text{Au}$, ^{249}Cf
334	$^{131\text{m}}\text{Te}$, ^{239}Np
336	^{95}Ru , ^{115}Cd , $^{115\text{m}}\text{In}$
338	^{66}Ge , $^{194\text{m}}\text{Ir}$, ^{206}Po , ^{223}Ra , ^{228}Ac

E(γ) (keV)	Parent Nuclides
339	^{182m} Hf
340	^{99m} Rh, ¹³⁶ Cs, ¹⁵¹ Pm, ²³³ Pa
342	¹¹¹ Ag
343	¹⁷⁵ Hf, ²⁰⁶ Bi
344	¹⁰⁵ Ag, ¹¹⁷ Cd, ¹⁵¹ Pm, ¹⁵² Eu, ^{152m} Eu, ¹⁵² Tb, ^{182m} Hf, ¹⁸⁴ Hf
345	¹⁸¹ Hf, ²⁰⁷ Po
346	^{133m} Ce, ¹⁴⁹ Gd, ¹⁵⁴ Tb, ¹⁵⁴ⁿ Tb, ¹⁶⁷ Ho, ¹⁶⁵ Tm, ^{197m} Pt, ²⁰² Bi
347	¹⁰⁹ In, ¹⁴⁷ Tb
348	¹⁷⁵ Ta
349	²⁵⁰ Es
350	¹²² Xe, ¹⁴³ Ce
351	¹⁹¹ Pt, ²¹⁴ Pb, ²¹¹ Bi
352	¹⁴⁹ Tb
353	⁹⁹ Rh, ¹⁸³ Ta, ¹⁹⁹ Pb
354	^{138m} Pr
355	⁷⁶ Kr, ⁹⁷ Zr, ^{196m} Ir, ¹⁹⁶ Au
356	¹³³ Ba, ¹⁵⁶ Tb
357	²³⁸ Am
359	^{195m} Ir, ¹⁹¹ Pt
360	¹⁸¹ Re
361	⁷³ Se, ^{190m} Re, ¹⁹⁰ Ir, ¹⁹⁰ⁿ Ir, ²⁰¹ Pb
362	⁸⁸ Kr, ¹⁷⁹ⁿ Hf
363	¹⁵⁹ Gd
364	¹³¹ I, ^{195m} Ir
365	¹⁸¹ Re, ¹⁹⁸ Pb
366	⁶⁵ Ni, ¹⁹⁹ Pb
367	⁷⁷ Ge, ^{177m} Lu, ^{200m} Au, ²⁰⁰ Tl, ²⁵⁸ Md
370	¹⁵⁷ Eu, ¹⁴⁷ Gd
371	¹²⁹ Cs, ^{190m} Re, ¹⁹⁰ Ir, ²⁵⁷ Md
372	⁴³ K, ⁴³ Sc
373	⁶¹ Cu, ¹³¹ Ba
374	¹²⁷ Xe, ^{204m} Pb, ²⁰⁴ Bi
375	²⁴⁹ Es
376	²⁴⁵ Pu
377	⁷⁵ Br
378	⁸⁰ Sr, ^{177m} Lu
379	²⁴⁹ Es
380	^{87m} Y, ²⁴⁵ Bk

$E(\gamma)$ (keV)	Parent Nuclides
381	^{66}Ge , ^{83}Sr , ^{183}Os , ^{188}Pt , ^{193}Hg
382	^{198}Pb
383	^{133}Ba , ^{172}Er , ^{250}Es
384	^{184}Ta , $^{184\text{m}}\text{Re}$
386	$^{71\text{m}}\text{Zn}$, ^{167}Ho , ^{158}Er
387	$^{195\text{m}}\text{Hg}$, ^{232}Pa
388	$^{87\text{m}}\text{Sr}$, ^{87}Y , ^{126}I , ^{149}Tb , ^{249}Cf
389	$^{71\text{m}}\text{Zn}$, $^{202\text{m}}\text{Pb}$
390	$^{138\text{m}}\text{Pr}$, ^{184}Ir , $^{194\text{m}}\text{Ir}$
391	$^{111\text{m}}\text{Pd}$, $^{113\text{m}}\text{In}$, ^{113}Sn
392	^{88}Zr , ^{105}Ag
393	^{67}Ga , ^{105}Ru , $^{196\text{m}}\text{Ir}$
394	^{62}Zn
395	^{151}Tb
396	^{43}K , ^{147}Gd , ^{175}Yb
397	^{79}Kr , ^{183}Hf , $^{190\text{m}}\text{Re}$, ^{190}Ir , ^{198}Pb
398	^{173}Tm
400	^{28}Mg , ^{75}Se
401	^{203}Pb , ^{219}Rn
402	^{87}Kr , ^{247}Cm
403	^{167}Ho
404	^{211}Pb
405	^{201}Pb , ^{207}Po
406	^{76}Kr , $^{106\text{m}}\text{Ag}$, ^{150}Pm , $^{150\text{m}}\text{Eu}$
407	$^{116\text{m}}\text{Sb}$, ^{172}Er , $^{190\text{m}}\text{Re}$, ^{190}Ir
409	^{157}Eu , $^{179\text{n}}\text{Hf}$, ^{191}Pt
410	^{157}Eu , $^{166\text{m}}\text{Ho}$
411	^{127}Cs , ^{129}Cs , ^{152}Eu , ^{152}Tb , ^{198}Au , ^{198}Tl , $^{198\text{m}}\text{Tl}$
412	^{127}Sb
413	^{105}Ru , $^{177\text{m}}\text{Lu}$
414	^{80}Sr , ^{126}Sb , $^{148\text{m}}\text{Pm}$, ^{148}Eu , ^{148}Eu , ^{184}Ta
416	^{77}Ge
417	^{130}I , ^{177}W
418	^{83}Sr , $^{102\text{m}}\text{Rh}$, $^{177\text{m}}\text{Lu}$
420	$^{102\text{m}}\text{Rh}$, $^{196\text{m}}\text{Ir}$
422	^{156}Tb , $^{202\text{m}}\text{Pb}$, ^{202}Bi
423	^{140}Ba , ^{149}Nd , ^{188}Pt
425	^{196}Tl , ^{197}Tl

$E(\gamma)$ (keV)	Parent Nuclides
426	^{109}In , ^{154}Tb , $^{154\text{m}}\text{Tb}$, $^{178\text{n}}\text{Hf}$, ^{177}W , ^{196}Au , $^{196\text{m}}\text{Tl}$
427	^{75}Br , ^{125}Sb
429	$^{106\text{m}}\text{Rh}$, $^{106\text{m}}\text{Ag}$
430	^{92}Sr , ^{146}Eu , ^{241}Cm
431	^{75}Br
432	^{140}La , $^{133\text{m}}\text{Ce}$, $^{195\text{m}}\text{Ir}$
433	$^{108\text{m}}\text{Ag}$, ^{197}Tl
434	^{117}Cd , ^{186}Ir
436	$^{116\text{m}}\text{Sb}$, ^{175}Ta
438	$^{69\text{m}}\text{Zn}$, ^{127}Sn , ^{237}Am
439	^{150}Eu , ^{202}Tl
441	$^{198\text{m}}\text{Tl}$
442	^{99}Rh , ^{211}Rn
443	^{86}Y , ^{105}Ag , ^{152}Eu , ^{151}Tb , $^{180\text{m}}\text{Hf}$, ^{230}Pa
445	^{90}Mo , ^{127}Sb , ^{151}Pm
446	^{81}Rb , ^{100}Rh , ^{172}Er
447	^{168}Tm , $^{196\text{m}}\text{Ir}$, ^{258}Md
448	^{92}Y , ^{240}Np
449	^{94}Tc
450	$^{106\text{m}}\text{Rh}$, $^{106\text{m}}\text{Ag}$, ^{200}Pb
451	^{76}Kr , ^{132}Ce
453	^{125}Xe , ^{146}Pm , $^{179\text{n}}\text{Hf}$, ^{232}Pa
454	$^{178\text{n}}\text{Hf}$, ^{230}Pa
455	$^{182\text{m}}\text{Hf}$, ^{199}Tl
456	^{81}Rb , ^{191}Pt
459	^{129}Te , ^{183}Hf , $^{202\text{m}}\text{Pb}$
460	^{96}Nb , ^{167}Ho , ^{165}Tm , ^{193}Os
461	^{110}In , ^{173}Tm
462	^{127}Cs
463	^{125}Sb , ^{228}Ac , ^{228}Pa
464	^{132}La , ^{149}Tb
467	^{207}At
468	^{102}Rh , ^{192}Ir
469	^{105}Ru , ^{230}Ra
470	^{66}Ge
471	^{163}Tm , ^{241}Cm
472	^{232}Pa
473	^{127}Sb , ^{237}Am

$E(\gamma)$ (keV)	Parent Nuclides
474	^{157}Eu
475	^{102}Rh , $^{102\text{m}}\text{Rh}$
476	^{144}Pm
477	^7Be , ^{55}Co , $^{133\text{m}}\text{Ce}$
478	^{188}Ir , ^{230}Ra
479	$^{90\text{m}}\text{Y}$, ^{151}Tb , ^{187}W
480	^{56}Ni , ^{96}Nb
481	^{170}Hf , $^{195\text{m}}\text{Ir}$
482	^{181}Hf , $^{194\text{m}}\text{Ir}$
484	^{87}Y , $^{183\text{m}}\text{Os}$, ^{192}Ir
486	^{131}Ba
487	$^{71\text{m}}\text{Zn}$, ^{140}La
489	^{47}Ca , ^{126}Ba , $^{198\text{m}}\text{Tl}$
490	^{127}Sn , ^{143}Ce , $^{202\text{m}}\text{Pb}$
491	^{126}I , ^{245}Pu
492	^{115}Cd
493	^{184}Ir
495	$^{178\text{n}}\text{Hf}$
496	^{131}Ba , ^{150}Tb
497	^{103}Ru , $^{200\text{m}}\text{Au}$, ^{206}Bi
499	^{71}As , ^{105}Ru
500	$^{180\text{m}}\text{Hf}$
501	$^{148\text{m}}\text{Pm}$, ^{170}Hf
502	$^{190\text{n}}\text{Ir}$
504	^{85}Y
505	^{132}I , ^{150}Eu , $^{196\text{m}}\text{Tl}$
506	$^{182\text{m}}\text{Hf}$
507	^{62}Zn , ^{97}Zr , $^{89\text{m}}\text{Nb}$, ^{121}Te
508	^{230}Pa
510	^{81}Rb , $^{133\text{m}}\text{Ce}$, ^{182}Os , ^{208}Tl
511	$^{71\text{m}}\text{Zn}$, $^{106\text{m}}\text{Rh}$, $^{106\text{m}}\text{Ag}$, ^{150}Tb , ^{205}Po , ^{206}Po
514	^{85}Sr
515	^{86}Y , ^{132}La , ^{232}Pa
516	^{149}Gd , ^{206}Bi
517	^{215}Bi , ^{208}At
518	^{135}Ce , $^{154\text{m}}\text{Tb}$, $^{190\text{m}}\text{Re}$, ^{190}Ir , ^{230}Pa
519	$^{198\text{m}}\text{Tl}$
520	^{77}Br , ^{83}Rb

$E(\gamma)$ (keV)	Parent Nuclides
521	$^{196\text{m}}\text{Ir}$
522	^{132}I , ^{206}Po
526	^{128}Sb
527	^{115}Cd
528	^{99}Rh
529	^{83}Rb , ^{133}I , $^{166\text{m}}\text{Ho}$
531	^{103}Ag , ^{147}Nd
532	^{94}Tc , ^{121}I
534	^{149}Gd , ^{156}Tb , ^{204}Po
535	$^{85\text{m}}\text{Y}$
536	^{66}Ge , ^{130}I , ^{184}Ta , $^{184\text{m}}\text{Re}$
537	^{81}Rb , ^{140}Ba , ^{206}Bi
538	^{191}Pt
539	^{100}Rh , ^{184}Ir
540	^{132}La , ^{149}Nd , ^{154}Tb , $^{154\text{m}}\text{Tb}$, ^{170}Hf
542	$^{116\text{m}}\text{Sb}$, ^{145}Eu
543	^{127}Sb
544	^{129}Sb , ^{189}Pt
545	^{78}As , $^{101\text{m}}\text{Rh}$, ^{209}At
546	^{135}I , ^{147}Tb
547	$^{138\text{m}}\text{Pr}$
548	^{62}Zn , ^{129}Cs
549	^{205}Bi
550	^{148}Pm , $^{148\text{m}}\text{Pm}$, ^{148}Eu
551	^{187}W , ^{209}At
552	^{83}Rb
553	^{80}Sr , ^{148}Eu
554	^{82}Br , $^{82\text{m}}\text{Rb}$, ^{129}Ba , ^{147}Tb , ^{240}Np
555	^{104}Ag
556	^{102}Rh
557	^{77}Ge , ^{133}Ce , $^{190\text{m}}\text{Re}$, ^{190}Ir
558	$^{114\text{m}}\text{In}$, ^{195}Tl
559	^{76}As , ^{76}Br , ^{147}Gd
560	^{120}I , $^{195\text{m}}\text{Hg}$, ^{245}Pu
561	^{92}Y , ^{92}Nb , ^{238}Am
562	$^{194\text{m}}\text{Ir}$, $^{194\text{m}}\text{Ir}$
563	^{76}Br , ^{134}Cs , ^{195}Tl
564	$^{117\text{m}}\text{Cd}$, ^{122}Sb

E(γ) (keV)	Parent Nuclides
565	¹⁰¹ Pd
566	²⁴⁰ Np
567	¹³² La
568	⁹⁶ Nb, ¹⁸⁹ Pt
569	¹³⁴ Cs, ¹⁵⁰ Tb, ^{190m} Re, ¹⁹⁰ Ir, ²⁰² Bi, ²⁰⁷ Bi, ²²⁹ Ac, ²³⁴ Pa
570	^{166m} Ho, ²⁰⁵ Bi
571	¹⁴⁸ Eu
572	¹³⁵ Ce, ¹⁷⁰ Hf
573	¹²⁶ Sb, ¹²¹ Te
574	⁶⁹ Ge, ^{178m} Hf
575	^{111m} Pd, ¹⁹⁸ Pb
577	¹³⁵ Ce, ¹⁹⁷ Tl
578	⁷⁷ Br, ²⁰² Bi
579	^{200m} Au, ²⁰⁰ Tl, ²⁰⁵ Bi
580	^{111m} Pd, ¹⁹³ Hg
581	¹¹⁰ In, ²³² Pa
582	^{95m} Tc, ¹⁹² Au
583	²⁰⁸ Tl
584	¹¹⁰ In, ¹⁵⁰ Eu, ²⁰¹ Pb, ^{254m} Es
585	¹⁹⁵ Hg
586	¹⁵² Tb
587	¹²⁷ Cs, ¹⁵¹ Tb, ^{198m} Tl
588	^{89m} Nb, ¹⁰⁰ Rh, ¹⁹² Ir, ^{196m} Tl, ²⁰⁷ At
589	⁸⁰ Sr
590	¹⁰¹ Pd
591	¹⁵⁴ Eu
592	¹⁶¹ Er
593	⁴³ K, ¹²⁶ Sb
595	^{71m} Zn, ⁷⁴ As
596	⁶² Zn
597	²⁴⁰ Np
599	^{132m} I, ^{148m} Pm, ²⁰⁵ Po
600	⁷² Ga, ¹²⁵ Sb, ^{194m} Ir, ²⁴⁰ Np
601	¹²⁰ I, ¹⁴⁷ Eu
602	¹²⁴ Sb, ¹²⁴ I
603	¹²⁷ Sb, ^{182m} Hf
604	¹³⁴ Cs, ¹⁹² Ir
605	^{190m} Re, ¹⁹⁰ Ir, ²³⁸ Am

E(γ) (keV)	Parent Nuclides
606	⁷⁹ Kr, ¹¹² Ag, ¹²⁵ Sb, ¹³⁵ Ce
607	¹⁸⁹ Pt
608	¹³⁵ Xe
609	²¹⁴ Bi
610	¹⁰³ Ru, ¹⁷² Er, ¹⁹⁶ Tl
611	^{148m} Pm, ¹⁴⁸ Eu, ¹⁷⁷ W
612	⁸⁶ Zr, ¹⁹² Ir, ¹⁹² Au
613	⁷⁸ As, ¹⁰⁹ In
614	^{108m} Ag, ^{132m} I
616	^{106m} Rh, ^{106m} Ag, ¹⁵¹ Tb, ¹⁹⁰ⁿ Ir
617	⁴³ K, ^{99m} Rh, ¹¹² Ag
618	⁹⁹ Rh, ¹⁴⁴ Pm, ¹⁸⁷ W
619	⁸² Br, ^{82m} Rb, ¹⁵⁷ Eu
620	^{71m} Zn, ¹⁷⁰ Hf
623	¹⁰⁹ In
626	⁹⁵ Ru
627	⁸⁶ Y
628	¹⁰² Rh, ^{102m} Rh, ¹²⁸ Sb, ¹¹⁶ Te
629	⁷² Ga, ⁷² As, ^{148m} Pm, ¹⁴⁸ Eu, ¹⁸⁷ Pt, ²⁰¹ Bi
630	¹³² I, ¹⁸⁶ Ir, ^{186m} Ir, ²⁴⁵ Pu
631	⁷⁷ Ge, ^{102m} Rh, ¹⁶⁸ Tm
632	^{111m} Pd
633	¹⁴⁶ Eu, ¹⁸⁸ Ir
634	⁷⁴ As, ¹⁴⁶ Eu, ¹⁸⁸ Ir, ²⁵⁶ Md
635	¹²⁵ Sb, ¹⁹⁶ Tl, ^{196m} Tl
636	¹²⁸ Sb, ¹³¹ I, ¹⁹⁸ Tl, ^{198m} Tl
638	¹⁵⁰ Tb
639	¹⁸¹ Re
641	¹¹⁰ In, ¹²⁰ I, ¹⁴² La
644	¹⁰⁵ Ag, ¹¹⁹ Te, ²⁵⁶ Md
645	⁸⁶ Y, ¹²⁴ Sb, ¹⁹⁴ Au
646	¹⁵⁶ Eu, ¹⁸⁵ Os
647	^{196m} Ir
648	²⁰⁷ At, ^{254m} Es
649	^{154m} Tb, ¹⁵⁴ⁿ Tb
650	¹⁰⁵ Ag, ¹⁰⁹ In, ¹⁵⁰ Tb
652	⁹¹ Sr, ⁹¹ Sr, ⁹⁸ Tc, ¹⁴⁹ Tb
653	¹⁴⁵ Eu

$E(\gamma)$ (keV)	Parent Nuclides
654	^{128}Sb , ^{129}Sb , ^{149}Nd
656	^{61}Cu
657	^{76}As , ^{76}Br , ^{97}Nb , $^{110\text{m}}\text{Ag}$, ^{110}In , $^{110\text{m}}\text{In}$, $^{202\text{m}}\text{Pb}$, ^{202}Bi
658	^{207}At
660	^{208}At
661	^{137}Cs , ^{181}Re , ^{200}Tl
663	^{132}La
664	^{143}Ce , ^{155}Dy
665	^{146}Eu
666	^{126}Sb , ^{126}I
667	^{132}I , $^{132\text{m}}\text{I}$, ^{132}Cs , ^{171}Lu
668	^{130}I
669	^{132}I
670	^{204}Bi
671	^{132}I
673	$^{190\text{m}}\text{Re}$
674	^{211}Rn
675	^{198}Tl , ^{207}At
676	^{105}Ru , $^{154\text{m}}\text{Tb}$
677	$^{110\text{m}}\text{Ag}$, ^{110}In , ^{147}Eu , ^{256}Md
678	^{211}Rn
680	^{204}Po
681	^{126}Ba
682	^{129}Sb , ^{256}Md
684	$^{93\text{m}}\text{Mo}$, $^{195\text{m}}\text{Ir}$
685	^{127}Sb , ^{187}W
686	^{208}At
687	$^{110\text{m}}\text{Ag}$, $^{194\text{m}}\text{Ir}$
688	$^{254\text{m}}\text{Es}$
689	$^{133\text{m}}\text{Ce}$, ^{171}Lu
691	^{166}Tm
692	^{122}Sb , $^{154\text{m}}\text{Tb}$, ^{201}Pb , ^{256}Md
693	$^{196\text{m}}\text{Ir}$, $^{254\text{m}}\text{Es}$
694	^{78}As , $^{111\text{m}}\text{Pd}$, ^{112}Ag , ^{147}Tb
695	^{126}Sb , $^{129\text{m}}\text{Te}$, $^{196\text{m}}\text{Tl}$
696	^{144}Pm
697	$^{102\text{m}}\text{Rh}$, ^{126}Sb , ^{172}Lu
698	^{82}Br , $^{82\text{m}}\text{Rb}$, ^{127}Sb

E(γ) (keV)	Parent Nuclides
699	¹¹⁹ Te
702	⁹⁴ Nb, ⁹⁴ Tc, ¹⁴⁶ Eu
703	⁸⁶ Y, ¹⁴⁶ Eu, ²⁰⁵ Bi
705	¹⁶⁶ Tm
706	^{110m} Ag
707	¹¹⁰ In
708	^{139m} Nd
709	¹⁸⁷ Pt
710	¹⁷⁶ Ta
711	^{166m} Ho
712	¹⁵⁰ Pm, ^{186m} Ir
713	¹²⁴ Sb
714	⁷⁷ Ge
717	^{106m} Rh, ^{106m} Ag, ¹⁵¹ Pm, ¹⁸⁵ Os
719	⁹⁶ Nb, ¹¹⁷ Te
720	¹²⁶ Sb, ¹⁶⁸ Tm, ¹⁹⁹ Pb
721	¹⁴³ Ce, ¹⁸⁹ Pt, ²⁰⁷ At
722	^{108m} Ag, ¹²⁴ Sb, ¹²⁴ I
723	¹⁵⁴ Eu, ¹⁵⁶ Eu, ^{196m} Tl
724	⁹⁵ Zr, ¹⁰⁵ Ru
725	^{114m} In, ^{148m} Pm, ¹⁴⁸ Eu
727	^{196m} Ir, ²¹² Bi
728	²³⁰ Pa
731	¹⁵¹ Tb
733	²³⁴ Pa
735	¹⁴⁶ Pm
737	¹⁵⁰ Eu
738	^{139m} Nd
739	⁷³ Ga, ⁹⁹ Mo, ¹³⁰ I, ¹⁷¹ Lu
740	¹⁰⁴ Ag
741	¹⁴³ Pm, ¹⁶⁸ Tm
742	¹⁰³ Ag, ²⁰⁷ Po, ²³⁴ Np
743	⁹⁷ Zr, ¹²⁸ Sb, ¹²⁸ Sb, ²⁴⁴ Am
744	⁵² Mn
745	⁹⁸ Tc
747	¹⁴⁶ Pm, ¹⁴⁶ Eu
748	^{106m} Rh, ^{106m} Ag, ^{117m} Cd, ¹⁵⁰ Eu, ¹⁴⁹ Gd
749	⁵⁶ Ni, ⁹¹ Sr

$E(\gamma)$ (keV)	Parent Nuclides
751	^{140}La , ^{150}Eu , ^{181}Os
752	$^{166\text{m}}\text{Ho}$
753	$^{71\text{m}}\text{Zn}$, ^{128}Sb , ^{126}I
754	^{128}Sb
756	^{95}Zr , ^{154}Eu
759	$^{200\text{m}}\text{Au}$
761	^{129}Sb , ^{199}Pb
762	^{83}Sr , ^{204}Po
763	$^{110\text{m}}\text{Ag}$
764	^{152}Tb
765	^{95}Nb , ^{95}Tc , ^{147}Gd
766	$^{102\text{m}}\text{Rh}$
767	$^{85\text{m}}\text{Y}$, ^{104}Ag , ^{186}Ir , $^{186\text{m}}\text{Ir}$, ^{201}Pb
768	^{214}Bi
769	$^{89\text{m}}\text{Nb}$
772	^{132}I , $^{132\text{m}}\text{I}$, ^{187}W
773	$^{131\text{m}}\text{Te}$, ^{186}Ir , ^{186}Ir , $^{186\text{m}}\text{Ir}$
776	^{82}Br , $^{82\text{m}}\text{Rb}$
777	^{86}Y , ^{99}Mo
778	^{96}Nb , ^{96}Tc , ^{152}Eu , ^{147}Gd , ^{152}Tb , ^{166}Tm
779	^{195}Hg
780	^{158}Tb , ^{171}Lu
781	^{209}At
782	$^{131\text{m}}\text{Te}$
783	^{127}Sb , ^{135}Ce , ^{183}Hf
784	$^{133\text{m}}\text{Ce}$
785	^{104}Ag , ^{166}Tm , ^{252}Es
786	$^{95\text{m}}\text{Tc}$, $^{202\text{m}}\text{Pb}$, ^{201}Bi , ^{234}Np
787	^{181}Os
788	^{138}La , $^{138\text{m}}\text{Pr}$, ^{149}Gd
789	^{193}Hg
790	^{209}At
791	^{204}Bi
792	^{150}Tb , ^{184}Ta , ^{184}Re , $^{184\text{m}}\text{Re}$
793	$^{131\text{m}}\text{Te}$
794	^{228}Ac
795	^{134}Cs
796	$^{139\text{m}}\text{Nd}$

E(γ) (keV)	Parent Nuclides
798	^{147}Eu
799	$^{182\text{m}}\text{Hf}$, ^{210}Tl
801	^{134}Cs
802	$^{139\text{m}}\text{Nd}$
803	^{206}Bi
805	^{127}Sn , ^{181}Re
806	^{95}Ru , ^{165}Tm
807	^{47}Ca , ^{206}Po , ^{208}At
809	$^{139\text{m}}\text{Nd}$
810	^{58}Co , ^{96}Nb , $^{166\text{m}}\text{Ho}$, ^{172}Lu , ^{250}Es
811	^{56}Ni , ^{156}Eu
812	^{96}Tc , ^{129}Sb , ^{132}I
813	^{249}Es
814	^{207}At
815	^{140}La , ^{168}Tm
817	^{77}Br , ^{149}Tb
818	$^{110\text{m}}\text{Ag}$, ^{136}Cs , ^{201}Bi
819	^{187}Pt , ^{232}Pa
820	$^{95\text{m}}\text{Tc}$, ^{203}Bi
821	^{168}Tm
822	^{100}Rh , ^{125}Sn
823	^{127}Sn
824	$^{106\text{m}}\text{Ag}$, ^{127}Sn
825	$^{106\text{m}}\text{Rh}$, ^{203}Bi
826	^{161}Er , ^{201}Pb
827	^{82}Br , $^{82\text{m}}\text{Rb}$, $^{139\text{m}}\text{Nd}$, ^{181}Os , ^{193}Hg
828	^{78}As , ^{135}Ce , ^{200}Tl , ^{250}Es
829	^{168}Tm , ^{188}Ir , ^{250}Es
830	$^{166\text{m}}\text{Ho}$
831	^{117}Cd , ^{150}Pm , ^{181}Os
832	^{211}Pb
833	^{66}Ga , ^{72}As
834	^{54}Mn , ^{72}Ga , ^{88}Kr
835	$^{95\text{m}}\text{Tc}$, $^{196\text{m}}\text{Ir}$
836	^{135}I , ^{205}Po
839	^{171}Lu
841	$^{152\text{m}}\text{Eu}$, ^{184}Ir
844	$^{116\text{m}}\text{Sb}$

$E(\gamma)$ (keV)	Parent Nuclides
845	^{87}Kr , ^{208}At
846	^{56}Mn , ^{56}Co
847	^{203}Bi
848	^{52}Mn
849	^{96}Nb , ^{94}Tc , ^{96}Tc , ^{205}Po
851	^{183}Os
852	$^{131\text{m}}\text{Te}$
853	^{149}Tb , ^{171}Lu
856	^{126}Sb , ^{147}Eu
857	^{104}Ag , ^{175}Ta , ^{197}Tl
859	^{127}Sn , ^{150}Pm
860	$^{117\text{m}}\text{Cd}$, ^{208}Tl , ^{210}Tl , ^{206}Po
861	^{149}Tb , ^{193}Hg
863	^{250}Es
865	^{198}Pb
866	^{211}Rn , ^{232}Pa
867	^{140}La , ^{152}Eu , ^{240}Np
869	^{148}Eu
871	^{69}Ge , ^{94}Nb , ^{94}Tc , ^{135}Ce
872	^{205}Po
873	^{154}Eu , $^{154\text{m}}\text{Tb}$
874	^{185}Os
875	^{105}Ru , ^{133}I
876	^{150}Pm
879	^{160}Tb
880	^{117}Cd , ^{150}Tb , ^{185}Os , ^{234}Pa , ^{251}Fm
881	^{84}Rb , ^{206}Bi
883	^{204}Po , ^{234}Pa
884	$^{110\text{m}}\text{Ag}$, ^{110}In , ^{195}Tl
888	^{78}As , ^{240}Am
889	^{46}Sc , ^{169}Lu
893	^{145}Eu , ^{147}Gd
894	^{72}Ga , ^{142}La , ^{184}Re , ^{232}Pa
895	^{206}Bi , ^{240}Np
896	^{203}Bi , ^{208}At
897	^{244}Am
898	^{88}Y , ^{230}Pa
899	^{123}Xe , ^{132}La , $^{204\text{m}}\text{Pb}$, ^{204}Bi

E(γ) (keV)	Parent Nuclides
900	¹⁷² Lu
902	²⁰¹ Bi
903	¹⁸⁴ Ta, ^{184m} Re, ^{184m} Re, ²⁰⁹ At
904	^{200m} Au
905	¹⁵⁵ Dy
907	²⁰¹ Pb, ²⁰⁷ At
908	²³⁷ Am
909	⁸⁹ Zr
910	^{139m} Nd
911	^{204m} Pb, ²⁰⁴ Bi, ²⁰⁴ Bi, ²⁰⁷ Po, ²²⁸ Ac, ²²⁸ Pa
912	^{119m} Te, ¹⁷² Lu
913	⁸⁵ Y
914	¹²⁹ Sb, ¹⁴⁸ Pm
915	¹²⁵ Sn, ^{148m} Pm
916	⁹⁴ Tc
917	⁶¹ Co
918	²⁰⁴ Bi, ²³⁰ Pa, ²³⁸ Am
919	¹⁴⁰ La
920	¹⁸⁴ Ta, ^{184m} Re
923	¹⁰⁴ Ag, ¹¹⁷ Te, ²³⁸ Np
924	²⁵² Es
925	⁹¹ Sr, ¹⁰⁴ Ag, ¹⁴⁰ La, ²³⁴ Pa
926	²³⁴ Pa
927	²⁰² Bi
929	¹⁴⁷ Gd
931	⁵⁵ Co
933	^{115m} Cd, ¹⁴⁷ Eu
934	⁹² Y, ⁹² Nb, ^{92m} Nb, ²¹⁴ Bi
935	⁵² Mn
936	^{99m} Rh, ²⁰¹ Bi
937	^{110m} Ag, ¹¹⁰ In, ^{162m} Ho
938	¹⁴⁹ Gd
941	²⁸ Mg, ⁹⁰ Mo, ¹⁰⁴ Ag, ²³⁸ Am
942	^{119m} Te, ^{182m} Hf
944	⁴⁸ V, ¹⁵⁸ Tb
945	²⁰¹ Pb
946	²¹¹ Rn, ²³⁴ Pa
947	⁹³ Y, ²¹¹ Rn

E(γ) (keV)	Parent Nuclides
948	¹⁹⁴ Au
951	²³⁰ Pa
953	⁹² Sr, ¹⁸¹ Re
954	¹³² I, ²⁰² Bi
955	¹⁴⁷ Eu, ¹⁸¹ Os
960	¹⁶⁹ Lu, ^{202m} Pb, ²⁰² Bi
961	¹⁸⁴ Ir
962	¹⁵⁸ Tb, ¹⁶⁰ Tb, ²³⁸ Am
963	^{152m} Eu
964	^{71m} Zn, ¹⁵² Eu, ¹⁹⁶ Tl, ²²⁸ Ac
966	¹²⁹ Sb, ¹⁶⁰ Tb
968	²²⁸ Ac
969	²³² Pa
972	^{116m} Sb
973	²⁴⁰ Np
974	¹⁵² Tb
976	^{119m} Te
979	¹²⁷ Sn, ^{119m} Te
980	²⁰⁶ Po
982	^{139m} Nd
983	⁴⁸ Sc, ⁴⁸ V, ²⁰⁴ Bi
984	²³⁸ Np
985	¹⁷⁰ Lu
987	¹⁸⁶ Ir, ^{186m} Ir, ²⁰⁵ Bi, ²⁴⁰ Np, ²⁴⁰ Am
989	¹²⁶ Sb, ²⁰⁸ At, ²⁵⁰ Bk, ²⁵⁰ Es
990	²⁰¹ Bi
992	^{154m} Tb, ²⁰⁷ Po
993	¹²⁶ Ba
996	¹¹⁷ Te, ¹⁵⁴ Eu, ^{154m} Tb
997	¹¹⁰ In
999	¹⁵⁵ Dy
1000	¹⁸¹ Re
1001	²⁰⁵ Po
1002	¹⁷² Lu
1003	¹⁷⁰ Lu
1004	¹⁵⁴ Eu, ^{154m} Tb, ^{154m} Tb
1007	^{82m} Rb, ¹⁰³ Ag, ²⁰⁶ Po
1009	¹⁸¹ Re

$E(\gamma)$ (keV)	Parent Nuclides
1011	^{142}La , $^{194\text{m}}\text{Ir}$
1013	$^{148\text{m}}\text{Pm}$
1014	^{177}W , ^{201}Bi
1016	^{204}Po
1024	^{91}Sr
1025	^{238}Np
1027	^{208}At
1028	^{238}Np , ^{250}Bk
1029	$^{117\text{m}}\text{Cd}$
1030	$^{85\text{m}}\text{Y}$, ^{129}Sb
1031	^{132}La , ^{250}Bk , ^{250}Es
1032	^{206}Po
1033	^{148}Eu , ^{203}Bi
1034	$^{183\text{m}}\text{Os}$
1036	^{177}W
1037	^{48}Sc , ^{56}Co
1038	^{135}I , $^{138\text{m}}\text{Pr}$
1039	^{66}Ga , $^{95\text{m}}\text{Tc}$
1040	^{204}Po
1043	^{142}La , ^{205}Bi
1044	^{82}Br , $^{82\text{m}}\text{Rb}$, ^{184}Ir
1045	$^{106\text{m}}\text{Ag}$
1046	$^{102\text{m}}\text{Rh}$, $^{106\text{m}}\text{Rh}$
1048	$^{119\text{m}}\text{Te}$, ^{136}Cs
1049	^{150}Eu
1050	^{72}Ga , ^{95}Ru , $^{118\text{m}}\text{Sb}$
1051	^{117}Cd
1054	^{170}Lu
1058	^{146}Eu
1060	^{181}Os
1063	^{207}Bi
1065	$^{117\text{m}}\text{Cd}$, ^{156}Eu , ^{156}Tb
1067	^{125}Sn
1069	^{147}Gd
1070	^{210}Tl
1072	$^{116\text{m}}\text{Sb}$
1073	^{95}Tc
1076	^{86}Y

$E(\gamma)$ (keV)	Parent Nuclides
1077	^{68}Ga , ^{86}Rb , ^{147}Eu
1079	^{156}Eu
1080	^{177}Yb , ^{193}Hg
1085	^{77}Ge , ^{152}Eu
1088	^{105}Ag
1089	^{125}Sn , ^{155}Dy
1090	^{117}Te , ^{155}Dy
1091	^{96}Nb , $^{118\text{m}}\text{Sb}$
1093	^{123}Xe , ^{172}Tm , ^{172}Lu
1095	^{71}As , ^{127}Sn
1096	^{95}Ru
1098	^{206}Bi
1099	^{59}Fe
1100	^{195}Tl
1101	$^{183\text{m}}\text{Os}$
1102	$^{121\text{m}}\text{Te}$
1103	^{102}Rh , $^{102\text{m}}\text{Rh}$, ^{209}At
1104	^{194}Au , ^{215}Bi
1105	^{184}Ir
1106	^{69}Ge
1107	^{100}Rh , ^{158}Tb , $^{183\text{m}}\text{Os}$
1108	^{201}Bi
1109	^{152}Tb
1110	^{210}Tl
1112	$^{102\text{m}}\text{Rh}$, ^{152}Eu
1114	^{127}Sn
1115	^{65}Ni , ^{65}Zn , ^{207}At
1118	^{193}Hg
1120	^{46}Sc , ^{214}Bi
1121	^{182}Ta , ^{182}Re , ^{182}Re
1124	^{135}I
1125	$^{131\text{m}}\text{Te}$
1126	^{96}Tc , ^{211}Rn
1127	^{89}Nb , $^{106\text{m}}\text{Rh}$
1129	^{26}Al , ^{76}Br , ^{90}Nb
1130	^{147}Gd
1131	^{135}I
1135	^{199}Pb

$E(\gamma)$ (keV)	Parent Nuclides
1136	^{119m}Te
1138	^{170}Lu
1142	^{92}Sr
1147	^{97}Zr
1148	$^{109}\text{In}, ^{207}\text{Po}$
1152	^{147}Tb
1153	$^{86}\text{Y}, ^{156}\text{Eu}$
1154	$^{156}\text{Eu}, ^{156}\text{Tb}$
1155	$^{103}\text{Ag}, ^{155}\text{Dy}$
1157	$^{44}\text{Sc}, ^{130}\text{I}$
1159	$^{156}\text{Tb}, ^{176}\text{Ta}$
1165	^{150}Pm
1170	^{209}At
1173	^{60}Co
1175	$^{149}\text{Tb}, ^{194}\text{Au}$
1176	^{166}Tm
1177	^{160}Tb
1178	^{95}Ru
1181	^{210}At
1184	$^{165}\text{Tm}, ^{169}\text{Lu}$
1185	^{61}Cu
1189	$^{182}\text{Ta}, ^{182}\text{Re}$
1190	^{176}Ta
1193	$^{150}\text{Pm}, ^{234}\text{Np}$
1200	$^{96}\text{Nb}, ^{198}\text{Tl}$
1201	^{120}I
1204	^{91m}Nb
1205	$^{174}\text{Ta}, ^{200}\text{Tl}$
1206	^{131m}Te
1208	^{173}Ta
1209	^{188}Ir
1210	^{210}Tl
1211	^{204}Bi
1212	$^{48}\text{Sc}, ^{119m}\text{Te}$
1216	$^{76}\text{As}, ^{76}\text{Br}$
1220	^{162m}Ho
1221	$^{182}\text{Ta}, ^{182}\text{Re}, ^{182}\text{Re}$
1222	^{156}Tb

$E(\gamma)$ (keV)	Parent Nuclides
1224	^{176}Ta
1225	^{170}Lu , ^{200}Tl
1227	^{87}Zr
1229	$^{118\text{m}}\text{Sb}$
1230	^{156}Eu
1231	^{182}Ta , ^{182}Re
1234	$^{117\text{m}}\text{Cd}$
1235	^{136}Cs
1237	^{234}Np
1238	^{56}Co , ^{214}Bi
1239	^{199}Pb , ^{205}Po
1240	^{78}As
1241	^{177}Yb , ^{174}Lu
1242	^{156}Eu
1246	^{52}Mn
1260	^{135}I
1261	$^{99\text{m}}\text{Rh}$
1265	^{163}Tm
1269	^{195}Tl
1271	^{90}Mo , ^{160}Tb
1273	^{103}Ag , ^{166}Tm , ^{200}Tl
1274	^{22}Na , ^{154}Eu
1276	^{193}Hg
1280	^{170}Lu
1289	^{101}Pd
1291	^{59}Fe
1293	^{41}Ar , $^{116\text{m}}\text{Sb}$, ^{126}Ba
1297	^{47}Ca , ^{146}Eu
1298	^{133}I
1299	^{152}Tb
1303	^{117}Cd
1308	^{78}As
1312	^{48}Sc , ^{48}V , ^{160}Tb , ^{198}Tl , ^{256}Md
1316	^{55}Co , ^{210}Tl
1317	^{82}Br , $^{82\text{m}}\text{Rb}$
1324	^{150}Pm
1325	^{201}Bi
1326	^{256}Md , ^{256}Md

$E(\gamma)$ (keV)	Parent Nuclides
1332	^{60}Co
1333	^{52}Mn
1336	^{69}Ge
1341	$^{100}\text{Rh}, ^{104}\text{Ag}$
1342	^{28}Mg
1343	^{150}Eu
1357	^{256}Md
1360	^{56}Co
1362	$^{93}\text{Tc}, ^{100}\text{Rh}, ^{211}\text{Rn}$
1363	$^{195}\text{Tl}, ^{200}\text{Tl}$
1364	^{170}Lu
1365	^{134}Cs
1368	$^{24}\text{Na}, ^{77}\text{Ge}, ^{124}\text{Sb}$
1370	^{55}Co
1372	^{28}Mg
1373	^{78}As
1374	$^{163}\text{Tm}, ^{256}\text{Md}$
1377	$^{57}\text{Ni}, ^{214}\text{Bi}$
1380	^{76}Br
1382	^{199}Pb
1383	^{92}Sr
1384	$^{110\text{m}}\text{Ag}$
1387	$^{112}\text{Ag}, ^{172}\text{Tm}$
1391	^{234}Np
1397	^{163}Tm
1398	^{132}I
1404	$^{85\text{m}}\text{Y}$
1405	^{92}Y
1407	^{214}Bi
1408	$^{55}\text{Co}, ^{152}\text{Eu}$
1410	^{95}Ru
1411	^{197}Tl
1419	$^{154}\text{Tb}, ^{154\text{n}}\text{Tb}$
1420	^{198}Tl
1421	^{156}Tb
1422	^{192}Au
1432	$^{117\text{m}}\text{Cd}$
1434	$^{52}\text{Mn}, ^{163}\text{Tm}$

$E(\gamma)$ (keV)	Parent Nuclides
1435	^{138}La , ^{198}Tl , ^{234}Np
1436	^{210}At
1447	^{198}Tl
1449	^{169}Lu
1453	^{150}Tb
1457	^{135}I
1459	^{95}Ru
1460	^{40}K
1465	^{148}Pm , ^{172}Tm
1466	^{169}Lu
1468	^{194}Au
1470	^{183}Hf
1474	^{82}Br , $^{82\text{m}}\text{Rb}$
1477	$^{93\text{m}}\text{Mo}$, ^{93}Tc
1481	^{65}Ni
1483	^{210}At
1495	^{196}Tl
1500	$^{133\text{m}}\text{Ce}$
1502	^{199}Pb
1505	$^{110\text{m}}\text{Ag}$
1509	^{124}I
1514	^{200}Tl
1518	^{150}Tb
1520	^{93}Tc
1523	^{120}I
1524	^{42}K
1526	^{104}Ag
1527	$^{106\text{m}}\text{Ag}$, ^{234}Np
1529	^{88}Kr , $^{106\text{m}}\text{Rh}$, ^{172}Tm
1530	^{78}As
1533	^{146}Eu
1536	^{203}Bi
1545	^{142}La
1551	^{205}Po
1553	^{50}V , ^{100}Rh , ^{196}Tl
1558	^{234}Np
1561	^{56}Ni
1570	^{234}Np

$E(\gamma)$ (keV)	Parent Nuclides
1575	^{142}Pr
1576	^{117}Cd
1577	^{238}Am
1584	^{176}Ta
1588	^{228}Ac
1589	^{28}Mg
1592	^{94}Tc
1596	$^{72}\text{Ga}, ^{140}\text{La}$
1599	^{210}At
1601	^{234}Np
1604	^{132}La
1608	^{172}Tm
1611	^{90}Nb
1613	^{112}Ag
1617	$^{186\text{m}}\text{Ir}$
1621	^{196}Tl
1622	^{109}In
1627	$^{89}\text{Nb}, ^{147}\text{Tb}$
1650	^{201}Bi
1658	$^{145}\text{Eu}, ^{199}\text{Pb}$
1668	^{185}Ir
1678	^{135}I
1679	^{203}Bi
1690	$^{124}\text{Sb}, ^{124}\text{I}$
1696	$^{176}\text{Ta}, ^{196}\text{Tl}$
1706	^{135}I
1715	^{188}Ir
1716	^{117}Te
1718	^{206}Bi
1723	$^{117}\text{Cd}, ^{192}\text{Au}$
1729	^{214}Bi
1732	^{185}Ir
1736	^{150}Pm
1738	$^{129}\text{Sb}, ^{185}\text{Ir}$
1740	^{87}Kr
1745	^{38}S
1749	$^{119}\text{Te}, ^{199}\text{Pb}$
1754	$^{186\text{m}}\text{Ir}$

$E(\gamma)$ (keV)	Parent Nuclides
1757	^{57}Ni
1764	^{205}Bi , ^{214}Bi
1770	^{207}Bi
1771	^{56}Co
1775	^{205}Bi
1791	^{135}I
1793	^{175}Ta
1808	^{26}Al
1810	^{56}Mn
1823	^{176}Ta
1828	^{185}Ir
1832	^{192}Au , ^{198}Tl
1833	^{89}Nb
1836	^{88}Y
1847	^{203}Bi
1853	^{76}Br
1854	^{86}Y
1861	^{72}Ga , ^{205}Bi
1887	^{194}Au
1893	^{203}Bi
1901	^{142}La
1903	^{205}Bi
1909	^{132}La
1919	^{57}Ni
1920	^{86}Y
1921	^{192}Au
1924	^{194}Au
1929	^{100}Rh
1941	^{38}S
1947	^{147}Tb
1997	$^{117\text{m}}\text{Cd}$, ^{145}Eu
2003	^{127}Sn
2010	^{210}Tl
2011	^{87}Kr , ^{196}Tl
2015	^{56}Co
2029	^{88}Kr
2034	^{56}Co
2035	^{88}Kr

$E(\gamma)$ (keV)	Parent Nuclides
2040	^{198}Tl
2041	^{170}Lu
2043	^{194}Au
2052	^{166}Tm
2059	^{188}Ir
2060	$^{139\text{m}}\text{Nd}$
2063	^{184}Ir
2079	^{166}Tm
2089	$^{119\text{m}}\text{Te}$
2090	^{124}Sb
2096	$^{117\text{m}}\text{Cd}, ^{188}\text{Ir}$
2102	^{132}La
2106	^{112}Ag
2113	^{56}Mn
2123	$^{85\text{m}}\text{Y}$
2126	^{170}Lu
2129	$^{110\text{m}}\text{In}$
2172	$^{85\text{m}}\text{Y}$
2186	^{90}Nb
2187	^{142}La
2189	^{66}Ga
2195	^{88}Kr
2201	^{72}Ga
2204	^{214}Bi
2212	^{196}Tl
2214	^{188}Ir
2231	^{88}Kr
2237	^{192}Au
2240	^{48}V
2300	^{117}Te
2318	^{90}Nb
2322	$^{117\text{m}}\text{Cd}$
2360	^{210}Tl
2375	^{100}Rh
2391	^{76}Br
2392	^{88}Kr
2397	^{142}La
2430	^{210}Tl

E(γ) (keV)	Parent Nuclides
2491	^{72}Ga
2507	^{72}Ga
2521	^{140}La
2542	^{142}La
2554	^{87}Kr
2558	^{87}Kr
2564	^{120}I
2572	^{89}Nb
2598	^{56}Co
2614	^{208}Tl , ^{208}Bi
2680	^{147}Tb
2751	^{66}Ga
2754	^{24}Na
2792	^{76}Br
2832	^{176}Ta
2950	^{76}Br
2971	^{142}La
3092	^{89}Nb
3202	^{56}Co
3253	^{56}Co
3383	^{150}Tb
4295	^{66}Ga

Alpha Decay Energy Table

$E(\alpha)$ (keV), $I(\alpha) \geq 20\%$	Parent Nuclides
3077	²⁰⁹ Bi
3947	²³² Th
4012	²³² Th
4151	²³⁸ U
4198	²³⁸ U
4395	²³⁵ U
4445	²³⁶ U
4494	²³⁶ U
4589	²⁴⁴ Pu
4620	²³⁰ Th
4687	²³⁰ Th
4722	²³⁴ U
4771	²³⁷ Np
4774	²³⁴ U
4784	²²⁶ Ra
4788	²³⁷ Np
4824	²³³ U
4845	²²⁹ Th
4858	²⁴² Pu
4870	²⁴⁷ Cm
4883	²⁰⁹ Po
4902	²⁴² Pu
4951	²³¹ Pa
5013	²³¹ Pa
5028	²³¹ Pa
5123	²⁴⁰ Pu
5156	²³⁹ Pu
5168	²⁴⁰ Pu
5263	²³² U
5275	²⁴³ Am
5304	²¹⁰ Po
5320	²³² U
5340	²²⁸ Th

$E(\alpha)$ (keV), $I(\alpha) \geq 20\%$	Parent Nuclides
5342	²⁴⁶ Cm
5361	²⁴⁵ Cm
5385	²⁴⁶ Cm
5423	²²⁸ Th
5456	²³⁸ Pu
5485	²⁴¹ Am
5489	²²² Rn
5499	²³⁸ Pu
5531	²⁴⁷ Bk
5606	²²³ Ra
5679	²⁵¹ Cf
5685	²²⁴ Ra
5716	²²³ Ra
5720	²³⁶ Pu
5756	²²⁷ Th
5762	²⁴⁴ Cm
5767	²³⁶ Pu
5785	²⁴³ Cm
5804	²⁴⁴ Cm
5810	²⁴⁹ Cf
5817	²³⁰ U
5830	²²⁵ Ac
5854	²⁵¹ Cf
5869	²¹¹ At
5888	²³⁰ U
5977	²²⁷ Th
6030	²⁵⁰ Cf
6038	²²⁷ Th
6050	²¹² Bi
6069	²⁴² Cm
6112	²⁴² Cm
6118	²⁵² Cf
6258	²⁴⁸ Cf

$E(\alpha)$ (keV), $I(\alpha) \geq 20\%$	Parent Nuclides
6288	^{220}Rn
6428	^{254}Es
6519	^{257}Fm
6622	^{211}Bi
6632	^{252}Es
6633	^{253}Es
6708	^{246}Cf
6718	^{258}Md
6750	^{246}Cf
6763	^{258}Md
6778	^{216}Po
6819	^{219}Rn
7022	^{255}Fm
7039	^{252}Fm
7192	^{254}Fm
7386	^{215}Po
7450	^{211}Po
7686	^{214}Po

**The following radioactive decay chains
occur in nature:**

The Thorium Series:	
$^{232}\text{Th}(\alpha)^{228}\text{Ra}(\beta^-)^{228}\text{Ac}(\beta^-)^{228}\text{Th}(\alpha)^{224}\text{Ra}(\alpha)$	
$^{220}\text{Rn}(\alpha)^{216}\text{Po}(\alpha)^{212}\text{Pb}(\beta^-)^{212}\text{Bi}(\beta^-)^{212}\text{Po}(\alpha)^{208}\text{Pb},$	
$^{212}\text{Bi}(\alpha)^{208}\text{Tl}(\beta^-)^{208}\text{Pb}$	
The Uranium Series:	
$^{238}\text{U}(\alpha)^{234}\text{Th}(\beta^-)^{234}\text{Pa}(\beta^-)^{234}\text{U}(\alpha)^{230}\text{Th}(\alpha)^{226}\text{Ra}(\alpha)$	
$^{222}\text{Rn}(\alpha)^{218}\text{Po}(\beta^-)^{218}\text{At}(\alpha)^{214}\text{Bi}(\beta^-)$	
$^{214}\text{Po}(\alpha)^{210}\text{Pb}(\beta^-),$	
$^{218}\text{Po}(\alpha)^{214}\text{Pb}(\beta^-)^{214}\text{Bi}(\alpha)^{210}\text{Tl}(\beta^-)$	
$^{210}\text{Pb}(\beta^-)^{210}\text{Bi}(\alpha)^{206}\text{Tl}(\beta^-)^{206}\text{Pb},$	
$^{210}\text{Pb}(\alpha)^{206}\text{Hg}(\beta^-)^{206}\text{Tl}(\beta^-)^{206}\text{Pb},$	
$^{210}\text{Bi}(\beta^-)^{210}\text{Po}(\alpha)^{206}\text{Pb}$	
The Actinium Series:	
$^{235}\text{U}(\alpha)^{231}\text{Th}(\beta^-)^{231}\text{Pa}(\alpha)^{227}\text{Ac}(\beta^-)^{227}\text{Th}(\alpha)^{223}\text{Ra}(\alpha),$	
$^{227}\text{Ac}(\alpha)^{223}\text{Fr}(\beta^-)^{223}\text{Ra}(\alpha)^{219}\text{Rn}(\alpha),$	
$^{223}\text{Fr}(\alpha)^{219}\text{At}(\beta^-)^{219}\text{Rn}(\alpha)^{215}\text{Po}(\alpha),$	
$^{219}\text{At}(\alpha)^{215}\text{Bi}(\beta^-)^{215}\text{Po}(\beta^-)^{215}\text{At}(\alpha)$	
$^{211}\text{Bi}(\beta^-)^{211}\text{Po}(\alpha)^{207}\text{Pb},$	
$^{215}\text{Po}(\alpha)^{211}\text{Pb}(\beta^-)^{211}\text{Bi}(\alpha)^{207}\text{Tl}(\beta^-)^{207}\text{Pb}$	

Radioactive Nuclides in Nature

Nuclide			$T_{1/2}$	Decay Mode	Major γ rays
Z	El	A			
1	H	3	12.322 y	β^-	
6	C	14	5686 y	β^-	
19	K	40	1.248×10^9 y	β^- , ϵ	1460.8
23	V	50	2.68×10^{17} y	ϵ , β^-	1553.8
37	Rb	87	4.967×10^{10} y	β^-	
48	Cd	113	8.04×10^{15} y	β^-	
49	In	115	4.41×10^{14} y	β^-	
57	La	138	1.028×10^{11} y	ϵ , β^-	
60	Nd	144	2.29×10^{15} y	α	
62	Sm	147	1.068×10^{11} y	α	
		148	6.8×10^{15} y	α	
64	Gd	152	1.08×10^{14} y	α	
71	Lu	176	3.714×10^{10} y	β^-	88.3, 201.8, 306.8
72	Hf	174	7.00×10^{16} y	α	
75	Re	187	4.12×10^{10} y	β^-	
76	Os	186	2.0×10^{15} y	α	
78	Pt	190	4.90×10^{11} y	α	
90	Th	232	1.407×10^{10} y	α	
92	U	235	7.040×10^8 y	α , IT	143.8, 163.4, 185.7, 205.3
		238	4.463×10^9 y	α , SF	

List of Elements - Alphabetical

Name	Symbol	Z
Actinium	Ac	89
Aluminum	Al	13
Americium	Am	95
Antimony	Sb	51
Argon	Ar	18
Arsenic	As	33
Astatine	At	85
Barium	Ba	56
Berkelium	Bk	97
Beryllium	Be	4
Bismuth	Bi	83
Bohrium	Bh	107
Boron	B	5
Bromine	Br	35
Cadmium	Cd	48
Calcium	Ca	20
Californium	Cf	98
Carbon	C	6
Cerium	Ce	58
Cesium	Cs	55
Chlorine	Cl	17
Chromium	Cr	24
Cobalt	Co	27
Copernicium	Cn	112
Copper	Cu	29
Curium	Cm	96
Darmstadtium	Ds	110
Dubnium	Db	105
Dysprosium	Dy	66
Einsteinium	Es	99
Erbium	Er	68
Europium	Eu	63
Fermium	Fm	100

Name	Symbol	Z
Flerovium	Fl	114
Fluorine	F	9
Francium	Fr	87
Gadolinium	Gd	64
Gallium	Ga	31
Germanium	Ge	32
Gold	Au	79
Hafnium	Hf	72
Hassium	Hs	108
Helium	He	2
Holmium	Ho	67
Hydrogen	H	1
Indium	In	49
Iodine	I	53
Iridium	Ir	77
Iron	Fe	26
Krypton	Kr	36
Lanthanum	La	57
Lawrencium	Lr	103
Lead	Pb	82
Lithium	Li	3
Livermorium	Lv	116
Lutetium	Lu	71
Magnesium	Mg	12
Manganese	Mn	25
Meitnerium	Mt	109
Mendelevium	Md	101
Mercury	Hg	80
Molybdenum	Mo	42
Moscovium	Mc	115
Neodymium	Nd	60
Neon	Ne	10
Neptunium	Np	93

Name	Symbol	Z
Nickel	Ni	28
Nihonium	Nh	113
Niobium	Nb	41
Nitrogen	N	7
Nobelium	No	102
Oganesson	Og	118
Osmium	Os	76
Oxygen	O	8
Palladium	Pd	46
Phosphorus	P	15
Platinum	Pt	78
Plutonium	Pu	94
Polonium	Po	84
Potassium	K	19
Praseodymium	Pr	59
Promethium	Pm	61
Protactinium	Pa	91
Radium	Ra	88
Radon	Rn	86
Rhenium	Re	75
Rhodium	Rh	45
Roentgenium	Rg	111
Rubidium	Rb	37
Ruthenium	Ru	44
Rutherfordium	Rf	104
Samarium	Sm	62
Scandium	Sc	21
Seaborgium	Sg	106
Selenium	Se	34
Silicon	Si	14
Silver	Ag	47
Sodium	Na	11
Strontium	Sr	38
Sulfur	S	16
Tantalum	Ta	73

Name	Symbol	Z
Technetium	Tc	43
Tellurium	Te	52
Tennessine	Ts	117
Terbium	Tb	65
Thallium	Tl	81
Thorium	Th	90
Thulium	Tm	69
Tin	Sn	50
Titanium	Ti	22
Tungsten	W	74
Uranium	U	92
Vanadium	V	23
Xenon	Xe	54
Ytterbium	Yb	70
Yttrium	Y	39
Zinc	Zn	30
Zirconium	Zr	40

