

## Experimental Nuclear Masses

G. Audi and A.H. Wapstra, private communication (1995).

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>1</sup> n	8071.323 2		782.353 2			
<sup>1</sup> H	7288.969 1					
<sup>2</sup> H	13135.720 1	2224.573 2				
<sup>3</sup> H	14949.794 1	8481.821 4	18.591 1	8481.82		
<sup>3</sup> He	14931.204 1	7718.058 2			7718.06	
<sup>4</sup> H	25930 110	5580 110	23500 110	3350 110		
<sup>4</sup> He	2424.911 1	28295.674 5	-22900.210			
<sup>4</sup> Li	25320 210	4620 210			2390 210	
<sup>5</sup> H	36800 900	2700 900	25400 900	-5700 900		
<sup>5</sup> He	11390 50	27410 50	-290 70	19690 50		
<sup>5</sup> Li	11680 50	26330 50	(-26000)		17850 50	
<sup>5</sup> Be	(38000)	(-1000)			(-8000)	
<sup>6</sup> H	41900 300	5800 300	24300 300	200 300		
<sup>6</sup> He	17594.1 10	29269.1 10	3507.8 9	973.4 10		
<sup>6</sup> Li	14086.3 5	31994.6 5	-4288 5	27380 210	26420 110	
<sup>6</sup> Be	18374 5	26924 5			-1372 5	
<sup>7</sup> He	26110 30	28820 30	11200 30	1420 60		
<sup>7</sup> Li	14907.7 5	39244.5 5	-861.815 18	12910 50	36500 900	
<sup>7</sup> Be	15769.5 5	37600.4 5	-12100 70	(38000)	10190 50	
<sup>7</sup> B	27870 70	24720 70			-1610 90	
<sup>8</sup> He	31598 7	31408 7	10652 7	2139 7		-3496 24
<sup>8</sup> Li	20946.2 5	41277.3 5	16004.5 5	9282.76 15	35500 300	
<sup>8</sup> Be	4941.66 3	56499.51 4	-17979.3 11	29575 5	27230.4 10	
<sup>8</sup> B	22921.0 11	37737.8 11	-12173 23		5743.3 10	
<sup>8</sup> C	35094 23	24782 23			-2142 24	
<sup>9</sup> He	40820 60	30260 60	15860 60	1430 70		11900 60
<sup>9</sup> Li	24953.9 19	45340.9 19	13606.3 19	6096.4 19		
<sup>9</sup> Be	11347.6 4	58164.9 4	-1068.1 9	20564.6 6	29340 30	
<sup>9</sup> B	12415.7 10	56314.4 10	-16497.9 24	31590 70	17069.9 11	
<sup>9</sup> C	28913.7 22	39034.1 22			1433.8 21	
<sup>10</sup> He	48810 70	30340 70	15760 70	-1070 70		33110 70
<sup>10</sup> Li	33050 15	45316 15	20444 15	4039 15		(-6600)
<sup>10</sup> Be	12606.6 4	64977.2 4	555.8 5	8477.7 4	33569 7	
<sup>10</sup> B	12050.8 4	64750.7 4	-3647.81 9	27012.9 12	23473.4 6	
<sup>10</sup> C	15698.6 4	60320.5 4	(-24000)	35538 23	3821.0 4	
<sup>10</sup> N	(39700)	(35500)			(-2200)	
<sup>11</sup> Li	40800 30	45640 30	20620 30	300 30		15840 180
<sup>11</sup> Be	20174 6	65481 6	11506 6	7316 6	35220 60	
<sup>11</sup> B	8668.0 4	76204.8 4	-1982.5 9	19890.4 11	30863.9 20	
<sup>11</sup> C	10650.5 10	73439.9 10	-14310 180	34405.8 24	15275.0 10	
<sup>11</sup> N	24960 180	58350 180			2030 180	
<sup>12</sup> Li	(50100)	(44400)	(25000)	(-900)		(32800)
<sup>12</sup> Be	25076 15	68650 15	11708 15	3673 15	38310 70	-6971 24
<sup>12</sup> B	13368.9 14	79575.2 14	13368.9 14	14824.5 14	34259 15	
<sup>12</sup> C		92161.750 14	-17338.1 10	31841.2 4	27184.5 4	
<sup>12</sup> N	17338.1 10	74041.3 10	-14710 18	(38500)	9290.6 11	
<sup>12</sup> O	32048 18	58549 18			-1771 18	
<sup>13</sup> Be	33700 500	68100 500	17100 500	2700 500		10500 500
<sup>13</sup> B	16562.2 11	84453.2 11	13437.2 11	8248.4 10	38810 30	
<sup>13</sup> C	3125.011 1	97108.063 16	-2220.4 3	23668.2 9	31627 6	
<sup>13</sup> N	5345.5 3	94105.3 3	-17765 10	35760 180	17900.5 5	
<sup>13</sup> O	23111 10	75558 10			2118 10	
<sup>14</sup> Be	39880 110	69990 110	16220 110	1340 110		31880 110
<sup>14</sup> B	23664 21	85423 21	20644 21	5848 21	(41000)	(-9900)
<sup>14</sup> C	3019.892 4	105284.508 19	156.475 4	13122.750 10	36634 15	
<sup>14</sup> N	2863.417 1	104658.625 16	-5143.04 7	30617.3 10	25083.4 14	
<sup>14</sup> O	8006.46 7	98733.23 8	(-25600)	40184 18	6571.48 7	
<sup>14</sup> F	(33600)	(72300)			(-1700)	
<sup>15</sup> B	28967 22	88191 22	19094 22	3738 22		12190 140
<sup>15</sup> C	9873.1 8	106502.6 8	9771.7 8	9394.5 8	38400 500	
<sup>15</sup> N	101.438 1	115491.930 19	-2753.9 5	21386.7 3	31038.7 11	
<sup>15</sup> O	2855.4 5	111955.6 5	-13920 130	36398 10	14847.6 5	

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>15</sup> F	16780 130	97250 130			3150 130	
<sup>16</sup> B	37080 60	88150 60	23390 60	2720 60		26400 60
<sup>16</sup> C	13694 4	110753 4	8011 4	5468 4	40770 110	-10298 21
<sup>16</sup> N	5683 3	117981 3	10420 3	13323 3	32558 21	
<sup>16</sup> O	-4736.998 1	127619.336 19	-15417 8	28886.10 7	22334.83	
<sup>16</sup> F	10680 8	111420 8	-13312 22	(39100)	6761 8	
<sup>16</sup> Ne	23992 20	97325 20			-1408 20	
<sup>17</sup> B	43720 140	89580 140	22680 140	1390 140		41760 140
<sup>17</sup> C	21037 17	111482 17	13166 23	4979 17		4550 50
<sup>17</sup> N	7871 15	123865 15	8680 15	8373 15	35670 30	
<sup>17</sup> O	-809.00 21	131762.66 21	-2760.7 3	19807.0 5	25260.1 8	
<sup>17</sup> F	1951.70 25	128219.61 25	-14530 50	30970 130	12727.68 25	
<sup>17</sup> Ne	16490 50	112900 50			950 50	
<sup>18</sup> B	(52300)	(89100)	(27400)	(900)		(51400)
<sup>18</sup> C	24920 30	115670 30	11810 40	4910 30		19620 30
<sup>18</sup> N	13117 20	126690 20	13899 20	8709 20	38540 60	(-12200)
<sup>18</sup> O	-782.1 8	139807.0 8	-1655.5 6	12187.7 8	29054 4	
<sup>18</sup> F	873.4 6	137369.2 6	-4433.4 16	25949 8	19388 3	
<sup>18</sup> Ne	5306.8 15	132153.5 15	(-20000)	34828 21	4534.2 15	
<sup>18</sup> Na	(25300)	(111400)			(-100)	
<sup>19</sup> B	(59400)	(90100)	(26500)	(500)		(60900)
<sup>19</sup> C	32830 110	115830 110	16970 110	4350 110		31080 110
<sup>19</sup> N	15860 16	132018 16	12527 17	8153 22	42430 140	2932 20
<sup>19</sup> O	3334 3	143763 3	4821 3	12000 3	32281 18	
<sup>19</sup> F	-1487.41 7	147801.36 7	-3238.5 6	19581.8 3	23936 15	
<sup>19</sup> Ne	1751.1 6	143780.5 6	-11178 12	30880 50	12017.9 6	
<sup>19</sup> Na	12929 12	131821 12			3601 12	
<sup>20</sup> C	37560 200	119170 200	15790 210	3510 200		44600 200
<sup>20</sup> N	21770 50	134180 50	17970 50	7490 60	(45100)	14920 50
<sup>20</sup> O	3796.9 12	151370.7 12	3814.3 12	11563.7 9	35710 30	-13770 30
<sup>20</sup> F	-17.40 8	154402.67 9	7024.53 8	17033.5 6	27712 20	
<sup>20</sup> Ne	-7041.930 2	160644.859 24	-13887 7	28491.4 15	20837.8 8	
<sup>20</sup> Na	6845 7	145976 7	-10730 30	(34600)	8607 7	
<sup>20</sup> Mg	17570 30	134470 30			2310 30	
<sup>21</sup> C	(46000)	(118800)	(20700)	(3000)		(51700)
<sup>21</sup> N	25230 90	138790 90	17170 90	6770 90	(48700)	27420 90
<sup>21</sup> O	8062 12	155177 12	8109 12	11414 12	39350 110	-2850 20
<sup>21</sup> F	-47.6 18	162504.2 18	5684.1 18	14702.8 18	30486 17	(-26200)
<sup>21</sup> Ne	-5731.72 4	167405.97 5	-3547.5 7	23625.4 6	23643 3	
<sup>21</sup> Na	-2184.3 7	163076.2 7	-13096 16	31256 12	15274.8 7	
<sup>21</sup> Mg	10912 16	149198 16	(-15200)		5417 16	
<sup>21</sup> Al	(26100)	(133200)			(1400)	
<sup>22</sup> C	(52600)	(120300)	(20500)	(1100)		(60600)
<sup>22</sup> N	32080 200	140010 200	22800 200	5830 200		37260 200
<sup>22</sup> O	9280 60	162030 60	6490 60	10660 60	42850 210	9680 60
<sup>22</sup> F	2794 12	167734 12	10818 12	13331 12	33550 50	(-15390)
<sup>22</sup> Ne	-8024.34 22	177769.91 22	-2842.2 4	17125.06 22	26399.2 12	(-40190)
<sup>22</sup> Na	-5182.1 5	174145.3 5	-4785.3 14	28170 7	19742.7 5	
<sup>22</sup> Mg	-396.8 14	168577.6 14	(-18580)	34110 30	7932.8 13	
<sup>22</sup> Al	(18180)	(149220)	(-13980)		(3240)	
<sup>22</sup> Si	(32160)	(134450)			(-20)	
<sup>23</sup> N	(37700)	(142400)	(23100)	(3600)		(47300)
<sup>23</sup> O	14620 100	164770 100	11290 130	9590 100	(45900)	20090 100
<sup>23</sup> F	3330 80	175270 80	8480 80	12770 80	36480 120	-3440 80
<sup>23</sup> Ne	-5153.64 25	182970.53 25	4375.84 20	15564.57 25	27793 12	(-28930)
<sup>23</sup> Na	-9529.49 21	186564.02 21	-4056.8 12	23487.9 7	24059.8 18	
<sup>23</sup> Mg	-5472.7 13	181724.8 13	-12240 25	32527 16	14318.9 12	
<sup>23</sup> Al	6767 25	168703 25	(-17010)	(35500)	5626 25	
<sup>23</sup> Si	(23770)	(150920)			(1720)	
<sup>24</sup> N	(47000)	(141200)	(28100)	(1200)		(55500)
<sup>24</sup> O	19000 300	168500 300	11400 300	6500 300	(48200)	32900 300
<sup>24</sup> F	7540 70	179130 70	13490 70	11390 70	39110 210	7600 70
<sup>24</sup> Ne	-5948 10	191836 10	2470 10	14066 10	29810 60	-16702 22
<sup>24</sup> Na	-8417.60 22	193523.47 22	5515.78 16	19378.1 4	25789 12	(-40400)
<sup>24</sup> Mg	-13933.38 19	198256.89 19	-13878 4	29679.3 13	20486.98 20	
<sup>24</sup> Al	-55 4	183596 4	-10810 20	(34380)	9451 4	
<sup>24</sup> Si	10755 19	172004 19	(-21200)	(37550)	3426 20	
<sup>24</sup> P	(32000)	(150000)			(800)	

Isotope	Mass Excess	Binding Energy	Q <sub>β<sup>-</sup></sub>	S <sub>n</sub>	S <sub>p</sub>	Q <sub>α</sub>
<sup>25</sup> O	(27100)	(168400)	(15900)	(3600)		(40300)
<sup>25</sup> F	11270 <i>80</i>	183480 <i>80</i>	13330 <i>90</i>	8210 <i>110</i>	(41000)	20180 <i>80</i>
<sup>25</sup> Ne	-2060 <i>40</i>	196020 <i>40</i>	7300 <i>40</i>	13050 <i>40</i>	31250 <i>110</i>	-5880 <i>50</i>
<sup>25</sup> Na	-9357.5 <i>12</i>	202534.6 <i>12</i>	3835.3 <i>12</i>	15970.6 <i>12</i>	27260 <i>80</i>	(-28230)
<sup>25</sup> Mg	-13192.73 <i>19</i>	205587.56 <i>19</i>	-4277.0 <i>7</i>	23862.7 <i>12</i>	22617.02 <i>23</i>	
<sup>25</sup> Al	-8915.7 <i>7</i>	200528.2 <i>7</i>	-12741 <i>10</i>	31826 <i>25</i>	13964.2 <i>7</i>	
<sup>25</sup> Si	3825 <i>10</i>	187005 <i>10</i>	(-15050)	(36090)	5280 <i>10</i>	
<sup>25</sup> P	(18870)	(171180)			(2470)	
<sup>26</sup> O	(35200)	(168400)	(16900)	(-0)		(51400)
<sup>26</sup> F	18290 <i>120</i>	184530 <i>120</i>	17860 <i>140</i>	5400 <i>140</i>	(43300)	30500 <i>120</i>
<sup>26</sup> Ne	430 <i>50</i>	201600 <i>50</i>	7330 <i>60</i>	9770 <i>60</i>	33100 <i>300</i>	7570 <i>50</i>
<sup>26</sup> Na	-6902 <i>14</i>	208151 <i>14</i>	9312 <i>14</i>	14628 <i>14</i>	29020 <i>70</i>	(-17880)
<sup>26</sup> Mg	-16214.48 <i>19</i>	216680.63 <i>19</i>	-4004.14 <i>6</i>	18423.74 <i>6</i>	24845 <i>10</i>	(-42200)
<sup>26</sup> Al	-12210.34 <i>20</i>	211894.14 <i>20</i>	-5066 <i>3</i>	28298 <i>4</i>	18370.68 <i>17</i>	
<sup>26</sup> Si	-7145 <i>3</i>	206046 <i>3</i>	(-18120)	34042 <i>20</i>	7789 <i>3</i>	
<sup>26</sup> P	(10970)	(187150)	(-15000)	(37200)	(3550)	
<sup>26</sup> S	(26000)	(171400)			(-600)	
<sup>27</sup> F	25100 <i>400</i>	185800 <i>400</i>	18000 <i>400</i>	2400 <i>400</i>		42200 <i>400</i>
<sup>27</sup> Ne	7090 <i>90</i>	203010 <i>90</i>	12670 <i>100</i>	6990 <i>100</i>	(34600)	19480 <i>90</i>
<sup>27</sup> Na	-5580 <i>40</i>	214900 <i>40</i>	9010 <i>40</i>	12370 <i>40</i>	31430 <i>90</i>	-4830 <i>50</i>
<sup>27</sup> Mg	-14586.50 <i>20</i>	223123.98 <i>20</i>	2610.33 <i>17</i>	17536.42 <i>6</i>	27110 <i>40</i>	(-32090)
<sup>27</sup> Al	-17196.83 <i>13</i>	224951.95 <i>13</i>	-4812.40 <i>10</i>	24423.7 <i>7</i>	22417.3 <i>12</i>	
<sup>27</sup> Si	-12384.43 <i>16</i>	219357.20 <i>16</i>	-11630 <i>40</i>	32352 <i>10</i>	13769.64 <i>19</i>	
<sup>27</sup> P	-750 <i>40</i>	206940 <i>40</i>	(-18260)	(35770)	6420 <i>40</i>	
<sup>27</sup> S	(17510)	(187900)			(900)	
<sup>28</sup> F	(33200)	(185700)	(21900)	(1200)		(50100)
<sup>28</sup> Ne	11280 <i>110</i>	206890 <i>110</i>	12310 <i>140</i>	5290 <i>120</i>	(38500)	32770 <i>110</i>
<sup>28</sup> Na	-1030 <i>80</i>	218420 <i>80</i>	13990 <i>80</i>	10270 <i>80</i>	33900 <i>150</i>	6130 <i>80</i>
<sup>28</sup> Mg	-15018.8 <i>20</i>	231627.5 <i>20</i>	1831.8 <i>20</i>	14946.9 <i>20</i>	30030 <i>50</i>	-19090 <i>50</i>
<sup>28</sup> Al	-16850.55 <i>14</i>	232677.00 <i>14</i>	4642.24 <i>14</i>	20782.86 <i>18</i>	24526 <i>14</i>	(-43400)
<sup>28</sup> Si	-21492.793 <i>2</i>	236536.89 <i>3</i>	-14332 <i>4</i>	30491 <i>3</i>	19856.26 <i>19</i>	
<sup>28</sup> P	-7161 <i>4</i>	221423 <i>4</i>	-11230 <i>160</i>	(34280)	9529 <i>4</i>	
<sup>28</sup> S	4070 <i>160</i>	209410 <i>160</i>	(-22500)	(38000)	3360 <i>160</i>	
<sup>28</sup> Cl	(26600)	(186100)			(-1000)	
<sup>29</sup> F	(40300)	(186700)	(22300)	(900)		(58500)
<sup>29</sup> Ne	18000 <i>300</i>	208200 <i>300</i>	15400 <i>300</i>	5200 <i>300</i>		39900 <i>300</i>
<sup>29</sup> Na	2620 <i>90</i>	222840 <i>90</i>	13280 <i>90</i>	7940 <i>100</i>	37000 <i>400</i>	19570 <i>90</i>
<sup>29</sup> Mg	-10660 <i>30</i>	235340 <i>30</i>	7550 <i>30</i>	12220 <i>30</i>	32330 <i>100</i>	-7500 <i>60</i>
<sup>29</sup> Al	-18215.5 <i>12</i>	242113.3 <i>12</i>	3679.5 <i>12</i>	17161.3 <i>12</i>	27210 <i>40</i>	(-31360)
<sup>29</sup> Si	-21895.03 <i>3</i>	245010.44 <i>5</i>	-4943.1 <i>7</i>	25653.24 <i>16</i>	21886.46 <i>20</i>	
<sup>29</sup> P	-16951.9 <i>7</i>	239285.0 <i>7</i>	-13790 <i>50</i>	32340 <i>40</i>	14333.0 <i>7</i>	
<sup>29</sup> S	-3160 <i>50</i>	224710 <i>50</i>	(-16300)	(36810)	5350 <i>50</i>	
<sup>29</sup> Cl	(13140)	(207630)			(680)	
<sup>30</sup> Ne	22200 <i>800</i>	212100 <i>800</i>	13600 <i>800</i>	5200 <i>800</i>		46700 <i>800</i>
<sup>30</sup> Na	8590 <i>90</i>	224940 <i>90</i>	17480 <i>110</i>	6510 <i>120</i>	(39200)	28790 <i>90</i>
<sup>30</sup> Mg	-8880 <i>70</i>	241630 <i>70</i>	6990 <i>70</i>	10010 <i>70</i>	34740 <i>130</i>	5180 <i>70</i>
<sup>30</sup> Al	-15872 <i>14</i>	247841 <i>14</i>	8561 <i>14</i>	15164 <i>14</i>	29420 <i>80</i>	(-20320)
<sup>30</sup> Si	-24432.88 <i>4</i>	255619.63 <i>6</i>	-4232.3 <i>4</i>	19082.73 <i>4</i>	23992.1 <i>20</i>	(-44500)
<sup>30</sup> P	-20200.6 <i>4</i>	250604.9 <i>4</i>	-6138 <i>3</i>	29182 <i>4</i>	17927.9 <i>4</i>	
<sup>30</sup> S	-14063 <i>3</i>	243685 <i>3</i>	(-18510)	34280 <i>160</i>	7148 <i>3</i>	
<sup>30</sup> Cl	(4440)	(224400)	(-15600)	(38300)	(2970)	
<sup>30</sup> Ar	(20100)	(208000)			(-1400)	
<sup>31</sup> Ne	(30800)	(211500)	(18200)	(3300)		(53800)
<sup>31</sup> Na	12660 <i>160</i>	228940 <i>160</i>	15880 <i>180</i>	6100 <i>190</i>	(42200)	37100 <i>160</i>
<sup>31</sup> Mg	-3220 <i>80</i>	244040 <i>80</i>	11740 <i>80</i>	8700 <i>80</i>	35800 <i>300</i>	15830 <i>80</i>
<sup>31</sup> Al	-14954 <i>20</i>	254995 <i>20</i>	7995 <i>20</i>	12881 <i>20</i>	32150 <i>90</i>	-7890 <i>50</i>
<sup>31</sup> Si	-22948.96 <i>6</i>	262207.03 <i>8</i>	1492.03 <i>19</i>	17196.58 <i>6</i>	26870 <i>30</i>	(-34250)
<sup>31</sup> P	-24440.99 <i>18</i>	262916.69 <i>19</i>	-5396.1 <i>15</i>	23631.7 <i>7</i>	20803.4 <i>12</i>	
<sup>31</sup> S	-19044.9 <i>15</i>	256738.3 <i>15</i>	-11980 <i>50</i>	32030 <i>50</i>	11727.8 <i>15</i>	
<sup>31</sup> Cl	-7060 <i>50</i>	243980 <i>50</i>	(-18360)	(36350)	4690 <i>50</i>	
<sup>31</sup> Ar	(11300)	(224830)			(120)	
<sup>32</sup> Ne	(37200)	(213300)	(18900)	(1200)		(61300)
<sup>32</sup> Na	18300 <i>500</i>	231400 <i>500</i>	19100 <i>500</i>	6400 <i>500</i>		42600 <i>500</i>
<sup>32</sup> Mg	-800 <i>100</i>	249690 <i>100</i>	10270 <i>130</i>	8060 <i>120</i>	37600 <i>800</i>	25220 <i>100</i>
<sup>32</sup> Al	-11060 <i>90</i>	259170 <i>90</i>	13020 <i>90</i>	11330 <i>90</i>	34230 <i>130</i>	2270 <i>90</i>
<sup>32</sup> Si	-24080.9 <i>22</i>	271410.3 <i>22</i>	224.5 <i>22</i>	15790.6 <i>22</i>	29780 <i>70</i>	-21900 <i>50</i>
<sup>32</sup> P	-24305.32 <i>19</i>	270852.34 <i>19</i>	1710.66 <i>21</i>	20247.4 <i>4</i>	23011 <i>14</i>	(-44700)
<sup>32</sup> S	-26015.98 <i>11</i>	271780.66 <i>12</i>	-12685 <i>7</i>	28096 <i>3</i>	16161.04 <i>12</i>	
<sup>32</sup> Cl	-13331 <i>7</i>	258313 <i>7</i>	-11150 <i>50</i>	(33920)	7708 <i>7</i>	

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>32</sup> Ar	-2180 50	246380 50	(-22600)	(38400)	2690 50	
<sup>32</sup> K	(20400)	(223000)			(-1400)	
<sup>33</sup> Na	25500 1500	232200 1500	20300 1500	3300 1500		51800 1500
<sup>33</sup> Mg	5200 150	251760 150	13710 160	7720 160	(40200)	31790 150
<sup>33</sup> Al	-8500 70	264690 70	11990 70	9690 70	35750 180	12500 70
<sup>33</sup> Si	-20492 16	275893 16	5845 16	13686 16	31860 80	-11110 30
<sup>33</sup> P	-26337.7 11	280956.1 11	248.5 11	18039.4 11	25961 20	(-33100)
<sup>33</sup> S	-26586.23 11	280422.22 12	-5582.7 5	23683.9 15	18215.22 13	
<sup>33</sup> Cl	-21003.5 5	274057.2 5	-11620 30	30080 50	11140.5 5	
<sup>33</sup> Ar	-9380 30	261650 30	(-16140)	(36820)	4910 30	
<sup>33</sup> K	(6760)	(244730)			(750)	
<sup>34</sup> Na	(32500)	(233300)	(24100)	(1900)		(57100)
<sup>34</sup> Mg	8500 300	256600 300	11300 300	6900 300	(43300)	38400 300
<sup>34</sup> Al	-2860 90	267120 90	17090 90	7940 130	35700 500	21580 90
<sup>34</sup> Si	-19957 14	283429 14	4601 15	12018 14	33740 100	-1578 14
<sup>34</sup> P	-24558 5	287247 5	5374 5	16395 5	28070 90	(-23100)
<sup>34</sup> S	-29931.85 10	291839.16 11	-5491.28 7	20058.52 6	20428.9 22	(-43100)
<sup>34</sup> Cl	-24440.57 12	285565.53 13	-6062 3	27253 7	14713.19 21	
<sup>34</sup> Ar	-18378 3	278721 3	(-16900)	32340 50	6940 3	
<sup>34</sup> K	(-1500)	(261000)	(-14600)	(38000)	(2700)	
<sup>34</sup> Ca	(13200)	(245600)			(-800)	
<sup>35</sup> Na	(41200)	(232700)	(24900)	(500)		(66000)
<sup>35</sup> Mg	(16300)	(256800)	(16400)	(5100)		(45100)
<sup>35</sup> Al	-60 140	272380 140	14300 150	7700 160	40100 1500	28960 140
<sup>35</sup> Si	-14360 40	285900 40	10500 40	10010 40	34140 150	8690 40
<sup>35</sup> P	-24857.6 19	295618.6 19	3988.8 19	14662.5 22	30930 70	-13691 20
<sup>35</sup> S	-28846.37 9	298825.00 10	167.14 8	18402.78 6	22932 16	(-33290)
<sup>35</sup> Cl	-29013.51 4	298209.81 6	-5965.3 8	24152.7 5	17253.7 11	
<sup>35</sup> Ar	-23048.2 8	291462.2 8	-11881 20	29810 30	11039.9 8	
<sup>35</sup> K	-11167 20	278799 20	(-15610)	(34070)	4742 20	
<sup>35</sup> Ca	(4440)	(262410)			(760)	
<sup>36</sup> Mg	(20900)	(260300)	(15000)	(3700)		(51600)
<sup>36</sup> Al	5900 300	274500 300	18300 300	7400 300	(41200)	35400 300
<sup>36</sup> Si	-12400 100	292020 100	7850 100	8590 100	35400 300	17830 100
<sup>36</sup> P	-20251 13	299083 13	10413 13	11836 14	31970 90	-2826 15
<sup>36</sup> S	-30663.96 23	308713.94 24	-1142.07 25	16874.75 25	25285 14	-24220 40
<sup>36</sup> Cl	-29521.89 8	306789.50 9	708.6 3	21223.97 13	19542 5	(-43400)
<sup>36</sup> Ar	-30230.4 3	306715.7 3	-12805 8	27995 3	14876.5 3	
<sup>36</sup> K	-17425 8	293128 8	-10990 40	(32100)	7562 8	
<sup>36</sup> Ca	-6440 40	281360 40	(-20300)	(35700)	2640 40	
<sup>36</sup> Sc	(13900)	(260200)			(-800)	
<sup>37</sup> Mg	(29100)	(260200)	(19500)	(3300)		(56000)
<sup>37</sup> Al	9600 500	278900 500	16100 600	6500 600	(46100)	41400 500
<sup>37</sup> Si	-6520 130	294210 130	12470 130	8310 130	(37400)	24420 130
<sup>37</sup> P	-18990 40	305900 40	7900 40	10280 40	33510 150	5800 40
<sup>37</sup> S	-26896.2 3	313017.5 3	4865.30 25	14192.5 3	27110 40	-13736 22
<sup>37</sup> Cl	-31761.52 5	317100.47 7	-813.5 3	18890.65 6	21481.8 19	(-34600)
<sup>37</sup> Ar	-30948.0 3	315504.6 3	-6148.8 4	24042.5 8	16679.6 3	
<sup>37</sup> K	-24799.2 3	308573.5 3	-11639 22	29775 20	10363.7 3	
<sup>37</sup> Ca	-13161 22	296152 22	(-16000)	(33740)	4690 22	
<sup>37</sup> Sc	(2800)	(279400)			(600)	
<sup>38</sup> Al	(15700)	(280800)	(19500)	(6300)		(45500)
<sup>38</sup> Si	-3700 300	299500 300	10700 300	7500 300	(39200)	31000 300
<sup>38</sup> P	-14470 140	309440 140	12390 140	10360 140	35000 300	14340 140
<sup>38</sup> S	-26861 7	321054 7	2937 7	12340 7	29040 100	-4802 8
<sup>38</sup> Cl	-29797.98 11	323208.25 12	4916.8 5	16418.74 13	24125 13	(-24900)
<sup>38</sup> Ar	-34714.8 5	327342.7 5	-5913.1 6	20627.0 5	18628.7 5	(-43820)
<sup>38</sup> K	-28801.7 7	320647.3 7	-6743 5	27519 8	13857.7 7	
<sup>38</sup> Ca	-22059 5	313122 5	(-17100)	31760 40	6407 5	
<sup>38</sup> Sc	(-4900)	(295200)	(-14000)	(35000)	(2100)	
<sup>38</sup> Ti	(9100)	(280400)			(-1000)	
<sup>39</sup> Al	(20400)	(284200)	(18300)	(5300)		(50200)
<sup>39</sup> Si	(2100)	(301700)	(14800)	(7500)	(41500)	(35400)
<sup>39</sup> P	-12650 150	315700 150	10510 160	9800 150	36800 600	21160 150
<sup>39</sup> S	-23160 50	325430 50	6640 50	12410 50	31220 130	4110 50
<sup>39</sup> Cl	-29800.7 17	331282.2 17	3441 5	14181.8 17	25380 40	-15633 24
<sup>39</sup> Ar	-33242 5	333941 5	565 5	18436 5	20924 5	(-34470)
<sup>39</sup> K	-33806.8 3	333723.7 3	-6530.6 18	25150.2 4	16623.3 3	
<sup>39</sup> Ca	-27276.3 18	326410.8 18	-13108 24	30258 22	10906.2 18	

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>39</sup> Sc	-14168.24	312520.24	(-15400)	(33200)	3947.24	
<sup>39</sup> Ti	(1230)	(296340)			(190)	
<sup>40</sup> Si	(5400)	(306500)	(13700)	(7000)		(40400)
<sup>40</sup> P	-8340.200	319450.200	14500.300	10010.240	(38700)	25200.200
<sup>40</sup> S	-22850.230	333180.230	4710.240	12130.230	33700.400	12000.230
<sup>40</sup> Cl	-27560.30	337110.30	7480.30	13900.30	27670.140	-7030.30
<sup>40</sup> Ar	-35039.891.4	343810.44.5	-1504.9.3	16467.8.5	22757.7	-26190.160
<sup>40</sup> K	-33535.0.3	341523.2.3	1311.09.12	20876.0.7	18315.0.3	(-43900)
<sup>40</sup> Ca	-34846.1.3	342052.0.3	-14320.4	28930.5	14709.3.4	
<sup>40</sup> Sc	-20526.4	326950.4	-11680.160	(31700)	6303.4	
<sup>40</sup> Ti	-8850.160	314490.160	(-19200)	(34100)	1370.160	
<sup>40</sup> V	(10300)	(294500)			(-700)	
<sup>41</sup> Si	(11800)	(308100)	(16700)	(6500)		(44900)
<sup>41</sup> P	-4800.500	324000.500	13800.500	8300.500	(39800)	30700.500
<sup>41</sup> S	-18600.210	337010.210	8740.220	11580.220	(35300)	16540.210
<sup>41</sup> Cl	-27340.60	344960.60	5730.60	13680.60	29270.160	1300.60
<sup>41</sup> Ar	-33067.3.7	349909.1.7	2491.6.7	15968.5	24480.50	(-17350)
<sup>41</sup> K	-35558.9.3	351618.4.3	-421.4.3	17894.68.12	20336.2.18	(-35320)
<sup>41</sup> Ca	-35137.5.4	350414.7.4	-6495.3.3	24003.9.18	16474.5	
<sup>41</sup> Sc	-28642.2.3	343137.0.3	(-12930)	30617.24	9413.31.12	
<sup>41</sup> Ti	(-15710)	(329430)	(-15470)	(33090)	(3020)	
<sup>41</sup> V	(-240)	(313170)			(650)	
<sup>42</sup> Si	(15000)	(313000)	(14900)	(6500)		(49400)
<sup>42</sup> P	(100)	(327200)	(17300)	(7700)		(35100)
<sup>42</sup> S	-17200.300	343700.300	7700.300	10500.400	(37200)	21300.300
<sup>42</sup> Cl	-24990.110	350680.110	9430.120	13570.110	31230.220	7130.110
<sup>42</sup> Ar	-34420.40	359340.40	600.40	15520.40	26150.240	-9300.40
<sup>42</sup> K	-35021.3.3	359152.2.3	3525.4.3	17628.95.18	22040.30	(-26850)
<sup>42</sup> Ca	-38546.8.4	361895.3.4	-6425.84.13	19843.3.3	18084.8.4	(-44500)
<sup>42</sup> Sc	-32120.9.4	354687.1.4	-7000.5	27737.4	13163.8.3	
<sup>42</sup> Ti	-25121.5	346905.5	(-16950)	32410.160	4853.5	
<sup>42</sup> V	(-8170)	(329170)	(-14200)	(34600)	(2220)	
<sup>42</sup> Cr	(6000)	(314200)			(-300)	
<sup>43</sup> P	(3100)	(332200)	(15600)	(8200)		(39700)
<sup>43</sup> S	-12500.800	347000.800	11500.900	10000.900	(38900)	25900.800
<sup>43</sup> Cl	-24030.160	357800.160	7950.180	12830.170	33800.500	12160.160
<sup>43</sup> Ar	-31980.70	364960.70	4620.70	15050.70	27950.230	-2660.70
<sup>43</sup> K	-36593.9	368795.9	1815.9	17177.9	23830.70	(-18570)
<sup>43</sup> Ca	-38408.4.5	369828.3.5	-2220.8.19	19413.6.3	19919.1.8	(-36270)
<sup>43</sup> Sc	-36187.6.19	366825.1.19	-6867.7	23688.1.19	15206.7.19	
<sup>43</sup> Ti	-29320.7	359175.7	(-11300)	(29750)	8761.7	
<sup>43</sup> V	(-18020)	(347100)	(-15890)	(33900)	(3960)	
<sup>43</sup> Cr	(-2140)	(330430)			(1000)	
<sup>44</sup> P	(9200)	(334200)	(20100)	(7000)		(45000)
<sup>44</sup> S	(-10900)	(353500)	(9100)	(9800)	(40500)	(30600)
<sup>44</sup> Cl	-19990.220	361830.220	12270.220	11150.250	(34700)	17820.220
<sup>44</sup> Ar	-32262.20	373318.20	3550.40	13980.40	29600.300	5286.20
<sup>44</sup> K	-35810.40	376080.40	5660.40	16930.40	25400.110	(-11960)
<sup>44</sup> Ca	-41469.1.9	380960.2.9	-3653.3.19	19065.0.8	21620.40	(-27930)
<sup>44</sup> Sc	-37815.8.18	376524.6.18	-267.5.19	21837.5.18	17372.4.18	(-44200)
<sup>44</sup> Ti	-37548.3.8	375474.7.8	(-13700)	28570.5	13579.5.7	
<sup>44</sup> V	(-23850)	(360990)	(-10310)	(31820)	(6300)	
<sup>44</sup> Cr	(-13540)	(349900)	(-19900)	(35700)	(2990)	
<sup>44</sup> Mn	(6400)	(329200)			(0)	
<sup>45</sup> P	(14100)	(337400)	(18900)	(5100)		(50700)
<sup>45</sup> S	(-4800)	(355500)	(14100)	(8500)		(36000)
<sup>45</sup> Cl	-18900.700	368800.700	10800.700	11000.700	(36600)	22200.700
<sup>45</sup> Ar	-29720.60	378850.60	6890.60	13880.90	31800.800	9290.60
<sup>45</sup> K	-36608.10	384953.10	4205.10	16158.14	27160.160	-4734.20
<sup>45</sup> Ca	-40812.5.9	388375.0.9	256.8.9	18546.7.8	23410.70	(-21400)
<sup>45</sup> Sc	-41069.3.11	387849.4.11	-2062.4.5	21024.4.21	19054.9	(-36000)
<sup>45</sup> Ti	-39006.9.12	385004.7.12	-7133.17	25829.7	15176.4.12	(-52600)
<sup>45</sup> V	-31874.17	377089.17	(-12460)	(29990)	10264.17	
<sup>45</sup> Cr	(-19410)	(363850)	(-14300)	(33420)	(4670)	
<sup>45</sup> Mn	(-5100)	(348800)	(-18700)		(1700)	
<sup>45</sup> Fe	(13600)	(329300)			(-1100)	
<sup>46</sup> P	(22200)	(337300)	(22600)	(3100)		(57600)
<sup>46</sup> S	(-400)	(359200)	(14400)	(5700)		(42700)
<sup>46</sup> Cl	(-14800)	(372800)	(14900)	(10900)	(38600)	(27000)

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>46</sup> Ar	-29720 40	386920 40	5700 40	13600 50	(33400)	14400 40
<sup>46</sup> K	-35419 16	391835 16	7716 16	15750 40	30010 220	1655 16
<sup>46</sup> Ca	-43134.9 24	398768.7 24	-1376.3 24	17808.5 24	25451 20	-13664 20
<sup>46</sup> Sc	-41758.6 11	396610.1 11	2366.7 7	20085.5 20	20530 40	(-29390)
<sup>46</sup> Ti	-44125.3 11	398194.4 11	-7051.4 10	22719.7 13	17234.2 10	(-44900)
<sup>46</sup> V	-37073.9 15	390360.7 15	-7603.20	(29370)	13836.1 23	
<sup>46</sup> Cr	-29471 20	381975 20	(-17100)	(32080)	6501 20	
<sup>46</sup> Mn	(-12370)	(364090)	(-13100)	(34900)	(3100)	
<sup>46</sup> Fe	(800)	(350200)			(300)	
<sup>47</sup> S	(7100)	(359700)	(18300)	(4200)		(49400)
<sup>47</sup> Cl	(-11200)	(377300)	(14700)	(8500)	(39900)	(33100)
<sup>47</sup> Ar	-25910 100	391180 100	9790 100	12330 120	(35700)	19020 100
<sup>47</sup> K	-35697 8	400184 8	6643 8	15232 13	31400 700	6307 8
<sup>47</sup> Ca	-42339.7 23	406044.8 23	1991.9 12	17669.8 24	27200 60	-7787 14
<sup>47</sup> Sc	-44331.6 21	407254.4 21	600.1 19	19404.9 21	22302 10	(-22070)
<sup>47</sup> Ti	-44931.7 10	407072.1 10	-2927.8 10	22067.5 12	18697.1 11	(-38300)
<sup>47</sup> V	-42003.9 11	403362.0 11	-7452 14	26273 17	15512.5 7	
<sup>47</sup> Cr	-34552 14	395128 14	(-12290)	(31280)	10123 14	
<sup>47</sup> Mn	(-22260)	(382060)	(-15600)	(33300)	(4970)	
<sup>47</sup> Fe	(-6600)	(365600)		(36300)	(1800)	
<sup>48</sup> S	(12100)	(362800)	(16900)	(3600)		(56300)
<sup>48</sup> Cl	(-4800)	(378900)	(18400)	(6100)	(41600)	(39700)
<sup>48</sup> Ar	(-23200)	(396600)	(8900)	(9600)	(37400)	(25300)
<sup>48</sup> K	-32124 24	404683 24	12090 24	12850 30	(31900)	12350 24
<sup>48</sup> Ca	-44215 4	415991 4	278 5	17222 4	29070 40	-1399 8
<sup>48</sup> Sc	-44493 5	415487 5	3994 5	18877 5	23652 16	(-15500)
<sup>48</sup> Ti	-48487.0 10	418698.7 10	-4012.3 24	20504.3 10	19930.0 22	(-30380)
<sup>48</sup> V	-44475 3	413904 3	-1659 8	23543 3	17294 3	(-46100)
<sup>48</sup> Cr	-42815 7	411462 7	(-13820)	29487 21	13268 7	
<sup>48</sup> Mn	(-29000)	(396860)	(-10890)	(32770)	(6500)	
<sup>48</sup> Fe	(-18110)	(385190)	(-19700)	(35000)	(3220)	
<sup>48</sup> Co	(1600)	(364700)			(600)	
<sup>49</sup> S	(20500)	(362500)	(20600)	(2700)		(61800)
<sup>49</sup> Cl	(-100)	(382300)	(16500)	(5000)		(46500)
<sup>49</sup> Ar	(-16600)	(398000)	(13700)	(6800)	(38300)	(32000)
<sup>49</sup> K	-30320 70	410950 70	10970 70	10770 70	(33700)	17640 70
<sup>49</sup> Ca	-41290 4	421138 4	5262 3	15093 4	29960 100	4035 5
<sup>49</sup> Sc	-46552 4	425618 4	2006 4	18363 4	25433 8	-8942 24
<sup>49</sup> Ti	-48558.0 10	426841.1 10	-601.9 8	19768.95 6	20796.3 21	(-23980)
<sup>49</sup> V	-47956.2 13	425456.9 13	-2631 3	22094.9 13	18202.5 21	(-38400)
<sup>49</sup> Cr	-45325 3	422044 3	-7715 24	26916 14	14971.6 25	
<sup>49</sup> Mn	-37611 24	413547 24	(-13030)	(31490)	10185 24	
<sup>49</sup> Fe	(-24580)	(399740)	(-15000)	(34100)	(4610)	
<sup>49</sup> Co	(-9600)	(383900)			(1900)	
<sup>50</sup> Cl	(7200)	(383100)	(20300)	(4100)		(51700)
<sup>50</sup> Ar	(-13100)	(402600)	(12300)	(6000)	(39800)	(38300)
<sup>50</sup> K	-25400 300	414100 300	14200 300	9400 300	(35100)	23900 300
<sup>50</sup> Ca	-39571 9	427491 9	4966 17	11499 8	(30900)	10683 9
<sup>50</sup> Sc	-44538 16	431674 16	6888 16	16187 16	26990 30	-1916 16
<sup>50</sup> Ti	-51425.8 10	437780.2 10	-2208.3 11	19081.49 6	21789 4	-16950 60
<sup>50</sup> V	-49217.5 13	434789.6 13	1036.9 4	20886 3	19303 5	(-32020)
<sup>50</sup> Cr	-50254.5 13	435044.1 13	-7633.0 3	23582 7	16345.4 12	(-46500)
<sup>50</sup> Mn	-42621.5 14	426628.8 14	-8150 60	(29770)	12725 3	
<sup>50</sup> Fe	-34470 60	417700 60	(-17280)	(32510)	6230 60	
<sup>50</sup> Co	(-17200)	(399640)	(-13400)	(35000)	(2780)	
<sup>50</sup> Ni	(-3800)	(385500)			(300)	
<sup>51</sup> Cl	(12600)	(385700)	(18900)	(3400)		(55800)
<sup>51</sup> Ar	(-6300)	(403900)	(15700)	(5800)	(41400)	(43400)
<sup>51</sup> K	(-22000)	(418800)	(13900)	(7800)	(36500)	(30200)
<sup>51</sup> Ca	-35890 90	431880 90	7330 90	10740 90	(33900)	15560 90
<sup>51</sup> Sc	-43219 20	438427 20	6508 20	12809 20	27480 70	5018 20
<sup>51</sup> Ti	-49726.9 13	444152.5 13	2470.6 15	17311.5 9	23015 4	-9510 15
<sup>51</sup> V	-52197.5 13	445840.8 13	-752.73 24	20384.0 14	20223 4	(-24920)
<sup>51</sup> Cr	-51444.8 13	444305.8 13	-3207.8 5	22262.0 22	17464.7 11	(-40000)
<sup>51</sup> Mn	-48237.0 13	440315.6 13	-8020 15	26769 24	14858.7 15	
<sup>51</sup> Fe	-40217 15	431514 15	(-12940)	(31780)	9470 15	
<sup>51</sup> Co	(-27270)	(417790)	(-15800)	(33800)	(4240)	
<sup>51</sup> Ni	(-11400)	(401200)			(1400)	
<sup>52</sup> Ar	(-1700)	(407300)	(14500)	(4800)		(47800)

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>52</sup> K	(-16200)	(421000)	(16300)	(7000)	(38000)	(35200)
<sup>52</sup> Ca	-32500 500	436600 500	7900 500	9100 500	(34000)	22900 500
<sup>52</sup> Sc	-40380 230	443660 230	9080 230	11990 230	29600 400	10320 230
<sup>52</sup> Ti	-49464 7	451961 7	1973 7	14181 7	24471 12	-1135 12
<sup>52</sup> V	-51437.4 13	453152.1 13	3975.4 11	18362.52 25	21478 16	(-17520)
<sup>52</sup> Cr	-55412.8 14	456345.1 14	-4711.7 20	21301.0 11	18564.9 14	(-32760)
<sup>52</sup> Mn	-50701.1 24	450851.1 24	-2372 10	24222.3 22	16061.5 22	(-48100)
<sup>52</sup> Fe	-48329 10	447697 10	(-14410)	30000 60	12653 10	
<sup>52</sup> Co	(-33920)	(432500)	(-11260)	(32860)	(5870)	
<sup>52</sup> Ni	(-22650)	(420460)	(-20000)	(35000)	(2760)	
<sup>52</sup> Cu	(-2600)	(399600)			(0)	
<sup>53</sup> Ar	(5800)	(407900)	(17800)	(4000)		(52600)
<sup>53</sup> K	(-12000)	(424900)	(15900)	(6100)	(39200)	(39800)
<sup>53</sup> Ca	(-27900)	(440000)	(10100)	(8200)	(36200)	(27400)
<sup>53</sup> Sc	(-38000)	(449300)	(8900)	(10900)	(30500)	(16700)
<sup>53</sup> Ti	-46820 100	457390 100	5020 100	13240 100	25520 140	4120 100
<sup>53</sup> V	-51845 3	461631 3	3436 3	15790 3	23204 21	-9205 18
<sup>53</sup> Cr	-55280.6 14	464284.3 14	-597.0 4	19978.5 11	20131.7 17	(-25900)
<sup>53</sup> Mn	-54683.6 14	462904.9 14	-3742.4 17	22589.3 11	17064.1 12	(-41200)
<sup>53</sup> Fe	-50941.3 21	458380.2 21	-8302 18	26867 15	14074.5 19	
<sup>53</sup> Co	-42639 18	449296 18	(-13260)	(31510)	8980 18	
<sup>53</sup> Ni	(-29380)	(435250)	(-15900)	(34100)	(3740)	
<sup>53</sup> Cu	(-13500)	(418600)			(800)	
<sup>54</sup> K	(-5600)	(426600)	(18000)	(5500)		(44300)
<sup>54</sup> Ca	(-23600)	(443800)	(10900)	(7200)	(36500)	(33300)
<sup>54</sup> Sc	-34500 500	453900 500	11300 500	10200 500	(32800)	21100 500
<sup>54</sup> Ti	-45760 230	464400 230	4120 230	12440 230	27800 500	10480 230
<sup>54</sup> V	-49887 15	467744 15	7042 15	14592 15	24080 230	-1881 15
<sup>54</sup> Cr	-56928.3 14	474003.3 14	-1377.1 10	17658.2 3	22042 7	-17720 50
<sup>54</sup> Mn	-55551.3 17	471843.9 17	697.1 11	20992.8 22	18691.8 15	(-33860)
<sup>54</sup> Fe	-56248.4 13	471758.7 13	-8243.08 22	24062 10	15413.5 5	(-49700)
<sup>54</sup> Co	-48005.3 13	462733.2 13	-8800 50	(30230)	11882.1 20	
<sup>54</sup> Ni	-39210 50	453150 50	(-17510)	(32700)	5450 50	
<sup>54</sup> Cu	(-21690)	(434860)	(-15100)	(35200)	(2360)	
<sup>54</sup> Zn	(-6600)	(418900)			(-1500)	
<sup>55</sup> K	(-600)	(429600)	(17500)	(4700)		(48600)
<sup>55</sup> Ca	(-18100)	(446400)	(12200)	(6400)	(38500)	(37000)
<sup>55</sup> Sc	(-30300)	(457800)	(11500)	(8500)	(32900)	(27400)
<sup>55</sup> Ti	-41810 240	468520 240	7300 300	11100 300	(28500)	15670 240
<sup>55</sup> V	-49150 100	475080 100	5960 100	13450 100	(25800)	4880 100
<sup>55</sup> Cr	-55103.3 14	480249.6 14	2603.1 5	15965.3 5	22860 100	-9773 11
<sup>55</sup> Mn	-57706.4 13	482070.3 13	-231.38 10	19165.4 5	20440 3	(-26100)
<sup>55</sup> Fe	-57475.0 13	481056.6 13	-3451.3 4	22676.4 17	16772.3 4	(-42550)
<sup>55</sup> Co	-54023.7 14	476822.9 14	-8694 11	27527 18	13918.0 7	
<sup>55</sup> Ni	-45330 11	467347 11	(-13700)	(32090)	8967 11	
<sup>55</sup> Cu	(-31600)	(452900)	(-16700)	(34300)	(3600)	
<sup>55</sup> Zn	(-14920)	(435380)			(100)	
<sup>56</sup> Ca	(-13200)	(449600)	(12200)	(5800)		(42100)
<sup>56</sup> Sc	(-25500)	(461000)	(13700)	(7100)	(34400)	(31400)
<sup>56</sup> Ti	-39100 300	473900 300	7100 400	9500 400	(30100)	21500 300
<sup>56</sup> V	-46240 240	480240 240	9050 240	12500 240	26400 500	9800 240
<sup>56</sup> Cr	-55289 10	488506 10	1617 9	14503 9	24100 230	-1389 15
<sup>56</sup> Mn	-56905.6 14	489340.8 14	3695.5 3	17496.9 11	21597 15	(-18300)
<sup>56</sup> Fe	-60601.0 14	492253.9 14	-4566.0 20	20495.2 3	18250.6 4	(-34900)
<sup>56</sup> Co	-56035.0 24	486905.5 24	-2135 11	24172.3 20	15061.7 23	(-51300)
<sup>56</sup> Ni	-53900 11	483988 11	(-15300)	30840 50	12229 11	
<sup>56</sup> Cu	(-38600)	(467910)	(-12900)	(33000)	(5170)	
<sup>56</sup> Zn	(-25700)	(454300)	(-21000)	(35300)	(1100)	
<sup>56</sup> Ga	(-4700)	(432500)			(-2400)	
<sup>57</sup> Ca	(-7100)	(451500)	(14300)	(5100)		(45300)
<sup>57</sup> Sc	(-21400)	(465000)	(13200)	(7200)	(35400)	(36100)
<sup>57</sup> Ti	(-34600)	(477400)	(9800)	(8900)	(31000)	(25600)
<sup>57</sup> V	-44380 250	486450 250	8000 300	11400 300	(28600)	14960 250
<sup>57</sup> Cr	-52390 90	493680 90	5090 90	13430 90	25200 300	3680 90
<sup>57</sup> Mn	-57485 3	497991 3	2691 3	15921 3	22920 100	-10180 16
<sup>57</sup> Fe	-60175.7 14	499899.9 14	-836.0 4	18843.35 22	19650.3 6	(-27490)
<sup>57</sup> Co	-59339.7 14	498281.5 14	-3264 3	21458.6 6	16211.2 4	(-43400)
<sup>57</sup> Ni	-56075 3	494235 3	-8770 16	26888 11	13178 3	
<sup>57</sup> Cu	-47305 16	484682 16	(-14620)	(31800)	7860 16	
<sup>57</sup> Zn	(-32690)	(469280)	(-16800)	(33900)	(1930)	

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>57</sup> Ga	(-15900)	(451700)			(-1100)	
<sup>58</sup> Sc	(-15800)	(467500)	(15800)	(6400)		(40100)
<sup>58</sup> Ti	(-31600)	(482500)	(8800)	(8600)	(32900)	(30600)
<sup>58</sup> V	-40400 <i>300</i>	490500 <i>300</i>	11600 <i>400</i>	10300 <i>400</i>	(29500)	19500 <i>300</i>
<sup>58</sup> Cr	-51930 <i>240</i>	501290 <i>240</i>	3970 <i>240</i>	12780 <i>240</i>	27400 <i>400</i>	8290 <i>240</i>
<sup>58</sup> Mn	-55900 <i>30</i>	504480 <i>30</i>	6250 <i>30</i>	15140 <i>30</i>	24240 <i>240</i>	-4240 <i>30</i>
<sup>58</sup> Fe	-62148.8 <i>14</i>	509944.4 <i>14</i>	-2307.4 <i>11</i>	17690.5 <i>3</i>	21438 <i>9</i>	-19860 <i>50</i>
<sup>58</sup> Co	-59841.4 <i>17</i>	506854.6 <i>17</i>	381.6 <i>12</i>	19949.1 <i>23</i>	17513.8 <i>12</i>	(-35860)
<sup>58</sup> Ni	-60223.0 <i>14</i>	506453.8 <i>14</i>	-8563.0 <i>21</i>	22466 <i>11</i>	14200.0 <i>6</i>	(-51800)
<sup>58</sup> Cu	-51660 <i>3</i>	497108 <i>3</i>	-9370 <i>50</i>	(29200)	10203 <i>3</i>	
<sup>58</sup> Zn	-42290 <i>50</i>	486960 <i>50</i>	(-18310)	(32700)	2970 <i>50</i>	
<sup>58</sup> Ga	(-23990)	(467870)	(-15600)	(35400)	(-)	
<sup>58</sup> Ge	(-8400)	(451500)			(-2800)	
<sup>59</sup> Sc	(-11100)	(470900)	(15000)	(5900)		(44300)
<sup>59</sup> Ti	(-26100)	(485100)	(11800)	(7700)	(33600)	(34500)
<sup>59</sup> V	-37900 <i>300</i>	496100 <i>300</i>	9900 <i>400</i>	9700 <i>400</i>	(31100)	24300 <i>300</i>
<sup>59</sup> Cr	-47850 <i>250</i>	505280 <i>250</i>	7620 <i>250</i>	11600 <i>300</i>	(27900)	13300 <i>250</i>
<sup>59</sup> Mn	-55470 <i>30</i>	512120 <i>30</i>	5190 <i>30</i>	14130 <i>30</i>	25670 <i>250</i>	880 <i>30</i>
<sup>59</sup> Fe	-60658.4 <i>14</i>	516525.3 <i>14</i>	1565.2 <i>6</i>	16625.4 <i>3</i>	22840 <i>90</i>	-13400 <i>40</i>
<sup>59</sup> Co	-62223.6 <i>14</i>	517308.1 <i>14</i>	-1072.5 <i>6</i>	19026.6 <i>5</i>	19317 <i>3</i>	(-28100)
<sup>59</sup> Ni	-61151.1 <i>14</i>	515453.3 <i>14</i>	-4799.6 <i>9</i>	21218 <i>3</i>	15553.4 <i>6</i>	(-44200)
<sup>59</sup> Cu	-56351.5 <i>17</i>	509871.3 <i>17</i>	-9090 <i>40</i>	25189 <i>16</i>	11589.8 <i>11</i>	
<sup>59</sup> Zn	-47260 <i>40</i>	499990 <i>40</i>	(-13140)	(30710)	5760 <i>40</i>	
<sup>59</sup> Ga	(-34120)	(486080)	(-17100)	(34400)	(1390)	
<sup>59</sup> Ge	(-17000)	(468200)			(-1100)	
<sup>60</sup> Ti	(-22700)	(489800)	(10400)	(7300)		(38700)
<sup>60</sup> V	-33100 <i>600</i>	499400 <i>600</i>	13800 <i>600</i>	8800 <i>600</i>	(31900)	28600 <i>600</i>
<sup>60</sup> Cr	-46800 <i>300</i>	512300 <i>300</i>	6100 <i>400</i>	11000 <i>400</i>	(29800)	17600 <i>300</i>
<sup>60</sup> Mn	-52900 <i>300</i>	517600 <i>300</i>	8500 <i>300</i>	13200 <i>300</i>	27100 <i>400</i>	5400 <i>300</i>
<sup>60</sup> Fe	-61407 <i>4</i>	525345 <i>4</i>	237 <i>3</i>	15401 <i>3</i>	24050 <i>240</i>	-7224 <i>11</i>
<sup>60</sup> Co	-61644.2 <i>14</i>	524800.1 <i>14</i>	2823.9 <i>5</i>	17945.4 <i>11</i>	20320 <i>30</i>	(-21650)
<sup>60</sup> Ni	-64468.1 <i>14</i>	526841.6 <i>14</i>	-6126.9 <i>21</i>	20387.7 <i>5</i>	16897.2 <i>6</i>	(-36700)
<sup>60</sup> Cu	-58341 <i>3</i>	519932 <i>3</i>	-4158 <i>11</i>	22824 <i>3</i>	13077.7 <i>23</i>	(-51900)
<sup>60</sup> Zn	-54183 <i>11</i>	514992 <i>11</i>	(-14190)	28030 <i>50</i>	8538 <i>11</i>	
<sup>60</sup> Ga	(-40000)	(500030)	(-12200)	(32160)	(2920)	
<sup>60</sup> Ge	(-27770)	(487010)	(-21400)	(35500)	(50)	
<sup>60</sup> As	(-6400)	(464900)			(-3000)	
<sup>61</sup> Ti	(-16800)	(491900)	(13600)	(6800)		(42200)
<sup>61</sup> V	(-30400)	(504700)	(12400)	(8600)	(33800)	(32500)
<sup>61</sup> Cr	-42800 <i>300</i>	516300 <i>300</i>	9000 <i>400</i>	11100 <i>400</i>	(31200)	21500 <i>300</i>
<sup>61</sup> Mn	-51700 <i>300</i>	524500 <i>300</i>	7200 <i>300</i>	12400 <i>300</i>	28400 <i>400</i>	10200 <i>300</i>
<sup>61</sup> Fe	-58917 <i>20</i>	530927 <i>20</i>	3978 <i>20</i>	14402 <i>20</i>	25640 <i>250</i>	-2580 <i>30</i>
<sup>61</sup> Co	-62895.0 <i>16</i>	534122.2 <i>16</i>	1321.7 <i>9</i>	16814.1 <i>9</i>	22000 <i>30</i>	(-15550)
<sup>61</sup> Ni	-64216.8 <i>14</i>	534661.6 <i>14</i>	-2237.2 <i>12</i>	19208.3 <i>5</i>	18136.3 <i>7</i>	(-30500)
<sup>61</sup> Cu	-61979.6 <i>18</i>	531642.0 <i>18</i>	-5637 <i>16</i>	21770.7 <i>15</i>	14333.9 <i>12</i>	(-43900)
<sup>61</sup> Zn	-56342 <i>16</i>	525223 <i>16</i>	(-9000)	25230 <i>40</i>	9769 <i>16</i>	
<sup>61</sup> Ga	(-47350)	(515450)	(-13600)	(29400)	(5570)	
<sup>61</sup> Ge	(-33700)	(501000)	(-15700)	(32900)	(1100)	
<sup>61</sup> As	(-18100)	(484600)			(-1500)	
<sup>62</sup> V	(-25000)	(507400)	(16200)	(8100)		(36400)
<sup>62</sup> Cr	-41200 <i>400</i>	522800 <i>400</i>	7300 <i>500</i>	10500 <i>500</i>	(33100)	25600 <i>400</i>
<sup>62</sup> Mn	-48500 <i>300</i>	529300 <i>300</i>	10400 <i>300</i>	11700 <i>400</i>	30000 <i>600</i>	14300 <i>300</i>
<sup>62</sup> Fe	-58898 <i>15</i>	538979 <i>15</i>	2530 <i>25</i>	13634 <i>15</i>	26600 <i>300</i>	2269 <i>18</i>
<sup>62</sup> Co	-61428 <i>20</i>	540727 <i>20</i>	5315 <i>20</i>	15927 <i>20</i>	23100 <i>300</i>	-9430 <i>30</i>
<sup>62</sup> Ni	-66742.7 <i>14</i>	545258.8 <i>14</i>	-3948 <i>4</i>	18417.2 <i>5</i>	19914 <i>3</i>	(-24500)
<sup>62</sup> Cu	-62795 <i>4</i>	540528 <i>4</i>	-1627 <i>11</i>	20596 <i>4</i>	15728 <i>4</i>	(-37800)
<sup>62</sup> Zn	-61167 <i>10</i>	538119 <i>10</i>	-9170 <i>30</i>	23127 <i>15</i>	11277 <i>10</i>	
<sup>62</sup> Ga	-52000 <i>30</i>	528170 <i>30</i>	(-9750)	(28140)	8230 <i>30</i>	
<sup>62</sup> Ge	(-42240)	(517630)	(-17300)	(30600)	(2640)	
<sup>62</sup> As	(-25000)	(499600)		(34700)	(-500)	
<sup>63</sup> V	(-21700)	(512200)	(13900)	(7400)		(40200)
<sup>63</sup> Cr	(-35500)	(525200)	(11200)	(8900)	(33400)	(30000)
<sup>63</sup> Mn	-46800 <i>300</i>	535700 <i>300</i>	9000 <i>300</i>	11200 <i>400</i>	(31000)	18800 <i>300</i>
<sup>63</sup> Fe	-55780 <i>190</i>	543930 <i>190</i>	6060 <i>190</i>	13000 <i>190</i>	27600 <i>300</i>	6430 <i>190</i>
<sup>63</sup> Co	-61837 <i>20</i>	549207 <i>20</i>	3672 <i>20</i>	15085 <i>20</i>	24700 <i>300</i>	-5150 <i>100</i>
<sup>63</sup> Ni	-65509.2 <i>14</i>	552096.7 <i>14</i>	66.945 <i>5</i>	17435.1 <i>5</i>	21170 <i>20</i>	(-18600)
<sup>63</sup> Cu	-65576.2 <i>14</i>	551381.3 <i>14</i>	-3366.9 <i>16</i>	19739.2 <i>11</i>	17259.1 <i>7</i>	(-31800)
<sup>63</sup> Zn	-62209.3 <i>21</i>	547232.0 <i>21</i>	-5520 <i>100</i>	22010 <i>62</i>	12570.5 <i>16</i>	
<sup>63</sup> Ga	-56690 <i>100</i>	540930 <i>100</i>	(-9780)	(25480)	9290 <i>100</i>	



Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>63</sup> Ge	(-46910)	(530370)	(-13100)	(29300)	(5150)	
<sup>63</sup> As	(-33800)	(516500)		(31900)	(1100)	
<sup>64</sup> Cr	(-33300)	(531100)	(9800)	(8300)		(33700)
<sup>64</sup> Mn	-43100 300	540100 300	12000 400	10800 400	(32700)	22300 300
<sup>64</sup> Fe	-55100 300	551300 300	4700 300	12300 300	28500 500	10900 300
<sup>64</sup> Co	-59789 20	555230 20	7307 20	14500 30	25900 300	-955 20
<sup>64</sup> Ni	-67095.9 14	561754.7 14	-1675.10 20	16495.86 20	22776 14	-12670 250
<sup>64</sup> Cu	-65420.8 14	559297.2 14	578.7 9	18769 4	18571 20	(-25900)
<sup>64</sup> Zn	-65999.5 17	559093.6 17	-7165 4	20975 10	13834.8 9	
<sup>64</sup> Ga	-58835 4	551146 4	-4410 250	22980 30	10618 5	
<sup>64</sup> Ge	-54420 250	545950 250	(-14900)	(28300)	7840 250	
<sup>64</sup> As	(-39500)	(530300)		(30700)	(2100)	
<sup>65</sup> Cr	(-27600)	(533500)	(13300)	(8200)		(37500)
<sup>65</sup> Mn	-40900 600	546000 600	10400 600	10300 600	(33800)	26400 600
<sup>65</sup> Fe	-51300 300	555600 300	7900 300	11700 300	(30300)	14600 300
<sup>65</sup> Co	-59164 13	562677 13	5958 13	13470 24	27000 300	3489 13
<sup>65</sup> Ni	-65122.6 15	567852.7 15	2137.1 10	15756.0 3	23920 190	-8710 100
<sup>65</sup> Cu	-67259.7 17	569207.4 17	-1351.9 3	17826.2 10	20001 20	(-20200)
<sup>65</sup> Zn	-65907.8 17	567073.1 17	-3254.9 9	19841.1 15	14976.5 9	(-33000)
<sup>65</sup> Ga	-62652.9 18	563035.9 18	-6240 100	22110 100	11654.7 11	
<sup>65</sup> Ge	-56410 100	556010 100	(-9400)	(25640)	8780 100	
<sup>65</sup> As	(-47100)	(545900)	(-14100)	(29400)	(4900)	
<sup>65</sup> Se	(-32900)	(531000)			(600)	
<sup>66</sup> Mn	(-36500)	(549600)	(13800)	(9500)		(29800)
<sup>66</sup> Fe	-50300 300	562700 300	5700 400	11400 400	(31600)	18600 300
<sup>66</sup> Co	-56100 300	567600 300	10000 300	12400 300	27500 400	7700 300
<sup>66</sup> Ni	-66029 16	576830 16	226 16	15075 16	25500 300	-4410 30
<sup>66</sup> Cu	-66254.3 17	576273.4 17	2642.0 12	16976.2 10	21043 20	(-14430)
<sup>66</sup> Zn	-68896.3 15	578133.0 15	-5175 3	19039.4 12	16378.3 8	(-27200)
<sup>66</sup> Ga	-63721 3	572176 3	-2100 30	21029 5	12878 3	
<sup>66</sup> Ge	-61620 30	569290 30	(-9800)	23340 250	10200 30	
<sup>66</sup> As	(-51820)	(558710)	(-10100)	(28400)	(7570)	
<sup>66</sup> Se	(-41700)	(547800)			(1900)	
<sup>67</sup> Mn	(-33700)	(554900)	(12900)	(9000)		(33600)
<sup>67</sup> Fe	-46600 500	567000 500	8700 500	11400 500	(33600)	21300 500
<sup>67</sup> Co	-55300 300	575000 300	8400 300	12300 300	29000 600	11600 300
<sup>67</sup> Ni	-63742 19	582615 19	3558 21	14763 19	27000 300	-1089 20
<sup>67</sup> Cu	-67300 8	585391 8	577 8	16183 8	22714 16	-10660 100
<sup>67</sup> Zn	-67877.2 16	585185.2 16	-1000.5 13	18112.0 13	17332.5 9	(-21390)
<sup>67</sup> Ga	-66876.7 17	583402.4 18	-4223 5	20366.4 18	14194.9 17	(-34100)
<sup>67</sup> Ge	-62654 5	578397 5	-6010 100	22390 100	11324 5	
<sup>67</sup> As	-56640 100	571600 100	(-10150)	(25700)	8570 100	
<sup>67</sup> Se	(-46490)	(560670)	(-13700)	(29700)	(4660)	
<sup>67</sup> Br	(-32800)	(546200)			(300)	
<sup>68</sup> Fe	(-44200)	(572700)	(7600)	(10100)		(25800)
<sup>68</sup> Co	-51800 300	579600 300	11700 300	11900 400	(29900)	15300 300
<sup>68</sup> Ni	-63486 17	590430 17	2060 50	13600 17	27700 300	3491 18
<sup>68</sup> Cu	-65540 50	591700 50	4460 50	15430 50	24100 300	-6660 110
<sup>68</sup> Zn	-70004.0 16	595383.4 16	-2921.1 12	17250.4 6	18553 16	(-15900)
<sup>68</sup> Ga	-67082.9 20	591679.9 20	-106 6	19504 3	15406.5 18	(-28200)
<sup>68</sup> Ge	-66977 6	590792 6	-8100 100	21500 30	12659 6	
<sup>68</sup> As	-58880 100	581910 100	(-4700)	(23200)	9730 100	
<sup>68</sup> Se	(-54100)	(576400)	(-15300)	(28600)	(7100)	
<sup>68</sup> Br	(-38900)	(560400)			(1600)	
<sup>69</sup> Fe	(-39400)	(576000)	(11600)	(9000)		(29000)
<sup>69</sup> Co	-51000 400	586800 400	9300 400	11900 500	(31900)	18300 400
<sup>69</sup> Ni	-60380 140	595390 140	5360 140	12780 140	28400 500	6720 140
<sup>69</sup> Cu	-65740 8	599973 8	2675 8	14582 11	25000 300	-2660 30
<sup>69</sup> Zn	-68414.9 17	601865.6 17	906 3	16680.4 7	19250 19	-12120 30
<sup>69</sup> Ga	-69321 3	601989 3	-2227.3 5	18587 3	16599 9	(-22900)
<sup>69</sup> Ge	-67094 3	598980 3	-4010 30	20583 6	13794 3	(-34800)
<sup>69</sup> As	-63080 30	594180 30	-6780 40	22580 100	10780 30	
<sup>69</sup> Se	-56300 30	586620 30	(-9900)	(25950)	8220 30	
<sup>69</sup> Br	(-46400)	(575900)	(-14100)	(29800)	(4300)	
<sup>69</sup> Kr	(-32300)	(561100)			(400)	
<sup>70</sup> Co	(-46800)	(590600)	(12700)	(11100)		(22200)
<sup>70</sup> Ni	-59500 300	602600 300	3500 300	12100 300	(29800)	11100 300
<sup>70</sup> Cu	-62960 15	605265 15	6599 14	13560 50	25700 300	1380 50
<sup>70</sup> Zn	-69559 3	611081 3	-654.7 16	15698 3	20651 16	(-7620)

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>70</sup> Ga	-68905.3	609644.3	1656.3	17964.3	17940.50	(-17300)
<sup>70</sup> Ge	-70560.3 17	610517.6 17	-6220.50	19726.6	15134.2 17	(-29600)
<sup>70</sup> As	-64340.50	603520.50	(-2400)	21610.110	11840.50	
<sup>70</sup> Se	(-61940)	(600330)	(-10400)	(23900)	(9540)	
<sup>70</sup> Br	(-51600)	(589200)	(-10600)	(28800)	(7300)	
<sup>70</sup> Kr	(-41000)	(577800)			(1400)	
<sup>71</sup> Co	(-45000)	(596900)	(10900)	(10100)		(25200)
<sup>71</sup> Ni	-55900.400	607000.400	6900.400	11700.400	(31100)	14000.400
<sup>71</sup> Cu	-62760.40	613140.40	4560.40	13170.40	26300.400	5130.40
<sup>71</sup> Zn	-67322.11	616915.11	2815.11	15049.10	21520.140	(-4230)
<sup>71</sup> Ga	-70136.8 18	618947.8 18	-231.9.3	16959.3	18975.8	(-13500)
<sup>71</sup> Ge	-69904.9 17	617933.5 17	-2013.4	18954.3	16067.9 18	(-23800)
<sup>71</sup> As	-67892.4	615138.4	(-4800)	20950.30	13149.5	(-35600)
<sup>71</sup> Se	(-63090)	(609560)	(-6500)	(22940)	(10580)	
<sup>71</sup> Br	(-56600)	(602300)	(-10500)	(26300)	(8100)	
<sup>71</sup> Kr	(-46100)	(591000)	(-13800)	(29900)	(4400)	
<sup>71</sup> Rb	(-32300)	(576400)			(500)	
<sup>72</sup> Co	(-40600)	(600600)	(14100)	(10000)		(28000)
<sup>72</sup> Ni	-54700.500	613900.500	(5400)	11300.600		17900.500
<sup>72</sup> Cu	(-60060)	(618510)	(8070)	(13250)	(27900)	(8170)
<sup>72</sup> Zn	-68128.6	625793.6	458.6	14712.7	23200.300	-234.14
<sup>72</sup> Ga	-68586.5 20	625468.8 20	3999.1 23	15824.3	20204.15	-9400.300
<sup>72</sup> Ge	-72585.6 15	628685.5 15	-4356.4	18167.9 20	17604.4	-18500.300
<sup>72</sup> As	-68229.4	623547.4	-335.13	20030.50	13903.5	(-30100)
<sup>72</sup> Se	-67894.12	622430.12	-8700.300	(22100)	11912.12	
<sup>72</sup> Br	-59200.300	612900.300	-5040.80	(23700)	9400.300	
<sup>72</sup> Kr	-54100.300	607100.300	(-16000)	(29300)	(6800)	
<sup>72</sup> Rb	(-38100)	(590300)			(1100)	
<sup>73</sup> Ni	(-50200)	(617500)	(8900)	(10500)		(21100)
<sup>73</sup> Cu	(-59200)	(625700)	(6300)	(12500)	(28800)	(11800)
<sup>73</sup> Zn	-65410.40	631150.40	4290.40	14230.40	24100.400	2810.40
<sup>73</sup> Ga	-69704.6	634657.6	1593.6	15710.6	21520.40	-6170.130
<sup>73</sup> Ge	-71297.1 15	635468.4 15	-341.4	17534.9 20	18553.11	-14410.140
<sup>73</sup> As	-70956.4	634345.4	-2740.10	19207.6	15397.4	(-24700)
<sup>73</sup> Se	-68216.11	630823.11	-4680.130	(21270)	12889.11	(-36500)
<sup>73</sup> Br	-63530.130	625360.130	-6650.190	(23100)	10220.130	
<sup>73</sup> Kr	-56890.140	617930.140	(-10700)	(26900)	(8370)	
<sup>73</sup> Rb	(-46200)	(606500)	(-14500)	(30100)	(4200)	
<sup>73</sup> Sr	(-31700)	(591200)			(200)	
<sup>74</sup> Ni	(-48500)	(623900)	(7200)	(10000)		(24900)
<sup>74</sup> Cu	(-55700)	(630300)	(10000)	(11800)	(29700)	(15200)
<sup>74</sup> Zn	-65710.50	639520.50	2340.90	13720.50	25600.500	6500.50
<sup>74</sup> Ga	-68050.70	641080.70	5370.70	15610.70	(22570)	-2750.70
<sup>74</sup> Ge	-73422.0 15	645664.6 15	-2562.4 17	16979.10 8	19872.6	-11250.60
<sup>74</sup> As	-70859.6 22	642319.8 22	1353.0 18	18773.4	16851.3	-19100.700
<sup>74</sup> Se	-72212.6 15	642890.5 15	-6907.15	20461.12	14205.0 6	(-31500)
<sup>74</sup> Br	-65306.15	635202.15	-3140.60	22300.300	11654.16	
<sup>74</sup> Kr	-62170.60	631280.60	-10400.700	24200.300	8850.60	
<sup>74</sup> Rb	-51700.700	620100.700	(-11000)	(29800)	7200.800	
<sup>74</sup> Sr	(-40700)	(608200)			(1200)	
<sup>75</sup> Ni	(-43800)	(627300)	(10500)	(9700)		(28000)
<sup>75</sup> Cu	(-54300)	(637000)	(8200)	(11300)		(18700)
<sup>75</sup> Zn	-62470.70	644350.70	6000.70	13200.80	(26800)	9700.70
<sup>75</sup> Ga	-68464.7	649560.7	3392.7	14903.9	(23900)	675.15
<sup>75</sup> Ge	-71855.9 15	652169.8 15	1176.5 10	16701.42 10	21020.40	-7614.16
<sup>75</sup> As	-73032.5 16	652564.0 17	-863.6 8	18219.4	17907.6	-15810.8
<sup>75</sup> Se	-72168.8 15	650918.0 15	-3030.14	20095.11	15449.6 6	(-25500)
<sup>75</sup> Br	-69139.14	647106.14	-4897.21	21750.130	12760.14	
<sup>75</sup> Kr	-64242.15	641426.15	-7019.17	23500.140	10603.19	
<sup>75</sup> Rb	-57222.8	633625.8	(-10600)	(27100)	8270.130	
<sup>75</sup> Sr	(-46600)	(622300)		(31100)	(4300)	
<sup>76</sup> Ni	(-41600)	(633100)	(8700)	(9200)		(31600)
<sup>76</sup> Cu	(-50300)	(641000)	(11700)	(10700)		(22000)
<sup>76</sup> Zn	-62040.120	651990.120	4160.80	12480.130	(28100)	13210.120
<sup>76</sup> Ga	-66200.90	655370.90	7010.90	14290.110	(25100)	4090.90
<sup>76</sup> Ge	-73212.9 15	661598.1 15	-923.3 9	15933.5 5	22080.50	-4234.11
<sup>76</sup> As	-72289.6 16	659892.4 17	2962.0 8	17572.6 19	18810.70	-11809.8
<sup>76</sup> Se	-75251.6 15	662072.1 15	-4963.9	19181.6 3	16407.5 6	(-20900)
<sup>76</sup> Br	-70289.9	656327.9	-1310.14	21125.18	14007.9	

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>76</sup> Kr	-68979.11	654235.11	-8498.13	22950.60	11344.11	
<sup>76</sup> Rb	-60481.8	644954.8	(-6100)	24900.700	9753.17	
<sup>76</sup> Sr	(-54400)	(638100)		(29800)	(6800)	
<sup>77</sup> Ni	(-36500)	(636100)	(12000)	(8800)		(34700)
<sup>77</sup> Cu	(-48500)	(647300)	(10100)	(10300)		(25400)
<sup>77</sup> Zn	-58600.130	656630.130	7270.120	12280.150	(29400)	15990.130
<sup>77</sup> Ga	-65870.60	663110.60	5340.60	13550.60	(26100)	7360.60
<sup>77</sup> Ge	-71214.1.18	667670.7.18	2702.0.21	15500.9.12	23320.70	-1043.9
<sup>77</sup> As	-73916.2.22	669590.4.22	682.9.18	17026.4.19	20030.7	-9090.8
<sup>77</sup> Se	-74599.0.15	669490.9.15	-1365.3	18572.9.3	17321.1.6	-16620.150
<sup>77</sup> Br	-73234.3	667343.3	-3063.9	20238.14	14779.3	(-26300)
<sup>77</sup> Kr	-70171.9	663499.9	-5346.12	22072.15	12581.9	
<sup>77</sup> Rb	-64826.8	657371.8	-6850.150	23746.10	10265.16	
<sup>77</sup> Sr	-57970.150	649740.150	(-11000)	(27500)	8310.150	
<sup>77</sup> Y	(-46900)	(637900)			(4300)	
<sup>78</sup> Ni	(-33700)	(641400)	(10200)	(8300)		(38100)
<sup>78</sup> Cu	(-44000)	(650800)	(13300)	(9800)		(28900)
<sup>78</sup> Zn	-57220.160	663310.160	6440.140	11320.200	(30200)	19800.160
<sup>78</sup> Ga	-63660.80	668970.80	8200.80	13600.120	(27900)	9790.80
<sup>78</sup> Ge	-71862.4	676390.4	954.10	14792.4	24400.120	2298.8
<sup>78</sup> As	-72816.10	676562.10	4209.10	16669.10	21190.90	-5880.13
<sup>78</sup> Se	-77025.7.15	679988.8.15	-3574.4	17916.8.3	18390.7.5	-13851.8
<sup>78</sup> Br	-73452.4	675633.4	708.8	19306.10	15740.4	(-20800)
<sup>78</sup> Kr	-74160.7	675558.7	-7224.10	21324.8	13486.7	
<sup>78</sup> Rb	-66936.8	667552.8	-3761.11	22598.11	11225.12	
<sup>78</sup> Sr	-63175.8	663008.8	(-10500)	(24900)	8774.13	
<sup>78</sup> Y	(-52600)	(651700)			(6700)	
<sup>79</sup> Cu	(-41700)	(656600)	(11700)	(9300)		(32000)
<sup>79</sup> Zn	(-53400)	(667600)	(9090)	(10900)	(31500)	(22500)
<sup>79</sup> Ga	-62490.120	675870.120	7000.80	12760.130	(28600)	13580.120
<sup>79</sup> Ge	-69490.90	682090.90	4150.90	14420.90	25460.160	4950.90
<sup>79</sup> As	-73636.6	685453.6	2281.5	15862.6	22340.60	-2839.9
<sup>79</sup> Se	-75916.9.15	686951.4.15	151.0.17	17460.5.4	19280.7.12	-10440.9
<sup>79</sup> Br	-76068.0.19	686320.1.19	-1626.3	18977.3	16729.7.20	-17700.500
<sup>79</sup> Kr	-74442.4	683912.4	-3646.8	20413.10	14421.4	(-27100)
<sup>79</sup> Rb	-70797.7	679484.7	-5319.11	22113.10	12141.7	
<sup>79</sup> Sr	-65477.9	673383.9	-7100.500	23650.150	9884.12	
<sup>79</sup> Y	-58400.500	665500.500	(-11000)	(27600)	8100.500	
<sup>79</sup> Zr	(-47400)	(653700)			(4000)	
<sup>80</sup> Cu	(-35500)	(658500)	(16300)	(7700)		(36600)
<sup>80</sup> Zn	-51780.170	674010.170	7290.120	10700.240	(32600)	25980.170
<sup>80</sup> Ga	-59070.120	680520.120	10380.120	11550.150	(29700)	16820.120
<sup>80</sup> Ge	-69448.23	690118.23	2670.18	13728.23	26800.160	8446.23
<sup>80</sup> As	-72118.21	692006.21	5641.21	15444.23	23030.80	55.22
<sup>80</sup> Se	-77759.4.19	696865.2.19	-1870.6.3	16876.4.16	20475.4	-7455.8
<sup>80</sup> Br	-75888.9.19	694212.3.19	2004.4	18580.4	17651.10	(-14700)
<sup>80</sup> Kr	-77893.4	695434.4	-5721.8	19876.7	15446.4	(-22500)
<sup>80</sup> Rb	-72173.7	688932.7	-1868.10	21380.10	13299.8	
<sup>80</sup> Sr	-70305.8	686281.8	(-9100)	23273.11	10723.10	
<sup>80</sup> Y	(-61200)	(676400)	(-5800)	(24700)	(8800)	
<sup>80</sup> Zr	(-55400)	(669800)			(6800)	
<sup>81</sup> Zn	(-46100)	(676400)	(11900)	(8900)		(30300)
<sup>81</sup> Ga	-57980.190	687510.190	8320.150	11640.230	(30900)	19990.190
<sup>81</sup> Ge	-66300.120	695040.120	6230.120	12960.150	(27500)	11390.120
<sup>81</sup> As	-72533.6	700492.6	3856.5	15039.7	24620.120	2924.8
<sup>81</sup> Se	-76389.1.20	703566.2.20	1585.3	16614.8.17	21480.90	-4863.8
<sup>81</sup> Br	-77974.3	704369.3	-280.7.5	18049.3	18916.6	-11960.60
<sup>81</sup> Kr	-77694.3	703306.3	-2237.7	19394.4	16355.3	-18800.300
<sup>81</sup> Rb	-75456.6	700287.6	-3930.10	20802.9	13966.6	(-28000)
<sup>81</sup> Sr	-71527.8	695574.8	-5510.60	22192.11	11662.9	
<sup>81</sup> Y	-66020.60	689280.60	-7200.300	23800.500	9800.60	
<sup>81</sup> Zr	-58900.300	681300.300	(-11400)	(27600)	8000.300	
<sup>81</sup> Nb	(-47500)	(669200)			(3700)	
<sup>82</sup> Zn	(-42100)	(680400)	(10900)	(6400)		(35500)
<sup>82</sup> Ga	(-52900)	(690500)	(12700)	(10000)	(32000)	(24600)
<sup>82</sup> Ge	-65620.240	702440.240	4700.140	12320.250	28400.300	14970.240
<sup>82</sup> As	-70320.200	706350.200	7270.200	14350.200	25830.230	5870.200
<sup>82</sup> Se	-77593.4.21	712841.9.21	-97.5.24	15976.7.12	22724.23	-1585.6
<sup>82</sup> Br	-77496.3	711962.3	3092.6.15	17750.3	19956.21	-9300.100

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>82</sup> Kr	-80589.3	714272.3	-4400.7	18838.4	17407.122	-16400.500
<sup>82</sup> Rb	-76189.7	709090.7	-180.9	20159.10	14878.7	(-23200)
<sup>82</sup> Sr	-76009.6	708128.6	-7820.100	21846.9	12693.7	
<sup>82</sup> Y	-68190.100	699530.100	-4000.500	(23200)	10600.100	
<sup>82</sup> Zr	-64200.500	694700.500	(-11200)	(25000)	8500.500	
<sup>82</sup> Nb	(-53000)	(682700)			(6400)	
<sup>83</sup> Ga	(-49500)	(695200)	(11500)	(7700)		(29500)
<sup>83</sup> Ge	(-61000)	(705900)	(8900)	(10800)	(29500)	(19000)
<sup>83</sup> As	-69880.220	713980.220	5460.220	13490.220	26500.300	9190.220
<sup>83</sup> Se	-75340.4	718660.4	3669.5	15094.3	23620.120	1457.9
<sup>83</sup> Br	-79009.4	721547.4	973.4	17177.5	21054.7	-6680.40
<sup>83</sup> Kr	-79982.3	721737.3	-909.7	18431.4	18171.4	-13520.100
<sup>83</sup> Rb	-79073.6	720045.6	-2276.6	19759.8	15676.6	-20100.300
<sup>83</sup> Sr	-76797.9	716987.9	-4470.40	21413.11	13681.9	(-29000)
<sup>83</sup> Y	-72330.40	711740.40	-5870.90	22450.80	11450.40	
<sup>83</sup> Zr	-66460.100	705090.100	-7500.300	23700.300	9510.100	
<sup>83</sup> Nb	-59000.300	696800.300	(-11200)	(27600)	7500.300	
<sup>83</sup> Mo	(-47700)	(684800)			(3500)	
<sup>84</sup> Ga	(-44400)	(698100)	(14000)	(7600)		(33400)
<sup>84</sup> Ge	(-58400)	(711400)	(7700)	(8900)	(30900)	(24000)
<sup>84</sup> As	(-66100)	(718300)	(9900)	(11900)	(27700)	(13700)
<sup>84</sup> Se	-75950.15	727341.15	1830.30	14499.14	24900.240	4694.15
<sup>84</sup> Br	-77776.25	728385.25	4655.25	16420.30	22030.200	-3620.90
<sup>84</sup> Kr	-82431.3	732257.3	-2680.9.23	17985.4	19416.3	(-10940)
<sup>84</sup> Rb	-79750.3	728794.3	894.3	19704.7	16832.4	(-17900)
<sup>84</sup> Sr	-80644.3	728906.3	-6490.90	20778.6	14634.4	(-24800)
<sup>84</sup> Y	-74160.90	721640.90	(-2670)	22110.140	12550.90	
<sup>84</sup> Zr	(-71490)	(718190)	(-9600)	(23400)	(10060)	
<sup>84</sup> Nb	(-61900)	(707800)	(-6100)	(25000)	(8300)	
<sup>84</sup> Mo	(-55800)	(700900)			(6200)	
<sup>85</sup> Ge	(-53400)	(714400)	(10100)	(8500)		(28100)
<sup>85</sup> As	(-63500)	(723800)	(8900)	(9800)	(28600)	(18600)
<sup>85</sup> Se	-72430.30	731890.30	6182.23	13230.30	(26000)	8670.30
<sup>85</sup> Br	-78611.19	737291.19	2870.19	15744.20	23310.220	-760.30
<sup>85</sup> Kr	-81481.3	739378.3	687.1.19	17641.4	20718.5	-8330.100
<sup>85</sup> Rb	-82167.7.23	739283.1.23	-1065.3	19238.6	17737.5	-15010.220
<sup>85</sup> Sr	-81103.3	737436.3	-3255.25	20448.9	15699.4	(-22000)
<sup>85</sup> Y	-77848.25	733398.25	-4690.100	21660.50	13350.30	(-30300)
<sup>85</sup> Zr	-73150.100	727920.100	-6000.200	22840.140	10940.100	
<sup>85</sup> Nb	-67150.220	721140.220	(-8100)	24300.400	9400.230	
<sup>85</sup> Mo	(-59100)	(712300)	(-11500)	(27500)	(7200)	
<sup>85</sup> Tc	(-47600)	(700000)			(3200)	
<sup>86</sup> Ge	(-50000)	(719100)	(9400)	(7800)		(33200)
<sup>86</sup> As	(-59400)	(727700)	(11100)	(9500)	(29600)	(23300)
<sup>86</sup> Se	-70541.16	738075.16	5099.11	10734.21	(26700)	13981.16
<sup>86</sup> Br	-75640.11	742391.11	7626.11	14010.30	(24100)	3642.18
<sup>86</sup> Kr	-83265.9.11	749235.0.11	-519.3	16978.3	21894.15	-5460.30
<sup>86</sup> Rb	-82747.3.23	747934.0.23	1774.2.14	19140.3	19549.25	-12920.90
<sup>86</sup> Sr	-84521.6.22	748925.9.22	-5240.14	20020.3	16668.3	-20000.400
<sup>86</sup> Y	-79282.14	742904.14	-1480.30	21270.90	14109.14	(-26100)
<sup>86</sup> Zr	-77810.30	740640.30	-7980.80	(22460)	11740.30	
<sup>86</sup> Nb	-69830.90	731880.90	-5300.400	(24100)	10250.130	
<sup>86</sup> Mo	-64600.400	725800.400	(-11400)	(24900)	(7600)	
<sup>86</sup> Tc	(-53200)	(713700)			(5900)	
<sup>87</sup> As	(-56300)	(732700)	(10300)	(8900)		(28300)
<sup>87</sup> Se	-66580.40	742190.40	7280.40	10300.50	(27800)	18300.40
<sup>87</sup> Br	-73857.18	748680.18	6853.18	11390.30	(24900)	9159.18
<sup>87</sup> Kr	-80710.0.13	754750.4.13	3885.3	15372.3	22860.30	-1362.8
<sup>87</sup> Rb	-84595.0.25	757853.1.25	283.3.15	18570.0.22	20562.19	-10410.60
<sup>87</sup> Sr	-84878.4.22	757354.0.22	-1861.6.14	19918.3	17976.3	-17180.220
<sup>87</sup> Y	-83017.3	754710.3	-3669.8	21312.25	15427.0.21	(-23900)
<sup>87</sup> Zr	-79348.8	750259.8	-5170.60	22340.100	12823.9	(-32000)
<sup>87</sup> Nb	-74180.60	744310.60	-6490.210	23170.230	10910.70	
<sup>87</sup> Mo	-67690.220	737040.220	(-8600)	(24800)	9120.250	
<sup>87</sup> Tc	(-59100)	(727700)	(-11800)	(27700)	(6500)	
<sup>87</sup> Ru	(-47300)	(715100)			(2900)	
<sup>88</sup> As	(-51600)	(736100)	(12200)	(8400)		(31000)
<sup>88</sup> Se	-63880.50	747550.50	6850.30	9480.50	(28400)	24040.50
<sup>88</sup> Br	-70730.40	753630.40	8960.40	11230.40	(25900)	13560.40

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>88</sup> Kr	-79692 13	761804 13	2914 14	12569 13	23729 21	3932 17
<sup>88</sup> Rb	-82606 4	763936 4	5313 4	16002 4	21544 12	(-6180)
<sup>88</sup> Sr	-87919.7 22	768466.6 22	-3622.6 15	19540.8 3	19231.7 24	-15219 20
<sup>88</sup> Y	-84297 3	764062 3	-673 10	21158 14	16127.7 21	(-21700)
<sup>88</sup> Zr	-83624 10	762606 10	(-7200)	21960 30	13680 10	(-28100)
<sup>88</sup> Nb	(-76420)	(754620)	(-3720)	(22740)	(11720)	
<sup>88</sup> Mo	-72701 20	750118 20	(-10100)	24300 400	9470 40	
<sup>88</sup> Tc	(-62600)	(739200)	(-7100)	(25500)	(7300)	
<sup>88</sup> Ru	(-55500)	(731400)			(5500)	
<sup>89</sup> As	(-47300)	(739800)	(12300)	(7200)		(34400)
<sup>89</sup> Se	(-59600)	(751300)	(9000)	(9200)		(26600)
<sup>89</sup> Br	-68570 60	759540 60	8160 30	10850 60	(26900)	19130 60
<sup>89</sup> Kr	-76720 50	766910 50	4990 50	12160 50	24720 60	8140 50
<sup>89</sup> Rb	-81711 6	771111 6	4496 5	13258 6	22431 19	-1130 40
<sup>89</sup> Sr	-86207.0 22	774825.4 22	1495.1 22	17471.3 3	20075 3	-11204 16
<sup>89</sup> Y	-87702.1 23	775538.1 23	-2833 3	20828 3	17685 3	-20210 210
<sup>89</sup> Zr	-84869 3	771923 3	-4290 40	21664 8	14569 3	(-25400)
<sup>89</sup> Nb	-80580 40	766850 40	-5580 40	22540 70	12140 40	(-33400)
<sup>89</sup> Mo	-75003 15	760492 15	-7510 210	23450 220	10233 17	
<sup>89</sup> Tc	-67490 210	752200 210	(-8000)	(24500)	7890 220	
<sup>89</sup> Ru	(-59500)	(743400)	(-12400)	(28300)	(6400)	
<sup>89</sup> Rh	(-47200)	(730300)			(2600)	
<sup>90</sup> Se	(-56400)	(756200)	(8200)	(8700)		(29500)
<sup>90</sup> Br	-64610 80	763650 80	10350 80	10020 90	(27500)	21870 80
<sup>90</sup> Kr	-74963 19	773217 19	4392 17	11414 23	25660 50	13805 19
<sup>90</sup> Rb	-79355 8	776827 8	6587 8	12891 9	23200 40	3302 9
<sup>90</sup> Sr	-85942 3	782632 3	546.0 14	14165 3	20828 14	-5774 6
<sup>90</sup> Y	-86487.9 23	782395.1 23	2280.1 16	18333 3	18460 4	-15280 240
<sup>90</sup> Zr	-88767.9 22	783892.9 22	-6111 4	21287 10	15426.2 24	(-23400)
<sup>90</sup> Nb	-82657 5	777000 5	-2489 4	(22380)	12938 5	(-29400)
<sup>90</sup> Mo	-80168 6	773728 6	-8960 240	23610 21	11122 11	
<sup>90</sup> Tc	-71210 240	763990 240	(-5800)	(24800)	(9400)	
<sup>90</sup> Ru	(-65400)	(757400)	(-12200)	(26100)	(7300)	
<sup>90</sup> Rh	(-53200)	(744400)			(5200)	
<sup>91</sup> Se	(-50900)	(758800)	(10600)	(7400)		(32800)
<sup>91</sup> Br	-61510 70	768620 70	9800 40	9080 90	(28800)	24840 70
<sup>91</sup> Kr	-71310 60	777640 60	6440 60	10730 80	(26300)	16580 60
<sup>91</sup> Rb	-77748 8	783291 8	5891 9	12180 9	23760 60	8890 9
<sup>91</sup> Sr	-83639 6	788400 6	2707 6	13575 6	21490 50	-1435 13
<sup>91</sup> Y	-86346 3	790325 3	1544.8 18	14786.8 25	19214 6	-10360 200
<sup>91</sup> Zr	-87891.1 22	791087.4 22	-1253.4 24	19164 3	16262.0 24	-19300 500
<sup>91</sup> Nb	-86638 3	789052 3	-4434 11	22200 40	13514 3	(-27500)
<sup>91</sup> Mo	-82204 11	783835 11	-6220 200	23343 18	11912 11	(-35100)
<sup>91</sup> Tc	-75980 200	776830 200	-7400 500	24600 300	9980 200	
<sup>91</sup> Ru	-68600 500	768600 500	(-9500)	(25200)	8200 500	
<sup>91</sup> Rh	(-59100)	(758400)	(-12000)	(28100)	(6200)	
<sup>91</sup> Pd	(-47100)	(745600)			(2100)	
<sup>92</sup> Se	(-47200)	(763200)	(9400)	(6900)		(35700)
<sup>92</sup> Br	-56580 50	771760 50	12200 50	8110 90		28230 50
<sup>92</sup> Kr	-68788 12	783185 12	5987 10	9968 22	(26900)	19666 12
<sup>92</sup> Rb	-74775 7	788390 7	8100 7	11563 10	24740 80	11674 7
<sup>92</sup> Sr	-82875 7	795707 7	1940 10	13076 7	22490 20	3930 8
<sup>92</sup> Y	-84815 9	796865 9	3639 9	14470 9	20038 12	-5880 30
<sup>92</sup> Zr	-88454.6 21	799722.1 22	-2005.6 18	15829.3 6	17090.6 22	(-14000)
<sup>92</sup> Nb	-86449 3	796934 3	357 4	19935 4	14539.0 24	(-23100)
<sup>92</sup> Mo	-86805 4	796508 4	-7870 30	22780 7	12615 4	(-31300)
<sup>92</sup> Tc	-78940 30	787860 30	(-4500)	23870 240	10860 30	
<sup>92</sup> Ru	(-74400)	(782500)	(-11000)	(25100)	(8800)	
<sup>92</sup> Rh	(-63400)	(770700)	(-7900)	(26300)	(6700)	
<sup>92</sup> Pd	(-55500)	(762100)			(4700)	
<sup>93</sup> Br	(-53000)	(776300)	(11000)	(7600)		(31200)
<sup>93</sup> Kr	-64030 100	786490 100	8600 100	8860 120	(27700)	23090 100
<sup>93</sup> Rb	-72626 8	794312 8	7462 9	11021 10	25690 70	14583 8
<sup>93</sup> Sr	-80088 8	800991 8	4137 12	12591 9	23350 60	6716 9
<sup>93</sup> Y	-84224 11	804345 11	2893 10	14021 11	21054 13	-621 11
<sup>93</sup> Zr	-87117.4 21	806456.3 22	91.4 16	15368.9 7	18056 6	-9850 90
<sup>93</sup> Nb	-87208.7 22	805765.3 22	-405 3	16714 3	15440.4 25	(-18000)
<sup>93</sup> Mo	-86804 4	804578 4	-3200.9 10	20743 11	13491 4	(-27100)
<sup>93</sup> Tc	-83603 4	800595 4	-6340 90	23760 200	11543 5	
<sup>93</sup> Ru	-77270 90	793480 90	(-8100)	24800 500	9640 90	

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>93</sup> Rh	(-69200)	(784600)	(-9500)	(26200)	(7800)	
<sup>93</sup> Pd	(-59700)	(774300)		(28800)	(5700)	
<sup>94</sup> Br	(-47800)	(779100)	(13300)	(7400)		(34500)
<sup>94</sup> Kr	(-61100)	(791700)	(7400)	(8500)	(28500)	(26100)
<sup>94</sup> Rb	-68551.9	798308.9	10291.10	9919.10	26550.50	17814.9
<sup>94</sup> Sr	-78842.7	807817.7	3508.8	12109.10	24631.14	9569.8
<sup>94</sup> Y	-82350.8	810542.8	4917.7	13677.12	22152.10	1805.9
<sup>94</sup> Zr	-87266.323	814676.523	-901.422	14954.420	18969.7	-4698.13
<sup>94</sup> Nb	-86364.922	812992.822	2045.419	16058.620	16127.9	(-13400)
<sup>94</sup> Mo	-88410.318	814255.818	-4256.4	17748.4	14533.720	(-22100)
<sup>94</sup> Tc	-84155.4	809218.4	-1587.13	21360.30	12284.5	(-30900)
<sup>94</sup> Ru	-82568.13	806849.13	(-9600)	(24300)	10340.13	
<sup>94</sup> Rh	(-72900)	(796400)	(-6600)	(25700)	(8600)	
<sup>94</sup> Pd	(-66400)	(789100)	(-13100)	(27000)	(6500)	
<sup>94</sup> Ag	(-53300)	(775200)			(4500)	
<sup>95</sup> Kr	(-56000)	(794700)	(9800)	(8200)		(29600)
<sup>95</sup> Rb	-65839.19	803667.19	9279.19	9355.20	(27400)	20944.19
<sup>95</sup> Sr	-75117.8	812164.8	6087.8	11172.11	25670.100	12591.8
<sup>95</sup> Y	-81204.8	817468.8	4453.7	13123.13	23156.11	4813.9
<sup>95</sup> Zr	-85657.623	821139.123	1124.819	14682.920	20148.8	-2208.12
<sup>95</sup> Nb	-86782.519	821481.619	925.65	15716.420	17136.11	-8440.150
<sup>95</sup> Mo	-87708.118	821624.918	-1691.5	17047.4	15168.620	(-17600)
<sup>95</sup> Tc	-86017.5	819152.5	-2567.13	18557.6	13387.5	(-25900)
<sup>95</sup> Ru	-83450.12	815802.12	-5110.150	22330.90	11224.12	
<sup>95</sup> Rh	-78340.150	809910.150	(-8200)	(25300)	9310.150	
<sup>95</sup> Pd	(-70200)	(800900)	(-10100)	(26600)	(7500)	
<sup>95</sup> Ag	(-60100)	(790100)			(5500)	
<sup>96</sup> Kr	(-53000)	(799700)	(8200)	(8000)		(32400)
<sup>96</sup> Rb	-61210.30	807110.30	11740.30	8810.30	(28000)	24390.30
<sup>96</sup> Sr	-72954.25	818072.25	5387.15	10260.30	(26400)	15837.25
<sup>96</sup> Y	-78341.22	822676.22	7100.22	12134.23	24368.23	7477.22
<sup>96</sup> Zr	-85441.3	828994.3	164.4	14317.3	21177.8	632.8
<sup>96</sup> Nb	-85604.4	828375.4	3187.3	15382.4	17833.8	-5978.13
<sup>96</sup> Mo	-88791.018	830779.218	-2973.5	16523.3211	16102.720	-12620.150
<sup>96</sup> Tc	-85818.5	827024.5	254.10	17806.7	14031.5	(-21200)
<sup>96</sup> Ru	-86072.8	826496.8	-6446.10	19647.10	12240.8	(-30000)
<sup>96</sup> Rh	-79626.13	819267.13	-3450.150	(22800)	10049.13	
<sup>96</sup> Pd	-76180.150	815030.150	(-11600)	(26000)	8190.150	
<sup>96</sup> Ag	(-64600)	(802600)	(-8500)	(27400)	(6200)	
<sup>96</sup> Cd	(-56100)	(793400)			(4300)	
<sup>97</sup> Kr	(-47900)	(802700)	(10400)	(8000)		(35000)
<sup>97</sup> Rb	-58360.30	812340.30	10430.30	8670.30		27240.30
<sup>97</sup> Sr	-68792.19	821981.19	7468.16	9817.20	(27300)	18749.19
<sup>97</sup> Y	-76260.12	828667.12	6688.11	11199.14	25000.22	10960.12
<sup>97</sup> Zr	-82949.3	834573.3	2658.119	13434.3	22409.8	3164.9
<sup>97</sup> Nb	-85607.3	836449.3	1933.919	14967.120	18981.8	-3020.40
<sup>97</sup> Mo	-87540.818	837600.318	-320.4	15975.4025	16461.219	-9700.300
<sup>97</sup> Tc	-87221.4	836498.5	-1108.9	17346.7	15016.4	(-16400)
<sup>97</sup> Ru	-86112.8	834607.8	-3520.40	18805.10	12982.8	(-25500)
<sup>97</sup> Rh	-82590.40	830300.40	-4800.300	20390.150	11150.40	
<sup>97</sup> Pd	-77800.300	824700.300	(-7000)	(23800)	8900.300	
<sup>97</sup> Ag	(-70800)	(816900)	(-10200)	(26800)	(7000)	
<sup>97</sup> Cd	(-60600)	(806000)			(5000)	
<sup>98</sup> Rb	-54300.30	816350.30	12326.24	9230.40		29220.30
<sup>98</sup> Sr	-66630.30	827890.30	5823.10	9820.30	(28200)	21480.30
<sup>98</sup> Y	-72452.24	832930.24	8824.15	10250.30	25820.30	13976.24
<sup>98</sup> Zr	-81276.20	840972.20	2250.20	11978.19	22900.30	6948.21
<sup>98</sup> Nb	-83526.6	842440.6	4586.6	14065.7	19764.22	-359.13
<sup>98</sup> Mo	-88112.018	846242.818	-1684.3	15463.63	17249.3	-6812.22
<sup>98</sup> Tc	-86428.4	843776.4	1796.7	16753.6	15402.5	-13550.150
<sup>98</sup> Ru	-88224.6	844791.6	-5057.10	18295.10	14011.6	(-20760)
<sup>98</sup> Rh	-83167.12	838951.12	-1867.24	19684.17	11927.13	(-29400)
<sup>98</sup> Pd	-81300.21	836301.21	-8420.150	21270.150	9806.20	
<sup>98</sup> Ag	-72880.150	827100.150	(-5420)	(24500)	7830.150	
<sup>98</sup> Cd	(-67460)	(820900)	(-13700)	(27500)	(5900)	
<sup>98</sup> In	(-53800)	(806500)			(3800)	
<sup>99</sup> Rb	-50840.150	820950.150	11280.110	8620.150		31490.150
<sup>99</sup> Sr	-62120.140	831450.140	8090.140	9470.140	(28800)	23850.140
<sup>99</sup> Y	-70202.24	838751.24	7567.14	10080.30	26420.40	17121.24

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>99</sup> Zr	-77769 20	845536 20	4558 15	10963 20	23560 30	9848 20
<sup>99</sup> Nb	-82327 13	849312 13	3639 13	12863 13	20645 18	3247 15
<sup>99</sup> Mo	-85966.1 18	852168.2 18	1357.2 10	14567.89 17	17595 3	-3778 15
<sup>99</sup> Tc	-87323.3 19	852743.1 19	293.7 14	16245 4	16294.3 21	-10570 150
<sup>99</sup> Ru	-87617.0 20	852254.4 20	-2043 7	17647 9	14654.1 16	(-17760)
<sup>99</sup> Rh	-85574 7	849429 7	-3387 15	19130 40	12932 8	(-24700)
<sup>99</sup> Pd	-82188 15	845261 15	-5430 150	20500 300	10653 15	
<sup>99</sup> Ag	-76760 150	839050 150	(-6910)	(22100)	8750 150	
<sup>99</sup> Cd	(-69850)	(831360)	(-8900)	(25400)	(6600)	
<sup>99</sup> In	(-60900)	(821600)			(4700)	
<sup>100</sup> Rb	(-46700)	(824900)	(13500)	(8500)		(33200)
<sup>100</sup> Sr	-60220 130	837620 130	7080 100	9730 130		25970 130
<sup>100</sup> Y	-67290 80	843910 80	9310 70	10990 80	27570 90	18720 80
<sup>100</sup> Zr	-76600 40	852440 40	3335 25	11470 40	24550 40	12610 40
<sup>100</sup> Nb	-79940 30	855000 30	6245 25	12560 30	22070 40	5650 30
<sup>100</sup> Mo	-86184 6	860458 6	-168 6	14215 6	19486 20	-957 13
<sup>100</sup> Tc	-86016.4 22	859507.5 22	3202.4 17	15731 4	17068 6	-7840 80
<sup>100</sup> Ru	-89218.8 20	861927.5 20	-3630 20	17137 7	15684.7 16	-14910 100
<sup>100</sup> Rh	-85589 20	857515 20	-361 23	18564 23	13739 20	-21500 400
<sup>100</sup> Pd	-85227 11	856371 11	-7050 80	20070 24	11581 13	(-28400)
<sup>100</sup> Ag	-78180 80	848540 80	-3880 70	21440 170	9590 80	
<sup>100</sup> Cd	-74310 100	843880 100	-10200 400	(22990)	7580 100	
<sup>100</sup> In	-64100 400	832900 400	(-7270)	(26500)	5800 400	
<sup>100</sup> Sn	(-56900)	(824900)			(4000)	
<sup>101</sup> Rb	-43600 170	829850 170	11810 110	8900 230		35350 170
<sup>101</sup> Sr	-55410 120	840880 120	9510 80	9430 190		28100 120
<sup>101</sup> Y	-64910 100	849600 100	8550 90	10850 100	28650 180	21420 100
<sup>101</sup> Zr	-73460 30	857370 30	5485 25	11830 40	25920 140	14490 30
<sup>101</sup> Nb	-78943 19	862070 19	4569 18	12758 22	23320 30	8470 30
<sup>101</sup> Mo	-83512 6	865856 6	2824 24	13688 6	20320 19	1916 19
<sup>101</sup> Tc	-86336 24	867899 24	1613 24	15155 24	18590 30	-5110 110
<sup>101</sup> Ru	-87949.6 20	868729.6 20	-541 17	16475.3 7	16561.4 17	-12200 150
<sup>101</sup> Rh	-87408 17	867406 17	-1980 4	17976 18	14663 17	(-19000)
<sup>101</sup> Pd	-85428 18	864643 18	-4200 100	19383 23	12389 18	(-25900)
<sup>101</sup> Ag	-81220 100	859660 100	-5480 110	20610 180	10230 100	
<sup>101</sup> Cd	-75750 150	853400 150	(-7300)	(22000)	8140 150	
<sup>101</sup> In	(-68400)	(845300)	(-8800)	(23600)	(6200)	
<sup>101</sup> Sn	(-59600)	(835600)			(4300)	
<sup>102</sup> Rb	(-38000)	(832300)	(15100)	(7400)		(38400)
<sup>102</sup> Sr	-53080 110	846620 110	8820 70	9000 170		30480 110
<sup>102</sup> Y	-61890 90	854660 90	9850 70	10740 120	(29800)	22670 90
<sup>102</sup> Zr	-71740 50	863720 50	4610 30	11280 60	26100 140	17360 50
<sup>102</sup> Nb	-76350 40	867550 40	7210 40	12550 50	23630 90	10430 40
<sup>102</sup> Mo	-83558 21	873974 21	1010 23	13516 20	21530 40	4368 21
<sup>102</sup> Tc	-84568 9	874201 9	4530 9	14694 10	19210 30	-2600 70
<sup>102</sup> Ru	-89097.9 20	877949.3 20	-2323 5	16021.7 7	17491 6	-9710 70
<sup>102</sup> Rh	-86775 5	874844 5	1151 5	17329 21	15337 5	-16600 400
<sup>102</sup> Pd	-87926 3	875213 3	-5950 70	18841 11	13285 3	(-23200)
<sup>102</sup> Ag	-81970 70	868480 70	-2587 8	19930 100	10960 70	
<sup>102</sup> Cd	-79380 70	865110 70	-9300 400	21220 120	8730 70	
<sup>102</sup> In	-70100 400	855100 400	(-5400)	22100 500	6500 400	
<sup>102</sup> Sn	(-64700)	(848900)		(24000)	(5000)	
<sup>103</sup> Sr	(-47600)	(849200)	(11200)	(8300)		(33300)
<sup>103</sup> Y	(-58700)	(859600)	(9600)	(10000)	(29700)	(25900)
<sup>103</sup> Zr	-68370 110	868430 110	6950 90	11060 110	27540 170	18880 110
<sup>103</sup> Nb	-75320 70	874590 70	5530 30	12520 70	24980 120	12700 70
<sup>103</sup> Mo	-80850 60	879340 60	3750 60	13480 60	21970 70	6630 60
<sup>103</sup> Tc	-84599 10	882304 10	2660 10	14410 30	20235 21	192 19
<sup>103</sup> Ru	-87258.9 20	884181.6 21	763.4 21	15452.0 3	18325 6	-6609 15
<sup>103</sup> Rh	-88022 3	884163 3	-543.1 8	16757 17	16264 24	-13423 25
<sup>103</sup> Pd	-87479 3	882837 3	-2688 17	18194 17	14107.5 23	(-20500)
<sup>103</sup> Ag	-84792 17	879367 17	-4142 10	19710 110	11961 24	(-29000)
<sup>103</sup> Cd	-80650 15	874443 15	-6050 20	21040 150	9800 23	
<sup>103</sup> In	-74600 25	867611 25	(-7700)	(22300)	7950 110	
<sup>103</sup> Sn	(-66900)	(859200)	(-11200)	(23500)	(5800)	
<sup>103</sup> Sb	(-55800)	(847200)			(1900)	
<sup>104</sup> Sr	(-44400)	(854100)	(10100)	(7500)		(35900)
<sup>104</sup> Y	(-54500)	(863400)	(11800)	(8800)	(31100)	(28000)
<sup>104</sup> Zr	(-66300)	(874500)	(5900)	(10700)	(27800)	(21800)
<sup>104</sup> Nb	-72230 110	879570 110	8110 90	12020 120	24910 140	14720 110

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>104</sup> Mo	-80330 60	886890 60	2160 40	12920 60	23170 80	9060 60
<sup>104</sup> Tc	-82490 50	888260 50	5600 50	14060 50	20720 60	2620 50
<sup>104</sup> Ru	-88091 4	893085 4	-1141 4	15136 3	19112 21	-4115 10
<sup>104</sup> Rh	-86950 3	891162 3	2441 5	16317 5	16960 10	-10880 140
<sup>104</sup> Pd	-89391 5	892820 5	-4279 4	17608 5	14871 5	-17840 150
<sup>104</sup> Ag	-85112 6	887759 6	-1136 11	19280 70	12915 8	(-25800)
<sup>104</sup> Cd	-83976 10	885841 10	-7910 140	20730 70	10628 10	
<sup>104</sup> In	-76070 140	877150 140	-4520 60	22100 400	8670 160	
<sup>104</sup> Sn	-71550 150	871850 150	(-12200)	(22900)	6750 170	
<sup>104</sup> Sb	(-59300)	(858900)			(3800)	
<sup>105</sup> Y	(-51100)	(868100)	(11200)	(8600)		(31100)
<sup>105</sup> Zr	(-62400)	(878600)	(8500)	(10100)	(29400)	(23600)
<sup>105</sup> Nb	-70850 100	886270 100	6490 70	11680 120	(26700)	16990 100
<sup>105</sup> Mo	-77340 70	891970 70	4950 50	12630 90	23540 130	11070 70
<sup>105</sup> Tc	-82290 60	896140 60	3640 60	13830 60	21550 90	4780 60
<sup>105</sup> Ru	-85930 4	898995 4	1917 4	14814 3	19660 60	-1600 12
<sup>105</sup> Rh	-87847 5	900130 5	567 3	15967 5	17825 10	-8366 17
<sup>105</sup> Pd	-88414 5	899914 5	-1345 11	17077 5	15733 5	-15190 90
<sup>105</sup> Ag	-87068 11	897787 11	-2738 4	18419 20	13624 11	-23290 150
<sup>105</sup> Cd	-84330 11	894266 11	-4849 13	19823 19	11429 12	
<sup>105</sup> In	-79481 17	888635 17	-6260 90	21020 30	9268 24	
<sup>105</sup> Sn	-73220 90	881600 90	-9440 180	(22400)	7150 90	
<sup>105</sup> Sb	-63780 150	871370 150		(24100)	3760 160	
<sup>106</sup> Y	(-46400)	(871400)	(13300)	(8000)		(33400)
<sup>106</sup> Zr	(-59700)	(884000)	(7200)	(9500)	(29900)	(26600)
<sup>106</sup> Nb	(-66900)	(890400)	(9400)	(10800)	(26900)	(19500)
<sup>106</sup> Mo	-76257 22	898959 22	3520 17	12070 60	(24500)	13648 21
<sup>106</sup> Tc	-79777 14	901696 14	6547 11	13430 50	22130 110	7162 13
<sup>106</sup> Ru	-86324 8	907461 8	39.40 21	14376 8	20570 60	809 10
<sup>106</sup> Rh	-86364 8	906718 8	3541 6	15556 8	18450 50	-5753 16
<sup>106</sup> Pd	-89905 5	909477 5	-2965 3	16656.7 8	16392 4	-12480 50
<sup>106</sup> Ag	-86940 5	905729 5	194 8	17970 5	14568 6	(-20600)
<sup>106</sup> Cd	-87134 6	905141 6	-6523 12	19300 7	12321 8	(-29100)
<sup>106</sup> In	-80610 14	897835 14	-3190 50	20690 140	10076 15	
<sup>106</sup> Sn	-77430 50	893870 50	(-11100)	22020 160	8030 50	
<sup>106</sup> Sb	(-66400)	(882000)	(-8300)	(23200)	(4900)	
<sup>106</sup> Te	(-58000)	(872900)			(1100)	
<sup>107</sup> Zr	(-55100)	(887400)	(9800)	(8900)		(28800)
<sup>107</sup> Nb	(-64900)	(896500)	(8000)	(10200)	(28300)	(21900)
<sup>107</sup> Mo	-72940 160	903710 160	6160 60	11740 180	(25200)	15430 160
<sup>107</sup> Tc	-79100 150	909090 150	4820 90	12950 160	22820 180	9300 150
<sup>107</sup> Ru	-83920 120	913130 120	2940 120	14130 120	21160 140	3070 120
<sup>107</sup> Rh	-86861 12	915287 12	1511 13	15157 13	19150 60	-3299 17
<sup>107</sup> Pd	-88372 6	916016 6	33 3	16101 7	17020 7	-9820 90
<sup>107</sup> Ag	-88405 6	915266 6	-1417 4	17480 11	15136 6	(-17800)
<sup>107</sup> Cd	-86988 7	913067 7	-3426 11	18801 12	13153 8	(-26500)
<sup>107</sup> In	-83562 13	908859 13	-5010 90	20224 21	11072 16	
<sup>107</sup> Sn	-78560 90	903070 90	(-7900)	21470 110	8800 90	
<sup>107</sup> Sb	(-70700)	(894400)	(-10100)	(23000)	(5800)	
<sup>107</sup> Te	(-60500)	(883500)			(1900)	
<sup>108</sup> Zr	(-51900)	(892300)	(8600)	(8300)		(31800)
<sup>108</sup> Nb	(-60500)	(900200)	(10600)	(9800)	(28700)	(24500)
<sup>108</sup> Mo	(-71190)	(910030)	(4750)	(11070)	(26100)	(18340)
<sup>108</sup> Tc	-75940 130	914000 130	7720 50	12300 130	(23600)	11670 130
<sup>108</sup> Ru	-83660 120	920930 120	1360 60	13470 120	21980 120	5600 120
<sup>108</sup> Rh	-85020 110	921510 110	4510 110	14800 110	19820 110	-920 110
<sup>108</sup> Pd	-89522 4	925236 4	-1918 6	15759 6	17775 9	-7520 40
<sup>108</sup> Ag	-87604 6	922536 6	1649 8	16807 7	15818 9	(-15100)
<sup>108</sup> Cd	-89253 6	923403 6	-5160 40	18261 8	13926 7	-23570 150
<sup>108</sup> In	-84100 40	917460 40	-2092 25	19630 40	11730 40	(-31300)
<sup>108</sup> Sn	-82000 40	914590 40	(-9500)	20720 60	9450 40	
<sup>108</sup> Sb	(-72510)	(904310)	(-6800)	(22300)	(6480)	
<sup>108</sup> Te	-65680 150	896700 150	(-12900)	(23800)	2840 160	
<sup>108</sup> I	(-52800)	(883100)			(1000)	
<sup>109</sup> Nb	(-58100)	(905800)	(9100)	(9300)		(26900)
<sup>109</sup> Mo	(-67200)	(914200)	(7600)	(10400)	(26700)	(20400)
<sup>109</sup> Tc	(-74870)	(921000)	(5990)	(11900)	(24500)	(13850)
<sup>109</sup> Ru	-80850 70	926200 70	4160 70	13070 140	22490 170	7650 70
<sup>109</sup> Rh	-85012 12	929581 12	2591 12	14294 17	20490 150	1473 13
<sup>109</sup> Pd	-87604 4	931390 4	1115.9 20	15374 7	18260 120	-4968 10



Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>109</sup> Ag	-88720.3	931723.3	-214.3	16457.6	16436.12	-12464.19
<sup>109</sup> Cd	-88505.4	930727.4	-2020.6	17660.8	14711.7	-20930.70
<sup>109</sup> In	-86485.6	927924.6	-3850.11	19066.14	12658.8	-28910.150
<sup>109</sup> Sn	-82636.10	923292.10	-6380.16	20220.90	10225.12	
<sup>109</sup> Sb	-76256.19	916130.19	-8680.80	(21700)	7271.23	
<sup>109</sup> Te	-67570.70	906670.70	-10000.170	(23200)	3600.100	
<sup>109</sup> I	-57570.150	895880.150			(1500)	
<sup>110</sup> Nb	(-53400)	(909200)	(12100)	(9000)		(29600)
<sup>110</sup> Mo	(-65500)	(920400)	(5900)	(10400)	(28100)	(22900)
<sup>110</sup> Tc	(-71400)	(925600)	(8800)	(11600)	(25400)	(16100)
<sup>110</sup> Ru	-80140.230	933560.230	2810.50	12600.300	(23500)	10210.230
<sup>110</sup> Rh	-82950.220	935590.220	5400.220	14080.250	21600.300	3520.220
<sup>110</sup> Pd	-88350.11	940207.11	-892.11	14971.11	19270.120	-2515.19
<sup>110</sup> Ag	-87458.3	938532.3	2892.2.16	15997.6	17020.110	(-9920)
<sup>110</sup> Cd	-90350.3	940642.3	-3878.12	17240.6	15406.3	-18070.50
<sup>110</sup> In	-86472.12	935982.12	-637.19	18520.40	13446.13	(-26100)
<sup>110</sup> Sn	-85835.16	934563.16	(-8300)	19970.50	11160.17	(-34100)
<sup>110</sup> Sb	(-77540)	(925480)	(-5260)	(21200)	(8020)	
<sup>110</sup> Te	-72280.50	919440.50	(-11900)	22740.160	4850.70	
<sup>110</sup> I	(-60300)	(906700)	(-8600)	(23700)	(2400)	
<sup>110</sup> Xe	(-51700)	(897300)			(600)	
<sup>111</sup> Mo	(-61000)	(924100)	(8800)	(9900)		(25000)
<sup>111</sup> Tc	(-69800)	(932100)	(7000)	(11100)	(26300)	(18400)
<sup>111</sup> Ru	(-76800)	(938300)	(5500)	(12100)	(24100)	(12500)
<sup>111</sup> Rh	(-82290)	(943000)	(3740)	(13420)	(22000)	(6100)
<sup>111</sup> Pd	-86030.40	945960.40	2190.40	14570.40	19750.80	-90.40
<sup>111</sup> Ag	-88217.3	947364.3	1036.8.14	15640.4.22	17783.12	(-7370)
<sup>111</sup> Cd	-89254.3	947618.3	-865.5	16892.3	16228.3	-15780.70
<sup>111</sup> In	-88389.5	945970.5	-2445.8	18046.6	14247.5	(-23400)
<sup>111</sup> Sn	-85944.7	942743.7	(-5100)	19451.11	12016.8	(-31600)
<sup>111</sup> Sb	(-80840)	(936860)	(-7370)	(20730)	(8940)	
<sup>111</sup> Te	-73480.70	928710.70	(-8500)	22040.100	5420.70	
<sup>111</sup> I	(-64900)	(919400)	(-10600)	(23500)	(3300)	
<sup>111</sup> Xe	(-54400)	(908000)			(1400)	
<sup>112</sup> Mo	(-58800)	(930000)	(7100)	(9500)		(27500)
<sup>112</sup> Tc	(-65900)	(936300)	(10000)	(10700)	(27100)	(20700)
<sup>112</sup> Ru	(-75900)	(945400)	(3670)	(11900)	(25000)	(14700)
<sup>112</sup> Rh	(-79500)	(948300)	(6800)	(12700)	(22800)	(8500)
<sup>112</sup> Pd	-86337.18	954337.18	288.17	14130.17	20780.230	2322.18
<sup>112</sup> Ag	-86625.17	953843.17	3956.17	15310.17	18250.220	-5020.30
<sup>112</sup> Cd	-90581.3	957016.3	-2586.5	16374.0.22	16809.11	-13320.170
<sup>112</sup> In	-87995.5	953648.5	664.5	17666.13	15116.5	(-20900)
<sup>112</sup> Sn	-88659.4	953529.4	-7055.23	18967.15	12887.4	-28730.150
<sup>112</sup> Sb	-81604.23	945692.23	-4350.170	(20210)	9710.30	(-35300)
<sup>112</sup> Te	-77260.170	940560.170	(-10200)	21120.180	6000.170	
<sup>112</sup> I	(-67100)	(929620)	(-7200)	(22900)	(4100)	
<sup>112</sup> Xe	-59930.150	921670.150	(-13700)	(24300)	2230.160	
<sup>112</sup> Cs	(-46300)	(907200)			(500)	
<sup>113</sup> Mo	(-54000)	(933200)	(10000)	(9100)		(29700)
<sup>113</sup> Tc	(-64000)	(942400)	(8200)	(10300)		(23100)
<sup>113</sup> Ru	(-72200)	(949800)	(6600)	(11500)	(25700)	(16900)
<sup>113</sup> Rh	(-78800)	(955600)	(4900)	(12600)	(23500)	(10600)
<sup>113</sup> Pd	-83690.40	959760.40	3340.40	13810.60	(21500)	4640.40
<sup>113</sup> Ag	-87033.17	962322.17	2016.17	14959.17	(19320)	-2620.30
<sup>113</sup> Cd	-89050.3	963556.3	316.3	15938.3.22	17600.40	(-10740)
<sup>113</sup> In	-89366.3	963091.3	-1036.3	17120.4	15727.4	-18240.50
<sup>113</sup> Sn	-88330.4	961272.4	-3917.22	18529.6	13654.4	-26280.90
<sup>113</sup> Sb	-84414.22	956573.22	(-6100)	(19710)	10603.22	-32750.160
<sup>113</sup> Te	(-78310)	(949690)	(-7190)	(20980)	(6950)	
<sup>113</sup> I	-71120.50	941720.50	-9070.100	(22300)	(4860)	
<sup>113</sup> Xe	-62050.90	931870.90	-10390.180	(23800)	3160.110	
<sup>113</sup> Cs	-51660.150	920690.150			(1300)	
<sup>114</sup> Tc	(-59700)	(946200)	(11100)	(10000)		(25200)
<sup>114</sup> Ru	(-70800)	(956500)	(4800)	(11100)	(26500)	(19200)
<sup>114</sup> Rh	(-75600)	(960500)	(7900)	(12200)	(24300)	(13000)
<sup>114</sup> Pd	-83494.25	967637.25	1451.25	13300.30	(22200)	7064.25
<sup>114</sup> Ag	-84940.30	968310.30	5080.30	14460.30	(20000)	-270.200
<sup>114</sup> Cd	-90021.3	972599.3	-1452.3	15582.9.7	18262.18	(-8100)
<sup>114</sup> In	-88569.3	970365.3	1988.7.7	16717.5	16522.17	(-15800)
<sup>114</sup> Sn	-90558.3	971571.3	-5880.200	18042.3	14555.3	(-23630)

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>114</sup> Sb	-84680.200	964910.200	(-2800)	19220.200	11260.200	(-30100)
<sup>114</sup> Te	(-81920)	(961370)	(-9100)	(20800)	(7840)	(-36200)
<sup>114</sup> I	(-72800)	(951500)	(-5900)	(21800)	(5800)	
<sup>114</sup> Xe	(-66930)	(944820)	(-12400)	(23100)	(4300)	
<sup>114</sup> Cs	(-54600)	(931700)	(-8900)	(24400)	(2000)	
<sup>114</sup> Ba	(-45700)	(922000)			(300)	
<sup>115</sup> Tc	(-57500)	(952100)	(9300)	(9700)		(27500)
<sup>115</sup> Ru	(-66800)	(960600)	(7600)	(10800)	(27400)	(21300)
<sup>115</sup> Rh	-74400.500	967400.500	6000.500	(11800)	(25000)	15100.500
<sup>115</sup> Pd	-80400.60	972620.60	4580.60	12850.70	(22800)	9630.60
<sup>115</sup> Ag	-84990.30	976420.30	3100.30	14100.40	(20800)	2020.40
<sup>115</sup> Cd	-88091.3	978740.3	1446.4	15183.66	18980.40	-5730.110
<sup>115</sup> In	-89537.4	979404.4	496.4	16313.4	17081.17	(-13100)
<sup>115</sup> Sn	-90033.3	979117.3	-3030.20	17845.3	15561.3	(-21600)
<sup>115</sup> Sb	-87003.20	975305.20	-4640.100	18730.30	12214.20	(-27300)
<sup>115</sup> Te	-82360.110	969880.110	(-5900)	(20190)	8610.110	(-33700)
<sup>115</sup> I	(-76500)	(963200)	(-8000)	(21500)	(6600)	
<sup>115</sup> Xe	(-68430)	(954390)	(-8800)	(22500)	(4700)	
<sup>115</sup> Cs	(-59700)	(944800)	(-11000)	(24200)	(3100)	
<sup>115</sup> Ba	(-48700)	(933100)			(1200)	
<sup>116</sup> Ru	(-65100)	(966900)	(6000)	(10400)		(23700)
<sup>116</sup> Rh	(-71100)	(972100)	(8900)	(11600)	(25900)	(17200)
<sup>116</sup> Pd	-79960.60	980250.60	2610.30	12610.60	(23700)	11560.60
<sup>116</sup> Ag	-82570.50	982070.50	6150.50	13770.50	(21600)	4250.50
<sup>116</sup> Cd	-88720.3	987440.3	-470.4	14841.1.20	19804.24	-3410.90
<sup>116</sup> In	-88250.4	986188.4	3275.4	15823.4	17880.30	-10690.140
<sup>116</sup> Sn	-91525.3	988681.3	-4707.5	17109.2.16	16081.3	(-18620)
<sup>116</sup> Sb	-86818.6	983191.6	-1510.90	18280.200	12826.5	-24300.400
<sup>116</sup> Te	-85310.90	980900.90	-7750.110	(19530)	9330.90	(-31000)
<sup>116</sup> I	-77560.140	972370.140	(-4660)	(20900)	7460.250	
<sup>116</sup> Xe	(-72900)	(966930)	(-10400)	(22100)	(5600)	
<sup>116</sup> Cs	-62500.400	955700.400	(-8200)	(24100)	(4300)	
<sup>116</sup> Ba	(-54300)	(946800)		(24800)	(2000)	
<sup>117</sup> Ru	(-60700)	(970700)	(8800)	(10100)		(25700)
<sup>117</sup> Rh	(-69500)	(978700)	(7000)	(11300)	(26600)	(19400)
<sup>117</sup> Pd	(-76500)	(984900)	(5700)	(12300)	(24300)	(13900)
<sup>117</sup> Ag	-82270.50	989840.50	4160.50	13420.60	22400.500	6380.50
<sup>117</sup> Cd	-86426.3	993217.3	2517.6	14477.4.23	20600.60	-1319.19
<sup>117</sup> In	-88943.6	994952.6	1455.5	15549.6	18530.40	-8510.70
<sup>117</sup> Sn	-90398.3	995625.3	-1757.9	16508.0.11	16885.3	-16400.180
<sup>117</sup> Sb	-88641.9	993086.9	-3535.17	17781.22	13683.10	-22170.50
<sup>117</sup> Te	-85107.19	988769.19	-4670.70	18890.110	9652.19	(-28200)
<sup>117</sup> I	-80440.70	983320.70	-6440.180	(20100)	8010.70	(-33900)
<sup>117</sup> Xe	-73990.180	976090.180	-7520.190	(21700)	6210.210	
<sup>117</sup> Cs	-66470.50	967790.50	(-9500)	(22900)	(4600)	
<sup>117</sup> Ba	(-57000)	(957500)	(-10400)	(24400)	(3100)	
<sup>117</sup> La	(-46600)	(946300)			(1500)	
<sup>118</sup> Ru	(-58700)	(976600)	(7100)	(9700)		(28100)
<sup>118</sup> Rh	(-65700)	(982900)	(9700)	(10800)		(21500)
<sup>118</sup> Pd	-75470.210	991890.210	4100.200	11650.220	(25000)	16190.210
<sup>118</sup> Ag	-79570.60	995210.60	7140.60	13140.80	(23100)	8430.60
<sup>118</sup> Cd	-86709.20	1001572.20	521.22	14132.20	21330.60	1010.30
<sup>118</sup> In	-87230.8	1001311.8	4423.8	15123.9	19240.50	-6540.80
<sup>118</sup> Sn	-91653.3	1004952.3	-3657.3	16271.0.17	17511.4	-13900.1000
<sup>118</sup> Sb	-87996.4	1000513.4	-273.16	17321.6	14325.5	-19583.14
<sup>118</sup> Te	-87723.16	999457.16	-7030.80	18560.90	10776.16	(-25700)
<sup>118</sup> I	-80690.80	991640.80	-3000.1000	19270.160	8450.80	(-30900)
<sup>118</sup> Xe	-77700.1000	987900.1000	-9300.1000	(21000)	7000.1000	
<sup>118</sup> Cs	-68414.13	977800.13	(-6400)	22100.400	5430.140	
<sup>118</sup> Ba	(-62000)	(970600)	(-12200)	(23800)	(3700)	
<sup>118</sup> La	(-49800)	(957600)			(1900)	
<sup>119</sup> Rh	(-63900)	(989200)	(8100)	(10500)		(23800)
<sup>119</sup> Pd	(-72000)	(996500)	(6500)	(11600)	(25900)	(18000)
<sup>119</sup> Ag	-78560.90	1002270.90	5350.40	12430.100	(23600)	10920.90
<sup>119</sup> Cd	-83910.80	1006840.80	3800.80	13620.80	(22000)	3270.80
<sup>119</sup> In	-87704.8	1009856.8	2364.8	14903.6	20020.50	-4040.60
<sup>119</sup> Sn	-90067.3	1011437.3	-594.8	15811.9.19	18219.4	-11410.120
<sup>119</sup> Sb	-89473.8	1010061.8	-2293.0.20	16975.12	15108.9	-17162.16
<sup>119</sup> Te	-87180.8	1006985.8	-3510.60	18216.20	11360.8	-23000.1000
<sup>119</sup> I	-83670.60	1002690.60	-5010.110	19370.90	9600.60	(-28700)

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>119</sup> Xe	-78660 120	996900 120	-6350 120	20810 220	8130 120	(-34700)
<sup>119</sup> Cs	-72311 14	989769 14	-8100 1000	21980 60	6450 70	
<sup>119</sup> Ba	-64200 1000	980900 1000	(-9300)	(23400)	4800 1000	
<sup>119</sup> La	(-55000)	(970900)	(-11000)	(24500)	(3100)	
<sup>119</sup> Ce	(-44000)	(959100)			(1600)	
<sup>120</sup> Rh	(-59800)	(993200)	(10900)	(10200)		(25900)
<sup>120</sup> Pd	(-70800)	(1003300)	(4900)	(11400)	(26700)	(20300)
<sup>120</sup> Ag	-75650 70	1007440 70	8330 70	12220 100	(24500)	12770 70
<sup>120</sup> Cd	-83973 19	1014979 19	1760 40	13410 30	23080 210	5432 21
<sup>120</sup> In	-85730 40	1015960 40	5370 40	14650 40	20750 80	-1940 40
<sup>120</sup> Sn	-91103 3	1020544 3	-2681 7	15592.8 25	18972 20	-9270 40
<sup>120</sup> Sb	-88423 8	1017081 8	982 13	16569 8	15771 11	-14535 12
<sup>120</sup> Te	-89405 10	1017281 10	-5615 15	17824 12	12330 11	-20500 300
<sup>120</sup> I	-83790 18	1010884 18	-1960 40	19240 80	10371 19	(-26100)
<sup>120</sup> Xe	-81830 40	1008140 40	-7940 50	20300 1000	8680 40	(-32100)
<sup>120</sup> Cs	-73888 10	999417 10	-5000 300	21617 16	7780 80	
<sup>120</sup> Ba	-68900 300	993600 300	(-11200)	(23000)	5800 1000	
<sup>120</sup> La	(-57700)	(981700)	(-8000)	(24100)	(3900)	
<sup>120</sup> Ce	(-49700)	(972900)			(2300)	
<sup>121</sup> Rh	(-57700)	(999100)	(9200)	(9900)		(28200)
<sup>121</sup> Pd	(-66900)	(1007500)	(7800)	(11000)		(22300)
<sup>121</sup> Ag	-74660 150	1014520 150	6400 120	12240 170	(25300)	14930 150
<sup>121</sup> Cd	-81060 80	1020140 80	4780 80	13290 120	(23600)	7500 90
<sup>121</sup> In	-85840 30	1024130 30	3360 30	14280 30	21860 90	450 30
<sup>121</sup> Sn	-89202.8 25	1026715.2 25	390.1 21	15278.2 22	19870 80	-6660 25
<sup>121</sup> Sb	-89592.9 23	1026322.9 23	-1036 25	16262 8	16467 8	-12450 14
<sup>121</sup> Te	-88557 25	1024505 25	-2270 30	17520 30	13068 25	-18200 300
<sup>121</sup> I	-86288 11	1021453 11	-3750 30	18760 60	11393 14	(-23900)
<sup>121</sup> Xe	-82543 24	1016926 24	-5400 20	20020 130	9940 30	(-30100)
<sup>121</sup> Cs	-77143 14	1010744 14	-6800 300	20975 20	8050 60	(-35600)
<sup>121</sup> Ba	-70300 300	1003200 300	(-7900)	22300 1100	6300 300	
<sup>121</sup> La	(-62400)	(994400)	(-9900)	(23600)	(4700)	
<sup>121</sup> Ce	(-52500)	(983700)	(-10900)	(24600)	(2800)	
<sup>121</sup> Pr	(-41600)	(972100)			(1200)	
<sup>122</sup> Pd	(-65400)	(1014100)	(6000)	(10800)		(24600)
<sup>122</sup> Ag	(-71430)	(1019360)	(9100)	(11920)	(26200)	(16900)
<sup>122</sup> Cd	(-80570)	(1027720)	(3000)	(12740)	(24400)	(9740)
<sup>122</sup> In	-83580 50	1029940 50	6370 50	13990 60	22510 90	2500 50
<sup>122</sup> Sn	-89945 3	1035529 3	-1616 3	14984 3	20550 19	-4760 90
<sup>122</sup> Sb	-88328.5 22	1033129.9 22	1982.5 20	16048 7	17170 40	-10197 16
<sup>122</sup> Te	-90311.1 18	1034330.1 19	-4234 5	17049 10	13786 3	(-16000)
<sup>122</sup> I	-86077 5	1029314 5	-890 90	18430 19	12232 9	(-21500)
<sup>122</sup> Xe	-85190 90	1027640 90	-7050 90	19500 100	10360 90	(-27400)
<sup>122</sup> Cs	-78132 16	1019804 16	(-3900)	20387 19	8920 24	(-33100)
<sup>122</sup> Ba	(-74300)	(1015200)	(-9700)	(21500)	(7000)	
<sup>122</sup> La	(-64500)	(1004700)	(-6800)	(23000)	(5200)	
<sup>122</sup> Ce	(-57700)	(997100)	(-12700)	(24200)	(3400)	
<sup>122</sup> Pr	(-45000)	(983600)			(1900)	
<sup>123</sup> Pd	(-61200)	(1018000)	(8700)	(10500)		(26600)
<sup>123</sup> Ag	(-70000)	(1026000)	(7400)	(11400)	(26900)	(19300)
<sup>123</sup> Cd	-77310 40	1032530 40	6120 30	12390 90	(25000)	11860 40
<sup>123</sup> In	-83426 24	1037863 24	4394 24	13730 40	23350 150	4509 24
<sup>123</sup> Sn	-87819 3	1041475 3	1403 3	14759 3	21340 80	-2561 16
<sup>123</sup> Sb	-89222.5 20	1042095.2 20	-53.3 18	15772.2 22	17960 30	-8173 12
<sup>123</sup> Te	-89169.2 18	1041259.5 18	-1234 3	16755 25	14544 3	(-13600)
<sup>123</sup> I	-87935 4	1039243 4	-2676 15	17790 11	12920 4	(-19200)
<sup>123</sup> Xe	-85259 15	1035785 15	-4210 20	18860 30	11280 30	(-25200)
<sup>123</sup> Cs	-81049 12	1030792 12	(-5500)	20049 18	9339 17	(-30700)
<sup>123</sup> Ba	(-75600)	(1024600)	(-6900)	(21400)	(7600)	
<sup>123</sup> La	(-68700)	(1016900)	(-8600)	(22400)	(6100)	
<sup>123</sup> Ce	(-60100)	(1007500)	(-9700)	(23700)	(4300)	
<sup>123</sup> Pr	(-50300)	(997000)		(24900)	(2500)	
<sup>124</sup> Ag	(-66600)	(1030600)	(10100)	(11300)		(21000)
<sup>124</sup> Cd	-76710 60	1040000 60	4170 40	(12280)	(25900)	13810 60
<sup>124</sup> In	-80880 50	1043380 50	7360 50	13440 70	(24030)	6490 50
<sup>124</sup> Sn	-88236.1 14	1049962.5 14	-617.5 21	14434 3	(22240)	-578.6 23
<sup>124</sup> Sb	-87618.6 20	1048562.6 20	2904.5 15	15432.7 22	18620 50	-5876 12
<sup>124</sup> Te	-90523.1 15	1050684.8 15	-3159.6 19	16354.7 12	15156 3	-11428 14
<sup>124</sup> I	-87363.5 24	1046742.8 24	294 3	17429 5	13613 3	(-17100)
<sup>124</sup> Xe	-87657.5 20	1046254.4 20	-5915 12	18610 90	11924.4 25	(-22900)

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>124</sup> Cs	-81743 12	1039557 12	-2648 18	19753 20	10243 13	(-28600)
<sup>124</sup> Ba	-79095 14	1036127 14	(-8800)	(21000)	8490 90	
<sup>124</sup> La	(-70300)	(1026600)	(-5600)	(21900)	(6700)	
<sup>124</sup> Ce	(-64700)	(1020200)	(-11600)	(23100)	(5000)	
<sup>124</sup> Pr	(-53100)	(1007800)		(24200)	(3200)	
<sup>125</sup> Ag	(-64700)	(1036800)	(8700)	(10900)		(23600)
<sup>125</sup> Cd	-73360 70	1044720 70	7120 60	12190 80	(26700)	15670 70
<sup>125</sup> In	-80480 30	1051060 30	5420 30	13200 40	(25100)	8360 30
<sup>125</sup> Sn	-85897.8 15	1055695.5 15	2363 3	14221 3	23170 40	1291.7 24
<sup>125</sup> Sb	-88261 3	1057276 3	766.7 21	15181 3	19413 24	-4170 8
<sup>125</sup> Te	-89027.8 19	1057260.8 19	-185.77 6	16001.3 18	15786 3	-9500 250
<sup>125</sup> I	-88842.0 19	1056292.6 19	-1653 3	17050 4	14197.5 20	(-14900)
<sup>125</sup> Xe	-87189.5 20	1053857.8 20	-3099 8	18073 16	12598.3 25	(-20600)
<sup>125</sup> Cs	-84091 8	1049977 8	-4560 250	19184 14	10734 9	(-26200)
<sup>125</sup> Ba	-79530 250	1044630 250	(-5600)	(20100)	8850 250	
<sup>125</sup> La	(-73900)	(1038200)	(-7300)	(21300)	(7400)	
<sup>125</sup> Ce	(-66600)	(1030100)	(-8700)	(22600)	(5600)	
<sup>125</sup> Pr	(-57900)	(1020700)		(23700)	(3800)	
<sup>126</sup> Ag	(-61000)	(1041200)	(11300)	(10600)		(25400)
<sup>126</sup> Cd	-72330 50	1051760 50	5490 40	11760 80		17740 50
<sup>126</sup> In	-77810 40	1056460 40	8210 40	13080 60	(25800)	10100 40
<sup>126</sup> Sn	-86020 11	1063889 11	380 30	13926 11	23890 60	3153 12
<sup>126</sup> Sb	-86400 30	1063480 30	3670 30	14920 30	20100 60	-2050 30
<sup>126</sup> Te	-90070.3 19	1066374.6 19	-2155 4	15689.9 14	16412.1 20	-7395 14
<sup>126</sup> I	-87915 4	1063437 4	1258 5	16694 4	14874 4	(-12800)
<sup>126</sup> Xe	-89173 6	1063913 6	-4824 14	17658 7	13228 6	(-18500)
<sup>126</sup> Cs	-84349 12	1058306 12	-1673 18	18749 16	11563 13	(-24100)
<sup>126</sup> Ba	-82676 14	1055850 14	(-7600)	19724 20	9596 14	(-29600)
<sup>126</sup> La	(-75100)	(1047500)	(-4400)	(20900)	(7900)	
<sup>126</sup> Ce	(-70700)	(1042300)	(-10400)	(22100)	(6200)	
<sup>126</sup> Pr	(-60300)	(1031100)	(-7200)	(23300)	(4500)	
<sup>126</sup> Nd	(-53000)	(1023100)			(2900)	
<sup>127</sup> Ag	(-58800)	(1047100)	(9700)	(10200)		(27900)
<sup>127</sup> Cd	-68530 70	1056030 70	8470 60	11310 100		19760 70
<sup>127</sup> In	-76990 40	1063720 40	6510 30	12660 50	(26900)	11990 40
<sup>127</sup> Sn	-83508 25	1069448 25	3201 24	13752 25	24730 70	4817 25
<sup>127</sup> Sb	-86709 6	1071867 6	1581 5	14590 6	20810 30	-469 10
<sup>127</sup> Te	-88290 3	1072665 3	698 4	15404 3	16970 3	-5500 100
<sup>127</sup> I	-88987 4	1072580 4	-662.4 21	16288 4	15304 4	(-10890)
<sup>127</sup> Xe	-88325 4	1071136 4	-2085 9	17278 5	13875 4	(-16400)
<sup>127</sup> Cs	-86240 9	1068269 9	-3450 100	18292 11	11976 9	(-21800)
<sup>127</sup> Ba	-82790 100	1064040 100	(-4690)	19400 300	10180 100	(-27400)
<sup>127</sup> La	(-78100)	(1058560)	(-6100)	(20300)	(8580)	
<sup>127</sup> Ce	(-72000)	(1051600)	(-7500)	(21500)	(7000)	
<sup>127</sup> Pr	(-64400)	(1043300)	(-9000)	(22700)	(5100)	
<sup>127</sup> Nd	(-55400)	(1033500)			(3400)	
<sup>128</sup> Cd	-67300 300	1062900 300	7100 300	11100 300		21700 300
<sup>128</sup> In	-74360 50	1069150 50	8980 40	12690 60	(27900)	13380 50
<sup>128</sup> Sn	-83340 30	1077350 30	1274 15	13460 30	25590 60	6520 30
<sup>128</sup> Sb	-84610 25	1077839 25	4384 25	14350 40	21380 50	1320 30
<sup>128</sup> Te	-88993.6 18	1081440.6 18	-1252 4	15066.0 22	17552 11	-3584 11
<sup>128</sup> I	-87742 4	1079406 4	2119 4	15970 3	15920 30	-9000 400
<sup>128</sup> Xe	-89860.8 14	1080743.0 14	-3929 5	16830 6	14368.5 22	(-14300)
<sup>128</sup> Cs	-85932 6	1076032 6	-523 12	17726 13	12595 7	(-19600)
<sup>128</sup> Ba	-85410 11	1074727 11	-6700 400	18877 18	10815 13	(-25200)
<sup>128</sup> La	-78800 400	1067300 400	(-3200)	(19800)	9000 400	(-30600)
<sup>128</sup> Ce	(-75600)	(1063300)	(-9300)	(21000)	(7500)	
<sup>128</sup> Pr	(-66300)	(1053300)	(-6100)	(22200)	(5800)	
<sup>128</sup> Nd	(-60200)	(1046400)	(-12000)	(23300)	(4100)	
<sup>128</sup> Pm	(-48200)	(1033600)			(2500)	
<sup>129</sup> Cd	(-63100)	(1066700)	(9900)	(10700)		(23900)
<sup>129</sup> In	-72980 130	1075840 130	7660 30	12120 130	(28800)	15530 130
<sup>129</sup> Sn	-80630 120	1082710 120	4000 120	13270 120	26680 140	8070 120
<sup>129</sup> Sb	-84626 21	1085927 21	2380 21	14060 22	22210 50	2875 22
<sup>129</sup> Te	-87006 3	1087524 3	1498 3	14859 4	18076 25	-1936 12
<sup>129</sup> I	-88504 3	1088240 3	194 3	15659 5	16373 7	-7150 50
<sup>129</sup> Xe	-88697.4 8	1087650.9 8	-1196 5	16515 4	14986 3	(-12400)
<sup>129</sup> Cs	-87501 5	1085673 5	-2432 11	17404 10	13092 6	(-17500)
<sup>129</sup> Ba	-85070 11	1082459 11	-3720 50	18420 100	11323 12	(-22900)
<sup>129</sup> La	-81350 50	1077960 50	(-5050)	(19400)	9690 50	(-28400)

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>129</sup> Ce	(-76300)	(1072120)	(-6300)	(20500)	(8090)	
<sup>129</sup> Pr	(-70000)	(1065000)	(-7800)	(21700)	(6500)	
<sup>129</sup> Nd	(-62200)	(1056400)	(-9200)	(22900)	(4800)	
<sup>129</sup> Pm	(-52900)	(1046400)			(3100)	
<sup>130</sup> Cd	(-61500)	(1073200)	(8500)	(10300)		(25900)
<sup>130</sup> In	-70000 <i>50</i>	1080930 <i>50</i>	10250 <i>40</i>	11780 <i>70</i>		16940 <i>50</i>
<sup>130</sup> Sn	-80250 <i>30</i>	1090400 <i>30</i>	2148 <i>15</i>	13050 <i>40</i>	27500 <i>300</i>	9640 <i>30</i>
<sup>130</sup> Sb	-82394 <i>25</i>	1091766 <i>25</i>	4959 <i>25</i>	13930 <i>40</i>	22610 <i>50</i>	4510 <i>30</i>
<sup>130</sup> Te	-87352.9 <i>19</i>	1095942.5 <i>20</i>	-420 <i>4</i>	14501.9 <i>10</i>	18590 <i>30</i>	-82 <i>7</i>
<sup>130</sup> I	-86933 <i>3</i>	1094740 <i>3</i>	2949 <i>3</i>	15333 <i>5</i>	16900 <i>25</i>	(-5260)
<sup>130</sup> Xe	-89881.8 <i>9</i>	1096906.6 <i>9</i>	-2979 <i>8</i>	16163.6 <i>16</i>	15466.1 <i>19</i>	(-10400)
<sup>130</sup> Cs	-86903 <i>8</i>	1093145 <i>8</i>	369 <i>11</i>	17113 <i>10</i>	13739 <i>9</i>	(-15500)
<sup>130</sup> Ba	-87271 <i>7</i>	1092731 <i>7</i>	(-5600)	18004 <i>12</i>	11988 <i>7</i>	(-20900)
<sup>130</sup> La	(-81670)	(1086350)	(-2200)	(19100)	(10320)	(-26200)
<sup>130</sup> Ce	(-79500)	(1083400)	(-8100)	(20000)	(8600)	(-31600)
<sup>130</sup> Pr	(-71400)	(1074500)	(-5000)	(21200)	(7200)	
<sup>130</sup> Nd	(-66300)	(1068700)	(-10900)	(22300)	(5300)	
<sup>130</sup> Pm	(-55500)	(1057000)	(-7600)	(23400)	(3700)	
<sup>130</sup> Sm	(-47900)	(1048600)			(2200)	
<sup>131</sup> In	-68220 <i>80</i>	1087220 <i>80</i>	9174 <i>22</i>	11380 <i>150</i>		19230 <i>80</i>
<sup>131</sup> Sn	-77390 <i>70</i>	1095610 <i>70</i>	4632 <i>20</i>	12900 <i>140</i>	(28900)	11030 <i>70</i>
<sup>131</sup> Sb	-82020 <i>70</i>	1099460 <i>70</i>	3190 <i>70</i>	13540 <i>70</i>	23620 <i>140</i>	6040 <i>70</i>
<sup>131</sup> Te	-85211.3 <i>20</i>	1101872.3 <i>20</i>	2233.5 <i>23</i>	14348 <i>3</i>	19160 <i>120</i>	1482 <i>7</i>
<sup>131</sup> I	-87444.8 <i>11</i>	1103323.4 <i>12</i>	970.8 <i>6</i>	15084 <i>4</i>	17397 <i>21</i>	-3710 <i>100</i>
<sup>131</sup> Xe	-88415.6 <i>10</i>	1103511.8 <i>10</i>	-352 <i>5</i>	15860.9 <i>13</i>	15988 <i>3</i>	-8700 <i>400</i>
<sup>131</sup> Cs	-88063 <i>5</i>	1102377 <i>5</i>	-1370 <i>7</i>	16704 <i>7</i>	14138 <i>6</i>	-13600 <i>400</i>
<sup>131</sup> Ba	-86693 <i>7</i>	1100225 <i>7</i>	-2960 <i>100</i>	17766 <i>11</i>	12574 <i>7</i>	-18800 <i>500</i>
<sup>131</sup> La	-83730 <i>100</i>	1096480 <i>100</i>	-4000 <i>400</i>	18530 <i>110</i>	10810 <i>100</i>	(-23900)
<sup>131</sup> Ce	-79700 <i>400</i>	1091700 <i>400</i>	-5250 <i>150</i>	(19600)	9200 <i>400</i>	(-29300)
<sup>131</sup> Pr	-74500 <i>400</i>	1085600 <i>400</i>	-6560 <i>150</i>	(20600)	7700 <i>400</i>	
<sup>131</sup> Nd	-67900 <i>500</i>	1078300 <i>500</i>	(-8100)	(21900)	(6200)	
<sup>131</sup> Pm	(-59800)	(1069400)	(-9400)	(23000)	(4400)	
<sup>131</sup> Sm	(-50400)	(1059200)			(2800)	
<sup>132</sup> In	-62490 <i>70</i>	1089560 <i>70</i>	14140 <i>60</i>	8630 <i>80</i>		23220 <i>60</i>
<sup>132</sup> Sn	-76620 <i>30</i>	1102920 <i>30</i>	3103 <i>12</i>	12520 <i>40</i>	(29700)	12660 <i>30</i>
<sup>132</sup> Sb	-79724 <i>23</i>	1105238 <i>23</i>	5486 <i>20</i>	13470 <i>30</i>	24300 <i>50</i>	7437 <i>23</i>
<sup>132</sup> Te	-85210 <i>11</i>	1109942 <i>11</i>	493 <i>4</i>	13999 <i>12</i>	19540 <i>30</i>	3230 <i>12</i>
<sup>132</sup> I	-85703 <i>11</i>	1109652 <i>11</i>	3577 <i>11</i>	14913 <i>11</i>	17890 <i>30</i>	-1970 <i>50</i>
<sup>132</sup> Xe	-89279.5 <i>11</i>	1112447.0 <i>11</i>	-2119 <i>3</i>	15540.4 <i>14</i>	16504.5 <i>22</i>	(-6830)
<sup>132</sup> Cs	-87160 <i>3</i>	1109545 <i>3</i>	1279.5 <i>22</i>	16400 <i>9</i>	14805 <i>5</i>	(-11820)
<sup>132</sup> Ba	-88440 <i>3</i>	1110042 <i>3</i>	-4710 <i>40</i>	17311 <i>7</i>	13136 <i>3</i>	(-16800)
<sup>132</sup> La	-83730 <i>40</i>	1104550 <i>40</i>	(-1290)	(18200)	11410 <i>50</i>	(-22000)
<sup>132</sup> Ce	(-82450)	(1102490)	(-7100)	(19100)	(9750)	(-27300)
<sup>132</sup> Pr	(-75340)	(1094600)	(-3700)	(20100)	(8200)	(-32600)
<sup>132</sup> Nd	(-71600)	(1090100)	(-9900)	(21400)	(6700)	
<sup>132</sup> Pm	(-61700)	(1079400)	(-6600)	(22400)	(4900)	
<sup>132</sup> Sm	(-55100)	(1072000)	(-12400)	(23400)	(3400)	
<sup>132</sup> Eu	(-42700)	(1058800)			(1800)	
<sup>133</sup> In	(-57400)	(1092600)	(13500)	(5400)		(28400)
<sup>133</sup> Sn	-70970 <i>80</i>	1105340 <i>80</i>	7990 <i>25</i>	9720 <i>110</i>		16680 <i>80</i>
<sup>133</sup> Sb	-78960 <i>80</i>	1112540 <i>80</i>	4003 <i>13</i>	13080 <i>100</i>	25320 <i>110</i>	9120 <i>80</i>
<sup>133</sup> Te	-82960 <i>80</i>	1115760 <i>80</i>	2920 <i>70</i>	13890 <i>80</i>	20150 <i>100</i>	4600 <i>80</i>
<sup>133</sup> I	-85880 <i>30</i>	1117900 <i>30</i>	1770 <i>30</i>	14580 <i>30</i>	18430 <i>70</i>	-550 <i>200</i>
<sup>133</sup> Xe	-87648 <i>4</i>	1118887 <i>4</i>	427.4 <i>24</i>	15375 <i>4</i>	17015 <i>4</i>	(-5260)
<sup>133</sup> Cs	-88076 <i>3</i>	1118532 <i>3</i>	-517.4 <i>10</i>	16155 <i>6</i>	15209 <i>3</i>	(-10020)
<sup>133</sup> Ba	-87558 <i>3</i>	1117232 <i>3</i>	-2230 <i>200</i>	17007 <i>7</i>	13721 <i>3</i>	(-15100)
<sup>133</sup> La	-85330 <i>200</i>	1114220 <i>200</i>	(-2900)	17740 <i>220</i>	11840 <i>200</i>	(-19900)
<sup>133</sup> Ce	(-82390)	(1110500)	(-4300)	(18800)	(10280)	(-25300)
<sup>133</sup> Pr	(-78060)	(1105390)	(-5600)	(19700)	(8900)	(-30500)
<sup>133</sup> Nd	(-72500)	(1099000)	(-7000)	(20700)	(7300)	
<sup>133</sup> Pm	(-65500)	(1091200)	(-8400)	(21800)	(5600)	
<sup>133</sup> Sm	(-57100)	(1082100)	(-9500)	(22800)	(3700)	
<sup>133</sup> Eu	(-47600)	(1071800)			(2400)	
<sup>134</sup> In	(-51500)	(1094800)	(15100)	(5200)		(32400)
<sup>134</sup> Sn	-66640 <i>100</i>	1109080 <i>100</i>	7370 <i>90</i>	6160 <i>110</i>		21490 <i>100</i>
<sup>134</sup> Sb	-74010 <i>50</i>	1115660 <i>50</i>	8390 <i>40</i>	10420 <i>60</i>	26100 <i>80</i>	12890 <i>50</i>
<sup>134</sup> Te	-82400 <i>30</i>	1123270 <i>30</i>	1550 <i>30</i>	13330 <i>40</i>	20360 <i>40</i>	6560 <i>30</i>
<sup>134</sup> I	-83949 <i>15</i>	1124042 <i>15</i>	4175 <i>15</i>	14390 <i>18</i>	18800 <i>30</i>	1290 <i>30</i>
<sup>134</sup> Xe	-88124.4 <i>8</i>	1127434.6 <i>9</i>	-1229 <i>3</i>	14987.5 <i>14</i>	17493 <i>11</i>	-3380 <i>200</i>
<sup>134</sup> Cs	-86896 <i>3</i>	1125424 <i>3</i>	2058.7 <i>4</i>	15878.5 <i>19</i>	15771 <i>11</i>	(-8300)

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>134</sup> Ba	-88955.3	1126700.3	-3710.30	16657.6 11	14253.3	(-13200)
<sup>134</sup> La	-85240.30	1122200.30	-500.200	17650.50	12660.30	(-18600)
<sup>134</sup> Ce	-84740.200	1120920.200	(-6190)	(18400)	10880.200	(-23300)
<sup>134</sup> Pr	(-78600)	(1114000)	-2770.150	(19400)	(9400)	(-28500)
<sup>134</sup> Nd	(-75800)	(1110400)	-9170.200	(20300)	(7900)	
<sup>134</sup> Pm	(-66600)	(1100400)	(-5200)	(21000)	(5900)	
<sup>134</sup> Sm	(-61500)	(1094500)	(-11500)	(22500)	(4400)	
<sup>134</sup> Eu	(-50000)	(1082300)		(23400)	(2900)	
<sup>135</sup> Sn	(-60800)	(1111300)	(8900)	(6000)		(25600)
<sup>135</sup> Sb	-69710.110	1119430.110	8120.50	6890.130	(26800)	17880.110
<sup>135</sup> Te	-77830.90	1126770.90	5960.90	11010.120	21440.120	10030.90
<sup>135</sup> I	-83788.23	1131951.23	2648.24	14050.30	19410.80	2868.25
<sup>135</sup> Xe	-86436.10	1133817.10	1151.10	14930.10	18050.80	-1805.15
<sup>135</sup> Cs	-87587.3	1134186.3	269.3 12	15653.6 10	16290.30	-6680.150
<sup>135</sup> Ba	-87856.3	1133673.3	-1200.10	16440.4 12	14785.6 25	(-11700)
<sup>135</sup> La	-86656.10	1131690.10	-2026.5	17470.200	13158.10	(-16400)
<sup>135</sup> Ce	-84630.11	1128883.11	-3720.150	(18380)	11650.11	(-21600)
<sup>135</sup> Pr	-80910.150	1124380.150	(-4750)	(18990)	10160.250	(-26600)
<sup>135</sup> Nd	(-76160)	(1118850)	(-5940)	(19800)	(8300)	
<sup>135</sup> Pm	(-70200)	(1112100)	(-7200)	(20900)	(6700)	
<sup>135</sup> Sm	(-63000)	(1104100)	(-8700)	(22100)	(5100)	
<sup>135</sup> Eu	(-54300)	(1094600)		(22800)	(3400)	
<sup>136</sup> Sn	(-56500)	(1115100)	(8100)	(6000)		(29900)
<sup>136</sup> Sb	(-64600)	(1122400)	(9800)	(6700)	(27600)	(21800)
<sup>136</sup> Te	-74420.50	1131440.50	5070.60	8170.60	22370.120	14470.50
<sup>136</sup> I	-79500.50	1135730.50	6930.50	11690.50	20070.70	6520.90
<sup>136</sup> Xe	-86424.7	1141877.7	-80.8	14443.7	18600.30	70.50
<sup>136</sup> Cs	-86344.4	1141015.4	2548.2 19	15590.9 20	16973.15	-4980.50
<sup>136</sup> Ba	-88892.3	1142781.3	-2870.70	16080.5 5	15346.3	-9730.60
<sup>136</sup> La	-86020.70	1139130.70	470.80	16920.70	13700.70	-14710.220
<sup>136</sup> Ce	-86500.50	1138820.50	-5126.18	17900.210	12120.50	(-19700)
<sup>136</sup> Pr	-81370.50	1132910.50	-2211.25	(19000)	10710.60	(-25000)
<sup>136</sup> Nd	-79160.60	1129920.60	-7850.200	(19500)	8990.210	(-29900)
<sup>136</sup> Pm	-71310.210	1121280.210	(-4500)	(20800)	(7300)	
<sup>136</sup> Sm	(-66800)	(1116000)	(-10400)	(21500)	(5600)	
<sup>136</sup> Eu	(-56400)	(1104800)	(-7100)	(22500)	(4300)	
<sup>136</sup> Gd	(-49300)	(1096900)			(2400)	
<sup>137</sup> Sn	(-50500)	(1117200)	(9800)	(5800)		(31900)
<sup>137</sup> Sb	(-60300)	(1126100)	(9300)	(6700)		(26300)
<sup>137</sup> Te	-69560.120	1134650.120	6940.120	7880.150	(23300)	18170.120
<sup>137</sup> I	-76500.30	1140810.30	5880.30	8860.40	21370.110	10630.60
<sup>137</sup> Xe	-82379.7	1145903.7	4173.7	12086.12	19130.90	3530.50
<sup>137</sup> Cs	-86551.3	1149293.3	1175.63 17	15107.2 12	17342.23	-3350.50
<sup>137</sup> Ba	-87727.3	1149686.3	-600.50	16013.48 5	15869.10	-8210.70
<sup>137</sup> La	-87130.50	1148300.50	-1222.1 16	16610.50	14120.50	(-13270)
<sup>137</sup> Ce	-85900.50	1146300.50	-2702.10	17420.50	12630.50	-17950.100
<sup>137</sup> Pr	-83200.50	1142820.50	-3690.50	18430.160	11120.50	(-22900)
<sup>137</sup> Nd	-79510.70	1138340.70	(-5660)	(19500)	9460.70	(-28000)
<sup>137</sup> Pm	(-73860)	(1131900)	(-5900)	(19800)	(7520)	
<sup>137</sup> Sm	-67960.110	1125220.110	(-7600)	(21100)	(6380)	
<sup>137</sup> Eu	(-60400)	(1116800)	(-8800)	(22200)	(4700)	
<sup>137</sup> Gd	(-51600)	(1107300)			(3100)	
<sup>138</sup> Sb	(-55000)	(1128900)	(10900)	(6500)		(27900)
<sup>138</sup> Te	(-65930)	(1139090)	(6370)	(7650)	(24000)	(22340)
<sup>138</sup> I	-72300.80	1144680.80	7820.70	8940.90	(22300)	14230.80
<sup>138</sup> Xe	-80120.40	1151710.40	2770.40	9840.40	20270.60	7450.40
<sup>138</sup> Cs	-82893.10	1153706.10	5374.9	12692.9	17970.50	244.17
<sup>138</sup> Ba	-88267.3	1158298.3	-1738.4	15517.46 5	16421.7	(-6230)
<sup>138</sup> La	-86529.4	1155778.4	1044.11	16650.70	14763.4	(-11500)
<sup>138</sup> Ce	-87574.11	1156040.11	-4437.10	17220.50	13259.10	(-16400)
<sup>138</sup> Pr	-83137.15	1150821.15	(-1100)	17910.50	11690.70	(-21100)
<sup>138</sup> Nd	(-82040)	(1148940)	-7000.250	(19020)	(10120)	(-26100)
<sup>138</sup> Pm	(-75000)	(1141200)	(-3800)	(19900)	(8200)	(-31100)
<sup>138</sup> Sm	(-71200)	(1136600)	(-9200)	(20600)	(6600)	
<sup>138</sup> Eu	(-62000)	(1126500)	(-6100)	(21800)	(5300)	
<sup>138</sup> Gd	(-55900)	(1119700)	(-12000)	(22800)	(3700)	
<sup>138</sup> Tb	(-43900)	(1106900)			(2100)	
<sup>139</sup> Sb	(-50600)	(1132600)	(10200)	(6500)		(30100)
<sup>139</sup> Te	(-60800)	(1142000)	(8000)	(7400)	(24900)	(24100)
<sup>139</sup> I	-68840.30	1149290.30	6806.23	8490.40	(23200)	18390.30

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>139</sup> Xe	-75650 21	1155316 21	5057 21	9414 22	20670 120	11309 22
<sup>139</sup> Cs	-80707 4	1159591 4	4213 3	10298 3	18780 30	4123 9
<sup>139</sup> Ba	-84919 3	1163021 3	2317 3	13335.15 6	17119 7	-2880 50
<sup>139</sup> La	-87236 3	1164556 3	-278 7	16250 50	15263 3	-9700 60
<sup>139</sup> Ce	-86958 8	1163496 8	-2129 3	17200 50	13809 7	-14583 17
<sup>139</sup> Pr	-84829 8	1160584 8	-2790 50	17770 50	12280 50	(-19470)
<sup>139</sup> Nd	-82040 50	1157010 50	-4500 30	18670 90	10720 70	(-24400)
<sup>139</sup> Pm	-77540 60	1151730 60	-5160 60	(19830)	8910 80	(-29100)
<sup>139</sup> Sm	-72375 15	1145783 15	(-7020)	20560 120	7440 70	
<sup>139</sup> Eu	(-65360)	(1137980)	(-7700)	(21100)	(6080)	
<sup>139</sup> Gd	(-57700)	(1129500)	(-9300)	(22300)	(4300)	
<sup>139</sup> Tb	(-48400)	(1119500)			(2600)	
<sup>140</sup> Te	(-57100)	(1146400)	(7000)	(7300)		(26200)
<sup>140</sup> I	(-64080)	(1152600)	(8920)	(7920)	(23700)	(20250)
<sup>140</sup> Xe	-73000 60	1160730 60	4060 60	9020 70	(21640)	15090 60
<sup>140</sup> Cs	-77056 9	1164012 9	6220 10	10305 12	19330 80	7644 11
<sup>140</sup> Ba	-83276 8	1169449 8	1050 8	11152 8	17730 40	1201 21
<sup>140</sup> La	-84326 3	1169717 3	3761.9 19	13939 3	16011 9	-5900 30
<sup>140</sup> Ce	-88088 3	1172696 3	-3388 6	16656 10	14398 3	-12628 15
<sup>140</sup> Pr	-84700 7	1168526 7	-222 20	17705 15	12748 7	-17710 50
<sup>140</sup> Nd	-84477 19	1167521 19	-6047 23	(18580)	11481 22	(-22900)
<sup>140</sup> Pm	-78430 30	1160690 30	-2970 30	(19500)	9870 30	(-27700)
<sup>140</sup> Sm	-75459 15	1156939 15	-8470 50	(20400)	(8000)	(-32400)
<sup>140</sup> Eu	-66990 50	1147690 50	(-5500)	(21100)	(6500)	
<sup>140</sup> Gd	(-61500)	(1141400)	(-10800)	(21800)	(4900)	
<sup>140</sup> Tb	(-50700)	(1129900)	(-7700)	(23000)	(3300)	
<sup>140</sup> Dy	(-43000)	(1121400)			(1700)	
<sup>141</sup> Te	(-51800)	(1149200)	(8900)	(7100)		(27900)
<sup>141</sup> I	(-60700)	(1157300)	(7600)	(8000)	(24700)	(22200)
<sup>141</sup> Xe	-68330 90	1164140 90	6150 90	8820 90	(22100)	17120 90
<sup>141</sup> Cs	-74479 10	1169506 10	5251 11	9915 11	20210 30	11547 10
<sup>141</sup> Ba	-79730 8	1173975 8	3213 9	10953 8	18658 22	4473 9
<sup>141</sup> La	-82943 5	1176405 5	2502 4	11850 4	16814 6	-2470 30
<sup>141</sup> Ce	-85445 3	1178125 3	580.7 11	14629 7	15104 3	-9499 12
<sup>141</sup> Pr	-86026 3	1177923 3	-1823 3	17339 8	13367.4 22	-16060 30
<sup>141</sup> Nd	-84203 4	1175318 4	-3730 30	18300 50	11822 8	(-21100)
<sup>141</sup> Pm	-80470 30	1170810 30	-4530 30	19080 60	10220 30	(-25700)
<sup>141</sup> Sm	-75946 12	1165497 12	-5980 30	19714 19	8480 50	(-30500)
<sup>141</sup> Eu	-69970 30	1158740 30	(-6800)	(20760)	7010 60	
<sup>141</sup> Gd	(-63100)	(1151100)	(-8300)	(21600)	(5300)	
<sup>141</sup> Tb	(-54800)	(1142000)	(-9300)	(22500)	(4000)	
<sup>141</sup> Dy	(-45500)	(1131900)			(2400)	
<sup>142</sup> Te	(-48000)	(1153400)	(7800)	(7000)		(29900)
<sup>142</sup> I	(-55700)	(1160400)	(9800)	(7800)		(24300)
<sup>142</sup> Xe	-65480 100	1169360 100	5040 100	8630 120	(23000)	19060 100
<sup>142</sup> Cs	-70521 11	1173620 11	7307 10	9608 13	(21020)	13276 10
<sup>142</sup> Ba	-77828 6	1180144 6	2211 4	10695 10	19410 60	8132 6
<sup>142</sup> La	-80039 6	1181573 6	4504 5	11856 6	17561 10	1050 40
<sup>142</sup> Ce	-84543 3	1185294 3	-745.3 24	12597.7 25	15845 8	-5546 11
<sup>142</sup> Pr	-83797 3	1183766 3	2162.2 15	15240 6	14049.5 22	-12440 30
<sup>142</sup> Nd	-85960 3	1185146 3	-4870 40	17625 19	12449.8 18	(-19100)
<sup>142</sup> Pm	-81090 40	1179490 40	-2090 40	18800 50	10960 40	(-24100)
<sup>142</sup> Sm	-78997 11	1176619 11	-7640 30	19680 18	9098 22	(-28900)
<sup>142</sup> Eu	-71350 30	1168190 30	(-4500)	20510 60	7500 40	(-34000)
<sup>142</sup> Gd	(-66900)	(1162900)	(-9900)	(21500)	(6000)	
<sup>142</sup> Tb	(-57000)	(1152200)	(-6900)	(22400)	(4500)	
<sup>142</sup> Dy	(-50100)	(1144500)	(-12700)	(23200)	(3100)	
<sup>142</sup> Ho	(-37400)	(1131100)			(1200)	
<sup>143</sup> I	(-52100)	(1164800)	(8600)	(7500)		(26100)
<sup>143</sup> Xe	(-60650)	(1172600)	(7040)	(8460)	(23400)	(20970)
<sup>143</sup> Cs	-67691 22	1178861 22	6253 20	9355 24	(21600)	15386 22
<sup>143</sup> Ba	-73945 13	1184332 13	4246 18	10357 15	20190 90	10067 13
<sup>143</sup> La	-78191 15	1187796 15	3426 15	11391 16	18290 18	4780 15
<sup>143</sup> Ce	-81616 3	1190439 3	1461.4 18	12314.2 24	16464 8	-2089 4
<sup>143</sup> Pr	-83078 3	1191118 3	933.9 14	13194.9 19	14713 4	-8825 14
<sup>143</sup> Nd	-84012 3	1191270 3	-1041.4 24	15952 3	13144.8 18	-15770 200
<sup>143</sup> Pm	-82970 4	1189446 4	-3443 4	18640 30	11523 3	(-22200)
<sup>143</sup> Sm	-79528 4	1185221 4	-5275 14	19724 12	9903 4	(-27200)
<sup>143</sup> Eu	-74253 13	1179163 13	-6010 200	20430 30	8360 30	(-32000)
<sup>143</sup> Gd	-68240 200	1172370 200	(-7500)	(21200)	6870 200	

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>143</sup> Tb	(-60800)	(1164100)	(-8500)	(22100)	(5400)	
<sup>143</sup> Dy	(-52300)	(1154900)	(-10100)	(23000)	(3800)	
<sup>143</sup> Ho	(-42200)	(1144000)			(2000)	
<sup>144</sup> I	(-46900)	(1167700)	(10600)	(7400)		(28000)
<sup>144</sup> Xe	(-57500)	(1177600)	(5800)	(8200)	(24100)	(22900)
<sup>144</sup> Cs	-63320 30	1182560 30	8460 30	8940 30	(22200)	17440 30
<sup>144</sup> Ba	-71780 14	1190239 14	3120 60	10095 15	20880 100	11977 14
<sup>144</sup> La	-74900 60	1192580 60	5540 60	11000 60	18960 60	6530 60
<sup>144</sup> Ce	-80441 4	1197335 4	318.7 8	12041 3	17191 7	1535 3
<sup>144</sup> Pr	-80760 4	1196872 4	2997.5 24	13105 3	15299 6	-5099 18
<sup>144</sup> Nd	-83757 3	1199087 3	-2331.7 22	13940.61 15	13792.8 21	(-11840)
<sup>144</sup> Pm	-81426 4	1195973 4	551 3	16480 40	12206 3	(-18600)
<sup>144</sup> Sm	-81976 3	1195741 3	-6315 17	19122 11	10594.8 18	(-25200)
<sup>144</sup> Eu	-75661 18	1188644 18	(-3740)	20450 40	9150 50	(-30600)
<sup>144</sup> Gd	(-71920)	(1184120)	(-9100)	(21200)	(7500)	(-35200)
<sup>144</sup> Tb	(-62800)	(1174300)	(-6100)	(22000)	(6100)	
<sup>144</sup> Dy	(-56800)	(1167400)	(-11700)	(22800)	(4500)	
<sup>144</sup> Ho	(-45000)	(1154900)	(-8300)	(23800)	(2700)	
<sup>144</sup> Er	(-36700)	(1145800)			(1200)	
<sup>145</sup> Xe	(-52500)	(1180600)	(7700)	(8000)		(24600)
<sup>145</sup> Cs	-60190 50	1187500 50	7880 40	8640 50	(22700)	19450 50
<sup>145</sup> Ba	-68070 60	1194600 60	4920 70	10270 60	(22000)	13370 60
<sup>145</sup> La	-72990 70	1198740 70	4110 70	10950 70	19880 70	8290 70
<sup>145</sup> Ce	-77100 40	1202070 40	2530 40	11630 40	17740 40	3560 40
<sup>145</sup> Pr	-79636 8	1203819 8	1805 7	12701 7	16023 17	-1634 8
<sup>145</sup> Nd	-81442 3	1204842 3	-163.0 22	13572.5 6	14403.1 22	-8490 40
<sup>145</sup> Pm	-81279 4	1203897 4	-616.4 24	14450.8 20	12779 3	(-15030)
<sup>145</sup> Sm	-80662 3	1202498 3	-2660 3	17277.2 24	11228.3 18	(-21900)
<sup>145</sup> Eu	-78002 4	1199056 4	-5050 40	19892 14	9610 4	(-28500)
<sup>145</sup> Gd	-72950 40	1193220 40	(-6700)	20850 200	8000 40	(-33300)
<sup>145</sup> Tb	(-66250)	(1185740)	(-7520)	(21600)	(6570)	
<sup>145</sup> Dy	(-58700)	(1177400)	(-9200)	(22500)	(5100)	
<sup>145</sup> Ho	(-49500)	(1167400)	(-9900)	(23400)	(3300)	
<sup>145</sup> Er	(-39600)	(1156800)			(1900)	
<sup>146</sup> Xe	(-49100)	(1185300)	(6600)	(7700)		(26700)
<sup>146</sup> Cs	-55740 80	1191120 80	9370 40	8570 80	(23400)	21030 70
<sup>146</sup> Ba	-65110 80	1199710 80	4100 40	9470 80	(22100)	15830 80
<sup>146</sup> La	-69210 70	1203030 70	6530 50	10450 90	20470 70	10250 70
<sup>146</sup> Ce	-75740 70	1208780 70	1030 40	11440 70	18540 70	5270 70
<sup>146</sup> Pr	-76770 60	1209020 60	4170 60	12150 60	16440 80	360 60
<sup>146</sup> Nd	-80936 3	1212407 3	-1472 4	13320.7 6	15072 3	-4837 4
<sup>146</sup> Pm	-79464 5	1210153 5	1542 3	14181 5	13282 5	-11630 50
<sup>146</sup> Sm	-81006 4	1210913 4	-3878 6	15172 3	11826 3	-18330 110
<sup>146</sup> Eu	-77128 7	1206253 7	-1030 8	17609 18	10280 7	(-25100)
<sup>146</sup> Gd	-76098 5	1204441 5	-8270 50	(20320)	8700 4	(-31500)
<sup>146</sup> Tb	-67830 50	1195390 50	-5160 100	(21100)	6750 50	(-36600)
<sup>146</sup> Dy	-62670 110	1189450 110	(-10600)	(22100)	(5330)	
<sup>146</sup> Ho	(-52100)	(1178100)	(-7500)	(23200)	(3800)	
<sup>146</sup> Er	(-44600)	(1169800)	(-13400)	(24000)	(2400)	
<sup>146</sup> Tm	(-31200)	(1155600)			(700)	
<sup>147</sup> Xe	(-43800)	(1188000)	(8500)	(7400)		(28400)
<sup>147</sup> Cs	-52290 150	1195750 150	9200 180	8250 120		23180 150
<sup>147</sup> Ba	-61490 90	1204160 90	5750 50	9560 110	(23600)	16670 90
<sup>147</sup> La	-67240 80	1209130 80	4950 60	10380 100	21630 90	11820 80
<sup>147</sup> Ce	-72180 50	1213290 50	3290 40	11220 70	18690 80	7100 50
<sup>147</sup> Pr	-75470 40	1215800 40	2690 40	11980 40	17060 80	2080 40
<sup>147</sup> Nd	-78156 3	1217700 3	896.0 9	12857.32 20	15630 40	-2788.6 22
<sup>147</sup> Pm	-79052 3	1217813 3	224.1 3	13916.4 23	13994 7	-8293 12
<sup>147</sup> Sm	-79276 3	1217255 3	-1721.3 23	14756.9 20	12412.8 9	-14890 50
<sup>147</sup> Eu	-77555 4	1214751 4	-2187 3	15696 4	10854 3	(-21500)
<sup>147</sup> Gd	-75368 4	1211782 4	-4609 11	18560 40	9283.5 14	(-28200)
<sup>147</sup> Tb	-70759 12	1206390 12	-6370 50	(20650)	7335 12	(-34500)
<sup>147</sup> Dy	-64390 50	1199240 50	(-8300)	(21800)	6020 60	
<sup>147</sup> Ho	(-56000)	(1190100)	(-8800)	(22700)	(4400)	
<sup>147</sup> Er	(-47200)	(1180500)	(-11000)	(23700)	(3100)	
<sup>147</sup> Tm	(-36300)	(1168800)			(1400)	
<sup>148</sup> Cs	-47600 600	1199100 600	10400 600	8000 600		24900 600
<sup>148</sup> Ba	-58050 140	1208790 140	5120 60	9090 160	(23500)	19370 140
<sup>148</sup> La	-63160 130	1213130 130	7260 50	10100 150	22000 150	13710 130
<sup>148</sup> Ce	-70430 120	1219610 120	2060 80	10830 130	19900 140	8920 120



Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>148</sup> Pr	-72490 90	1220880 90	4930 90	11860 110	17850 120	3750 90
<sup>148</sup> Nd	-77418 3	1225032 3	-540 6	12625.0 16	16260 70	-1137.6 25
<sup>148</sup> Pm	-76878 7	1223711 7	2468 6	13557 7	14690 60	-6360 30
<sup>148</sup> Sm	-79347 3	1225397 3	-3107 17	14484 3	12989.0 11	-11510 30
<sup>148</sup> Eu	-76239 18	1221507 18	41 17	15254 19	11353 18	(-17800)
<sup>148</sup> Gd	-76280 3	1220765 3	-5760 30	16325 4	9852 3	(-24500)
<sup>148</sup> Tb	-70520 30	1214220 30	-2682 10	18830 50	7970 30	(-31000)
<sup>148</sup> Dy	-67830 30	1210750 30	(-9400)	21310 110	6310 30	(-36900)
<sup>148</sup> Ho	(-58400)	(1200600)	(-6700)	(22500)	(5200)	
<sup>148</sup> Er	(-51800)	(1193100)	(-12200)	(23300)	(3700)	
<sup>148</sup> Tm	(-39500)	(1180100)	(-8600)	(24500)	(2000)	
<sup>148</sup> Yb	(-31000)	(1170800)			(900)	
<sup>149</sup> Cs	(-44000)	(1203600)	(9600)	(7900)		(26900)
<sup>149</sup> Ba	(-53600)	(1212400)	(7500)	(8300)	(24400)	(20800)
<sup>149</sup> La	(-61100)	(1219200)	(5700)	(10000)	(23400)	(14900)
<sup>149</sup> Ce	-66800 80	1224050 80	4190 80	10760 90	19890 120	10350 80
<sup>149</sup> Pr	-70988 11	1227456 11	3397 10	11660 40	18330 80	5463 11
<sup>149</sup> Nd	-74385 3	1230071 3	1691 3	12371.6 16	16780 50	752 4
<sup>149</sup> Pm	-76076 4	1230979 4	1071 4	13166 4	15180 40	-4576 5
<sup>149</sup> Sm	-77147 3	1231268 3	-695 4	14013.0 10	13568.5 12	-9459 11
<sup>149</sup> Eu	-76452 5	1229790 5	-1314 4	15039 4	11977 4	-14777 22
<sup>149</sup> Gd	-75138 4	1227694 4	-3638 4	15913 3	10439 3	(-12300)
<sup>149</sup> Tb	-71500 5	1223274 5	-3812 10	16884 12	8523 4	(-27400)
<sup>149</sup> Dy	-67688 11	1218680 11	-6014 19	19440 50	6898 11	(-33700)
<sup>149</sup> Ho	-61674 22	1211884 22	(-7800)	(21800)	5493 24	
<sup>149</sup> Er	(-53900)	(1203300)	(-9800)	(22800)	(4100)	
<sup>149</sup> Tm	(-44100)	(1192800)	(-10100)	(24000)	(2600)	
<sup>149</sup> Yb	(-34000)	(1181900)			(1400)	
<sup>150</sup> Cs	(-39200)	(1206800)	(11500)	(7700)		(28900)
<sup>150</sup> Ba	(-50700)	(1217500)	(6600)	(8700)		(23000)
<sup>150</sup> La	(-57200)	(1223300)	(7800)	(10200)	(24200)	(16400)
<sup>150</sup> Ce	-64990 120	1230320 120	3010 90	10710 170	21520 190	12070 120
<sup>150</sup> Pr	-68000 80	1232540 80	5690 80	11660 120	19420 150	6800 80
<sup>150</sup> Nd	-73694 4	1237451 4	-87 20	12418 3	17850 120	2078 7
<sup>150</sup> Pm	-73607 20	1236582 20	3454 20	12872 21	15700 90	-2491 21
<sup>150</sup> Sm	-77061 3	1239254 3	-2261 6	13857.2 9	14221.2 20	-7739 5
<sup>150</sup> Eu	-74801 7	1236211 7	971 4	14704 18	12500 9	(-12720)
<sup>150</sup> Gd	-75772 7	1236400 7	-4656 9	15634 7	11003 6	(-17800)
<sup>150</sup> Tb	-71116 8	1230961 8	-1794 9	16740 30	9454 19	(-24200)
<sup>150</sup> Dy	-69322 5	1228385 5	(-7240)	17630 30	7620 4	(-30200)
<sup>150</sup> Ho	(-62080)	(1220360)	-4108 15	(19800)	(6150)	(-36600)
<sup>150</sup> Er	(-57970)	(1215470)	(-11100)	(22400)	(4720)	
<sup>150</sup> Tm	(-46900)	(1203600)	(-7800)	(23500)	(3000)	
<sup>150</sup> Yb	(-39100)	(1195100)	(-13700)	(24300)	(2000)	
<sup>150</sup> Lu	(-25500)	(1180600)			(500)	
<sup>151</sup> Cs	(-35400)	(1211100)	(10500)	(7500)		(31500)
<sup>151</sup> Ba	(-45900)	(1220900)	(8500)	(8500)		(25000)
<sup>151</sup> La	(-54400)	(1228600)	(7000)	(9400)	(25000)	(19000)
<sup>151</sup> Ce	(-61400)	(1234800)	(5400)	(10800)	(22400)	(13100)
<sup>151</sup> Pr	-66860 40	1239470 40	4100 40	12010 40	(20300)	7810 40
<sup>151</sup> Nd	-70957 4	1242785 4	2442 4	12714 3	18740 80	3242 4
<sup>151</sup> Pm	-73399 6	1244445 6	1187 5	13466 6	16989 11	-1766 6
<sup>151</sup> Sm	-74586 3	1244850 3	76.7 5	13582.1 7	14779.0 20	-5823 4
<sup>151</sup> Eu	-74663 3	1244144 3	-464 3	14354 4	13165 4	-11024 12
<sup>151</sup> Gd	-74199 4	1242898 4	-2565 4	15204 4	11630 3	(-15900)
<sup>151</sup> Tb	-71634 5	1239550 5	-2870 5	16276 6	9760 5	(-20810)
<sup>151</sup> Dy	-68763 4	1235898 4	-5124 12	17218 11	8204 4	(-27100)
<sup>151</sup> Ho	-63639 12	1229991 12	(-5400)	18107 24	6717 12	(-33000)
<sup>151</sup> Er	(-58300)	(1223800)	(-7400)	(20500)	(5100)	
<sup>151</sup> Tm	(-50830)	(1215620)	(-9100)	(22900)	(3730)	
<sup>151</sup> Yb	(-41700)	(1205700)	(-11100)	(23800)	(2400)	
<sup>151</sup> Lu	(-30600)	(1193800)			(1100)	
<sup>152</sup> Ba	(-42700)	(1225700)	(7500)	(8200)		(27500)
<sup>152</sup> La	(-50200)	(1232400)	(9100)	(9100)	(25600)	(21100)
<sup>152</sup> Ce	(-59300)	(1240700)	(4500)	(10400)	(23200)	(15500)
<sup>152</sup> Pr	(-63700)	(1244400)	(6400)	(11900)	(21100)	(9200)
<sup>152</sup> Nd	-70160 30	1250060 30	1110 80	12610 30	19740 120	4560 30
<sup>152</sup> Pm	-71270 70	1250390 70	3500 70	13800 70	17840 110	-540 80
<sup>152</sup> Sm	-74773 3	1253108 3	-1874.3 7	13854.2 7	15656.9 23	-4644 5
<sup>152</sup> Eu	-72898 3	1250451 3	1818.8 11	14240 6	13869 20	-9320 30

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>152</sup> Gd	-74717 3	1251488 3	-3990 40	15088 6	12233.9 12	-14240 30
<sup>152</sup> Tb	-70730 40	1246720 40	-600 40	15750 40	10500 40	(-18800)
<sup>152</sup> Dy	-70129 5	1245334 5	-6550 30	16949 6	8935 8	(-23700)
<sup>152</sup> Ho	-63580 30	1238010 30	-3109 10	(17640)	7050 30	(-29700)
<sup>152</sup> Er	-60470 30	1234120 30	(-8600)	(18640)	5730 30	
<sup>152</sup> Tm	(-51900)	(1224700)	-5470 200	(21100)	(4400)	
<sup>152</sup> Yb	(-46400)	(1218500)	(-12500)	(23400)	(3000)	
<sup>152</sup> Lu	(-33900)	(1205200)		(24600)	(1600)	
<sup>153</sup> Ba	(-37600)	(1228700)	(9500)	(7800)		(29700)
<sup>153</sup> La	(-47100)	(1237400)	(8300)	(8800)	(26300)	(23600)
<sup>153</sup> Ce	(-55300)	(1244900)	(6500)	(10100)	(24000)	(17200)
<sup>153</sup> Pr	(-61800)	(1250600)	(5500)	(11100)	(21900)	(11600)
<sup>153</sup> Nd	-67350 30	1255320 30	3336 25	12540 30	(20500)	5540 30
<sup>153</sup> Pm	-70688 11	1257877 11	1881 11	13432 12	18410 40	636 12
<sup>153</sup> Sm	-72569 3	1258976 3	808.2 8	14125.4 7	16190.2 23	-3416 4
<sup>153</sup> Eu	-73377 3	1259001 3	-484.4 11	14857.00 16	14556 5	-8354 5
<sup>153</sup> Gd	-72893 3	1257735 3	-1569 4	14837 3	12884.5 11	-12433 11
<sup>153</sup> Tb	-71324 5	1255383 5	-2170.4 19	15833 6	11239 4	-17323 22
<sup>153</sup> Dy	-69153 5	1252430 5	-4130 6	16533 5	9532 5	(-21800)
<sup>153</sup> Ho	-65023 6	1247518 6	-4563 11	17527 13	7968 7	(-26500)
<sup>153</sup> Er	-60460 11	1242173 11	-6459 19	(18300)	6275 11	
<sup>153</sup> Tm	-54001 22	1234931 22	(-6700)	(19320)	4940 24	
<sup>153</sup> Yb	(-47300)	(1227500)	(-8800)	(21800)	(3600)	
<sup>153</sup> Lu	(-38500)	(1217800)		(24000)	(2200)	
<sup>154</sup> La	(-42500)	(1240900)	(10300)	(8400)		(25900)
<sup>154</sup> Ce	(-52800)	(1250400)	(5500)	(9700)	(24700)	(19700)
<sup>154</sup> Pr	(-58300)	(1255100)	(7400)	(10700)	(22700)	(13400)
<sup>154</sup> Nd	-65690 110	1261730 110	2740 140	11670 120	(21000)	8030 110
<sup>154</sup> Pm	-68420 70	1263680 70	4040 70	13300 100	(19300)	1730 90
<sup>154</sup> Sm	-72465 3	1266943 3	-717.3 11	13835.3 9	16890 30	-2065 8
<sup>154</sup> Eu	-71748 3	1265443 3	1968.4 11	14992.3 3	15060 70	-7099 9
<sup>154</sup> Gd	-73716 3	1266629 3	-3560 50	15141.86 21	13521.6 12	-11099 6
<sup>154</sup> Tb	-70150 50	1262290 50	250 50	15570 60	11830 50	(-15590)
<sup>154</sup> Dy	-70400 9	1261749 9	-5751 11	16414 9	10261 8	(-20330)
<sup>154</sup> Ho	-64649 9	1255215 9	-2032 10	17210 30	8500 40	(-24700)
<sup>154</sup> Er	-62618 6	1252401 6	(-8050)	18290 30	7067 7	(-29300)
<sup>154</sup> Tm	(-54560)	(1243570)	-4490 50	(18800)	(5560)	
<sup>154</sup> Yb	(-50080)	(1238290)	(-10100)	(19800)	(4180)	
<sup>154</sup> Lu	(-40000)	(1227400)	(-6700)	(22200)	(2700)	
<sup>154</sup> Hf	(-33300)	(1220000)			(1500)	
<sup>155</sup> La	(-39000)	(1245500)	(9400)	(8100)		(28000)
<sup>155</sup> Ce	(-48400)	(1254100)	(7500)	(9200)	(25400)	(21800)
<sup>155</sup> Pr	(-55900)	(1260800)	(6900)	(10200)	(23400)	(15900)
<sup>155</sup> Nd	-62760 150	1266870 150	4220 150	11550 160	(22000)	9320 150
<sup>155</sup> Pm	-66980 30	1270310 30	3220 30	12430 30	(19800)	4280 30
<sup>155</sup> Sm	-70201 3	1272750 3	1626.9 12	13774.8 9	17430 30	-1037 12
<sup>155</sup> Eu	-71828 3	1273595 3	252.1 11	14593.4 5	15718 11	-5766 23
<sup>155</sup> Gd	-72080 3	1273065 3	-821 12	15329.9 3	14089.0 12	-9860 50
<sup>155</sup> Tb	-71259 12	1271461 12	-2094.5 19	16078 12	12460 12	-14616 18
<sup>155</sup> Dy	-69164 12	1268584 12	-3102 20	16154 12	10849 12	(-18700)
<sup>155</sup> Ho	-66062 23	1264700 23	-3840 60	17182 24	9317 24	(-23430)
<sup>155</sup> Er	-62220 50	1260070 50	-5580 50	17900 50	7640 50	(-27500)
<sup>155</sup> Tm	-56643 13	1253715 13	(-6100)	18784 25	6197 14	
<sup>155</sup> Yb	(-50500)	(1246800)	(-7900)	(19300)	(4600)	
<sup>155</sup> Lu	(-42630)	(1238140)	(-7900)	(20300)	(3210)	
<sup>155</sup> Hf	(-34700)	(1229400)			(2000)	
<sup>156</sup> Ce	(-45400)	(1259200)	(6700)	(8700)		(24000)
<sup>156</sup> Pr	(-52100)	(1265000)	(8300)	(9900)	(24200)	(18000)
<sup>156</sup> Nd	(-60400)	(1272500)	(3900)	(10800)	(22100)	(12200)
<sup>156</sup> Pm	-64220 40	1275620 40	5160 40	11940 80	(20500)	5880 40
<sup>156</sup> Sm	-69372 10	1279992 10	722 8	13049 9	18260 110	1162 11
<sup>156</sup> Eu	-70094 6	1279932 6	2451 5	14489 5	16250 70	(-4620)
<sup>156</sup> Gd	-72545 3	1281601 3	-2444 4	14971.5 3	14657.8 13	-8290 70
<sup>156</sup> Tb	-70101 5	1278374 5	434 7	16090 50	12931 4	-13290 60
<sup>156</sup> Dy	-70534 7	1278025 7	(-5060)	16277 10	11396 6	-17300 30
<sup>156</sup> Ho	(-65470)	(1272180)	(-1220)	(16970)	(9900)	(-21600)
<sup>156</sup> Er	-64260 70	1270190 70	-7440 40	17780 70	8440 70	(-26300)
<sup>156</sup> Tm	-56810 60	1261960 60	-3580 50	(18390)	6740 60	(-30400)
<sup>156</sup> Yb	-53240 30	1257600 30	(-9400)	(19310)	5200 30	
<sup>156</sup> Lu	(-43900)	(1247400)	-5910 200	(20000)	(3900)	

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>156</sup> Hf	(-38000)	(1240800)	(-11600)	(20800)	(2500)	
<sup>156</sup> Ta	(-26400)	(1228400)			(1000)	
<sup>157</sup> Ce	(-40700)	(1262500)	(8500)	(8400)		(26100)
<sup>157</sup> Pr	(-49200)	(1270300)	(7400)	(9500)	(24800)	(20300)
<sup>157</sup> Nd	(-56600)	(1276800)	(5700)	(10000)	(22700)	(14300)
<sup>157</sup> Pm	(-62200)	(1281700)	(4500)	(11400)	(20900)	(8600)
<sup>157</sup> Sm	-66740 <i>50</i>	1285430 <i>50</i>	2730 <i>50</i>	12680 <i>50</i>	18560 <i>160</i>	2700 <i>50</i>
<sup>157</sup> Eu	-69471 <i>6</i>	1287381 <i>6</i>	1363 <i>6</i>	13786 <i>6</i>	17070 <i>30</i>	-2580 <i>50</i>
<sup>157</sup> Gd	-70834 <i>3</i>	1287961 <i>3</i>	-60.1 <i>3</i>	14896.41 <i>19</i>	15210.7 <i>13</i>	-7440 <i>80</i>
<sup>157</sup> Tb	-70774 <i>3</i>	1287119 <i>3</i>	-1341 <i>6</i>	15658 <i>12</i>	13523.7 <i>12</i>	-11860 <i>110</i>
<sup>157</sup> Dy	-69432 <i>7</i>	1284995 <i>7</i>	-2540 <i>50</i>	16411 <i>12</i>	11930 <i>6</i>	-16020 <i>50</i>
<sup>157</sup> Ho	-66890 <i>50</i>	1281670 <i>50</i>	-3500 <i>60</i>	16970 <i>60</i>	10210 <i>50</i>	-20410 <i>50</i>
<sup>157</sup> Er	-63390 <i>80</i>	1277390 <i>80</i>	-4480 <i>70</i>	17320 <i>90</i>	8810 <i>80</i>	(-24400)
<sup>157</sup> Tm	-58910 <i>110</i>	1272130 <i>110</i>	-5500 <i>120</i>	18410 <i>110</i>	7430 <i>110</i>	(-29200)
<sup>157</sup> Yb	-53410 <i>50</i>	1265850 <i>50</i>	-6930 <i>50</i>	(19100)	5770 <i>70</i>	
<sup>157</sup> Lu	-46480 <i>22</i>	1258131 <i>22</i>	(-7500)	(19990)	4415 <i>25</i>	
<sup>157</sup> Hf	(-39000)	(1249900)	(-9300)	(20500)	(3100)	
<sup>157</sup> Ta	(-29700)	(1239800)			(1600)	
<sup>158</sup> Pr	(-44900)	(1274000)	(9200)	(9000)		(22300)
<sup>158</sup> Nd	(-54100)	(1282500)	(4800)	(9900)	(23300)	(16600)
<sup>158</sup> Pm	(-59000)	(1286500)	(6200)	(10900)	(21500)	(10500)
<sup>158</sup> Sm	-65220 <i>80</i>	1291980 <i>80</i>	1999 <i>15</i>	11990 <i>80</i>	(19400)	5200 <i>80</i>
<sup>158</sup> Eu	-67210 <i>80</i>	1293200 <i>80</i>	3490 <i>80</i>	13260 <i>80</i>	17580 <i>80</i>	-1030 <i>80</i>
<sup>158</sup> Gd	-70700 <i>3</i>	1295898 <i>3</i>	-1220.0 <i>9</i>	14297.37 <i>19</i>	15906 <i>9</i>	(-5410)
<sup>158</sup> Tb	-69480 <i>3</i>	1293896 <i>3</i>	936.7 <i>24</i>	15522 <i>4</i>	13964 <i>5</i>	(-10790)
<sup>158</sup> Dy	-70417 <i>4</i>	1294050 <i>4</i>	-4230 <i>30</i>	16025 <i>6</i>	12449.4 <i>24</i>	-14395 <i>10</i>
<sup>158</sup> Ho	-66190 <i>30</i>	1289040 <i>30</i>	(-900)	(16860)	10660 <i>30</i>	(-18840)
<sup>158</sup> Er	(-65290)	(1287360)	-6600 <i>50</i>	(17170)	(9330)	(-23040)
<sup>158</sup> Tm	(-58690)	(1279970)	(-2670)	(18020)	(7790)	(-27400)
<sup>158</sup> Yb	-56022 <i>10</i>	1276526 <i>10</i>	(-8670)	18930 <i>30</i>	6340 <i>70</i>	(-31700)
<sup>158</sup> Lu	(-47350)	(1267070)	-5100 <i>70</i>	(19600)	(5110)	
<sup>158</sup> Hf	(-42250)	(1261190)	(-10900)	(20400)	(3590)	
<sup>158</sup> Ta	(-31300)	(1249500)	(-7100)	(21100)	(2000)	
<sup>158</sup> W	(-24300)	(1241700)			(900)	
<sup>159</sup> Pr	(-41700)	(1278900)	(8200)	(8600)		(24400)
<sup>159</sup> Nd	(-49900)	(1286300)	(6800)	(9500)	(23800)	(18600)
<sup>159</sup> Pm	(-56700)	(1292300)	(5500)	(10600)	(22100)	(12800)
<sup>159</sup> Sm	(-62200)	(1297100)	(3800)	(11600)	(20200)	(7000)
<sup>159</sup> Eu	-66057 <i>8</i>	1300109 <i>8</i>	2514 <i>7</i>	12729 <i>5</i>	(18400)	1282 <i>8</i>
<sup>159</sup> Gd	-68572 <i>3</i>	1301842 <i>3</i>	970.6 <i>7</i>	13880.62 <i>19</i>	16410 <i>50</i>	-4001 <i>4</i>
<sup>159</sup> Tb	-69542 <i>3</i>	1302030 <i>3</i>	-365.6 <i>12</i>	14911.2 <i>8</i>	14649 <i>6</i>	-8820 <i>70</i>
<sup>159</sup> Dy	-69177 <i>3</i>	1300882 <i>3</i>	-1838 <i>3</i>	15887 <i>6</i>	12920.8 <i>13</i>	-13430 <i>90</i>
<sup>159</sup> Ho	-67339 <i>4</i>	1298262 <i>4</i>	-2768.6 <i>20</i>	16590 <i>50</i>	11143 <i>3</i>	-17610 <i>50</i>
<sup>159</sup> Er	-64570 <i>5</i>	1294711 <i>5</i>	-3850 <i>70</i>	17320 <i>80</i>	9716 <i>7</i>	(-21700)
<sup>159</sup> Tm	-60730 <i>70</i>	1290080 <i>70</i>	-4980 <i>90</i>	17960 <i>130</i>	8410 <i>80</i>	(-26180)
<sup>159</sup> Yb	-55750 <i>90</i>	1284320 <i>90</i>	-6020 <i>90</i>	18480 <i>100</i>	6930 <i>120</i>	(-29900)
<sup>159</sup> Lu	-49730 <i>50</i>	1277520 <i>50</i>	(-6900)	19390 <i>50</i>	5390 <i>120</i>	
<sup>159</sup> Hf	(-42800)	(1269900)	(-8300)	(20000)	(4000)	
<sup>159</sup> Ta	(-34550)	(1260770)	(-8700)	(21000)	(2640)	
<sup>159</sup> W	(-25800)	(1251300)			(1400)	
<sup>160</sup> Nd	(-47100)	(1291600)	(6000)	(9100)		(20800)
<sup>160</sup> Pm	(-53100)	(1296800)	(7300)	(10300)	(22800)	(14700)
<sup>160</sup> Sm	(-60400)	(1303300)	(3000)	(11300)	(20800)	(9300)
<sup>160</sup> Eu	(-63370)	(1305500)	(4580)	(12300)	(19000)	(3020)
<sup>160</sup> Gd	-67952 <i>3</i>	1309293 <i>3</i>	-105.6 <i>10</i>	13394.7 <i>7</i>	17310 <i>80</i>	-1890 <i>50</i>
<sup>160</sup> Tb	-67846 <i>3</i>	1308405 <i>3</i>	1835.3 <i>13</i>	14509.0 <i>6</i>	15210 <i>80</i>	-7400 <i>300</i>
<sup>160</sup> Dy	-69682 <i>3</i>	1309458 <i>3</i>	-3290 <i>15</i>	15407.6 <i>22</i>	13559.6 <i>12</i>	(-11520)
<sup>160</sup> Ho	-66392 <i>15</i>	1305386 <i>15</i>	-330 <i>50</i>	16350 <i>30</i>	11490 <i>15</i>	(-16110)
<sup>160</sup> Er	-66060 <i>50</i>	1304270 <i>50</i>	-5600 <i>300</i>	(16920)	10220 <i>50</i>	-20150 <i>60</i>
<sup>160</sup> Tm	-60500 <i>300</i>	1297900 <i>300</i>	(-2300)	(17900)	8900 <i>300</i>	(-24500)
<sup>160</sup> Yb	(-58160)	(1294810)	(-7880)	(18280)	(7450)	(-28700)
<sup>160</sup> Lu	(-50280)	(1286150)	(-4370)	(19100)	(6200)	(-33000)
<sup>160</sup> Hf	-45910 <i>30</i>	1280990 <i>30</i>	(-9900)	(19810)	4470 <i>30</i>	
<sup>160</sup> Ta	(-36000)	(1270300)	-6530 <i>210</i>	(20800)	(3200)	
<sup>160</sup> W	(-29500)	(1263000)	(-12200)	(21300)	(1800)	
<sup>160</sup> Re	(-17200)	(1250000)			(500)	
<sup>161</sup> Nd	(-42500)	(1295100)	(7900)	(8700)		(23000)
<sup>161</sup> Pm	(-50400)	(1302200)	(6500)	(9900)	(23300)	(17000)
<sup>161</sup> Sm	(-57000)	(1308000)	(4800)	(10900)	(21600)	(11100)
<sup>161</sup> Eu	(-61800)	(1312000)	(3700)	(11900)	(19700)	(5400)

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>161</sup> Gd	-65516.3	1314928.3	1955.6 14	13086.8 12	(17900)	-313.9
<sup>161</sup> Tb	-67472.3	1316102.3	593.1 14	14071.8 6	15992.8	-5430.90
<sup>161</sup> Dy	-68065.3	1315912.3	-859.3	15030.5 14	14070.7 12	(-10180)
<sup>161</sup> Ho	-67206.4	1314271.4	-2002.9	16009.4	12241.3	(-14620)
<sup>161</sup> Er	-65203.10	1311486.10	-3160.90	16775.10	10604.9	-18940.70
<sup>161</sup> Tm	-62040.90	1307540.90	(-4150)	17460.110	9280.90	-23260.110
<sup>161</sup> Yb	(-57890)	(1302610)	-5300.100	(18290)	(7900)	(-27200)
<sup>161</sup> Lu	(-52590)	(1296530)	(-6320)	(19000)	(6440)	(-31800)
<sup>161</sup> Hf	-46270.70	1289420.70	-7490.90	(19600)	5100.110	
<sup>161</sup> Ta	-38780.50	1281150.50	(-8100)	(20370)	3630.70	
<sup>161</sup> W	(-30700)	(1272200)	(-9800)	(21000)	(2400)	
<sup>161</sup> Re	(-20800)	(1261600)			(800)	
<sup>162</sup> Pm	(-46300)	(1306100)	(8400)	(9300)		(19400)
<sup>162</sup> Sm	(-54800)	(1313800)	(3900)	(10500)	(22200)	(13400)
<sup>162</sup> Eu	(-58600)	(1316900)	(5600)	(11400)	(20100)	(7400)
<sup>162</sup> Gd	-64291.5	1321774.5	1390.40	12481.4	(18500)	2055.5
<sup>162</sup> Tb	-65680.40	1322390.40	2510.40	13980.40	(16890)	-4180.50
<sup>162</sup> Dy	-68190.3	1324109.3	-2140.4	14651.31 15	14816.3 13	(-8340)
<sup>162</sup> Ho	-66050.4	1321187.4	296.4	15801.15	12782.4	(-13160)
<sup>162</sup> Er	-66346.4	1320700.4	-4840.30	16430.50	11242.3	-17166.11
<sup>162</sup> Tm	-61510.30	1315080.30	(-1660)	17200.300	9690.30	(-21590)
<sup>162</sup> Yb	(-59850)	(1312640)	-6960.80	(17800)	(8360)	(-25700)
<sup>162</sup> Lu	(-52890)	(1304900)	(-3710)	(18700)	(7000)	(-30300)
<sup>162</sup> Hf	-49180.11	1300405.11	(-9260)	19410.30	(5600)	(-34100)
<sup>162</sup> Ta	(-39920)	(1290360)	-5770.90	(20100)	(4200)	
<sup>162</sup> W	(-34150)	(1283810)	(-11500)	(20800)	(2820)	
<sup>162</sup> Re	(-22600)	(1271500)	(-7600)	(21500)	(1200)	
<sup>162</sup> Os	(-15100)	(1263200)			(200)	
<sup>163</sup> Pm	(-43300)	(1311200)	(7600)	(9000)		(21300)
<sup>163</sup> Sm	(-50900)	(1318000)	(5700)	(10100)	(22900)	(15500)
<sup>163</sup> Eu	(-56600)	(1323000)	(4900)	(11000)	(20800)	(9800)
<sup>163</sup> Gd	(-61500)	(1327000)	(3100)	(12100)	(19100)	(3700)
<sup>163</sup> Tb	-64605.5	1329377.5	1785.4	13276.4	(17400)	-1866.7
<sup>163</sup> Dy	-66390.3	1330380.3	-2.565 14	14467.88 14	15451.8 16	-7020.100
<sup>163</sup> Ho	-66387.3	1329595.3	-1210.5	15324.3	13493.7 14	-11620.220
<sup>163</sup> Er	-65177.5	1327603.5	-2439.3	16117.10	11691.5	(-15900)
<sup>163</sup> Tm	-62738.6	1324382.6	-3370.100	16840.90	10111.6	-20180.70
<sup>163</sup> Yb	-59370.100	1320230.100	-4600.200	(17620)	8740.100	(-24500)
<sup>163</sup> Lu	-54770.220	1314850.220	(-5500)	(18300)	7310.240	(-28660)
<sup>163</sup> Hf	(-49300)	(1308600)	(-6800)	(19200)	(6000)	(-32600)
<sup>163</sup> Ta	-42550.70	1301070.70	(-7700)	19920.90	(4540)	
<sup>163</sup> W	(-34900)	(1292600)	(-8800)	(20400)	(3200)	
<sup>163</sup> Re	(-26110)	(1283060)	(-9400)	(21400)	(1920)	
<sup>163</sup> Os	(-16700)	(1272900)			(600)	
<sup>164</sup> Sm	(-48200)	(1323400)	(4900)	(9600)		(17800)
<sup>164</sup> Eu	(-53100)	(1327500)	(6600)	(10600)	(21400)	(11900)
<sup>164</sup> Gd	(-59700)	(1333400)	(2300)	(11600)	(19600)	(6200)
<sup>164</sup> Tb	-62090.100	1334930.100	3890.100	12540.110	(18000)	-100.100
<sup>164</sup> Dy	-65977.3	1338038.3	-986.8 22	13929.01 14	16264.4	(-4980)
<sup>164</sup> Ho	-64990.3	1336269.3	962.8 23	15082.3	13880.40	(-10230)
<sup>164</sup> Er	-65953.3	1336450.3	-3963.19	15749.3	12340.2 24	(-14180)
<sup>164</sup> Tm	-61990.19	1331705.19	(-1000)	16630.40	10518.19	(-18700)
<sup>164</sup> Yb	(-60990)	(1329930)	-6240.70	(17290)	(9230)	(-22790)
<sup>164</sup> Lu	(-54760)	(1322910)	(-2990)	(18010)	(7830)	(-27100)
<sup>164</sup> Hf	(-51770)	(1319140)	(-8500)	(18730)	(6500)	(-31200)
<sup>164</sup> Ta	(-43200)	(1309800)	(-5000)	(19500)	(4900)	
<sup>164</sup> W	-38210.30	1304010.30	(-10600)	(20200)	3600.30	
<sup>164</sup> Re	(-27600)	(1292700)	-7090.210	(21200)	(2300)	
<sup>164</sup> Os	(-20600)	(1284800)		(21600)	(1000)	
<sup>165</sup> Sm	(-43800)	(1327100)	(6800)	(9000)		(19800)
<sup>165</sup> Eu	(-50600)	(1333000)	(5900)	(10100)	(21800)	(14300)
<sup>165</sup> Gd	(-56500)	(1338200)	(4200)	(11100)	(20100)	(8100)
<sup>165</sup> Tb	(-60660)	(1341570)	(2960)	(12200)	(18600)	(2280)
<sup>165</sup> Dy	-63621.3	1343754.3	1286.1 19	13373.97 16	(16700)	-3444.20
<sup>165</sup> Ho	-64907.3	1344258.3	-376.0 20	14662.6 18	14880.4	-8650.80
<sup>165</sup> Er	-64531.3	1343100.3	-1592.5 15	15497.5	12719.4 25	(-12900)
<sup>165</sup> Tm	-62939.4	1340725.4	-2762.20	16343.6	11129.3	(-17130)
<sup>165</sup> Yb	-60177.20	1337180.20	-3920.80	16950.100	9577.21	-21370.90
<sup>165</sup> Lu	-56260.80	1332480.80	(-4600)	17630.240	8100.80	-25560.110
<sup>165</sup> Hf	(-51700)	(1327100)	(-5800)	(18500)	(6900)	(-29700)

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>165</sup> Ta	(-45810)	(1320470)	(-7000)	(19400)	(5600)	(-34200)
<sup>165</sup> W	-38810 <i>90</i>	1312680 <i>90</i>	-8120 <i>110</i>	(20100)	(4100)	
<sup>165</sup> Re	-30690 <i>70</i>	1303780 <i>70</i>	(-8800)	(20720)	2720 <i>100</i>	
<sup>165</sup> Os	(-21900)	(1294200)	(-10300)	(21300)	(1600)	
<sup>165</sup> Ir	(-11600)	(1283100)			(0)	
<sup>166</sup> Eu	(-46600)	(1337200)	(7800)	(9600)		(16500)
<sup>166</sup> Gd	(-54400)	(1344200)	(3300)	(10800)	(20800)	(10500)
<sup>166</sup> Tb	(-57700)	(1346700)	(4900)	(11800)	(19200)	(4200)
<sup>166</sup> Dy	-62593 <i>3</i>	1350798 <i>3</i>	486.2 <i>19</i>	12759.4 <i>4</i>	(17400)	-1003 <i>8</i>
<sup>166</sup> Ho	-63080 <i>3</i>	1350502 <i>3</i>	1854.9 <i>9</i>	14232.4 <i>11</i>	15570 <i>100</i>	-6970 <i>160</i>
<sup>166</sup> Er	-64934 <i>3</i>	1351574 <i>3</i>	-3040 <i>11</i>	15124.5 <i>19</i>	13535.8 <i>19</i>	(-11100)
<sup>166</sup> Tm	-61895 <i>11</i>	1347752 <i>11</i>	-304 <i>14</i>	16047 <i>22</i>	11483 <i>11</i>	(-15800)
<sup>166</sup> Yb	-61591 <i>8</i>	1346666 <i>8</i>	-5480 <i>160</i>	(16740)	10216 <i>8</i>	-19692 <i>14</i>
<sup>166</sup> Lu	-56110 <i>160</i>	1340400 <i>160</i>	(-2300)	(17500)	8700 <i>160</i>	(-24260)
<sup>166</sup> Hf	(-53800)	(1337300)	(-7700)	(18200)	(7400)	(-28200)
<sup>166</sup> Ta	(-46100)	(1328900)	(-4200)	(19000)	(6000)	(-32600)
<sup>166</sup> W	-41899 <i>12</i>	1323844 <i>12</i>	(-10040)	19840 <i>40</i>	(4710)	
<sup>166</sup> Re	(-31860)	(1313020)	-6260 <i>100</i>	(20400)	(3200)	
<sup>166</sup> Os	(-25590)	(1305970)	(-12100)	(21200)	(1960)	
<sup>166</sup> Ir	(-13500)	(1293100)			(400)	
<sup>167</sup> Eu	(-43700)	(1342400)	(7000)	(9300)		(18600)
<sup>167</sup> Gd	(-50700)	(1348500)	(5100)	(10400)	(21500)	(12600)
<sup>167</sup> Tb	(-55800)	(1352900)	(4100)	(11300)	(19900)	(6700)
<sup>167</sup> Dy	-59940 <i>60</i>	1356220 <i>60</i>	2350 <i>60</i>	12460 <i>60</i>	(18100)	650 <i>60</i>
<sup>167</sup> Ho	-62293 <i>6</i>	1357786 <i>6</i>	1007 <i>5</i>	13528 <i>5</i>	(16210)	-4830 <i>100</i>
<sup>167</sup> Er	-63299 <i>3</i>	1358010 <i>3</i>	-748.4 <i>15</i>	14910.6 <i>20</i>	14256.0 <i>19</i>	(-9830)
<sup>167</sup> Tm	-62551 <i>3</i>	1356479 <i>3</i>	-1954 <i>4</i>	15755 <i>3</i>	12221.6 <i>16</i>	(-14100)
<sup>167</sup> Yb	-60597 <i>5</i>	1353743 <i>5</i>	-3130 <i>100</i>	16563 <i>21</i>	10643 <i>4</i>	(-18400)
<sup>167</sup> Lu	-57470 <i>100</i>	1349830 <i>100</i>	(-4000)	17350 <i>130</i>	9110 <i>100</i>	(-22600)
<sup>167</sup> Hf	(-53470)	(1345050)	(-5000)	(17900)	(7870)	(-27000)
<sup>167</sup> Ta	(-48500)	(1339300)	(-6200)	(18800)	(6800)	(-31300)
<sup>167</sup> W	(-42200)	(1332200)	(-7400)	(19600)	(5100)	
<sup>167</sup> Re	(-34870)	(1324110)	(-8400)	(20320)	(3600)	
<sup>167</sup> Os	(-26500)	(1314900)	(-9300)	(20700)	(2300)	
<sup>167</sup> Ir	(-17190)	(1304860)		(21800)	(1080)	
<sup>168</sup> Gd	(-48100)	(1354000)	(4400)	(9800)		(14900)
<sup>168</sup> Tb	(-52500)	(1357600)	(6000)	(10900)	(20500)	(8800)
<sup>168</sup> Dy	(-58500)	(1362800)	(1600)	(12000)	(18600)	(3100)
<sup>168</sup> Ho	-60080 <i>30</i>	1363650 <i>30</i>	2910 <i>30</i>	13150 <i>30</i>	(17000)	-2980 <i>90</i>
<sup>168</sup> Er	-62999 <i>3</i>	1365781 <i>3</i>	-1679.1 <i>19</i>	14207.2 <i>4</i>	14983.6 <i>20</i>	(-7700)
<sup>168</sup> Tm	-61320 <i>3</i>	1363320 <i>3</i>	257 <i>4</i>	15568 <i>11</i>	12818.3 <i>20</i>	(-12700)
<sup>168</sup> Yb	-61577 <i>4</i>	1362794 <i>4</i>	-4480 <i>80</i>	16129 <i>7</i>	11220 <i>4</i>	(-16740)
<sup>168</sup> Lu	-57100 <i>80</i>	1357540 <i>80</i>	(-1800)	17130 <i>180</i>	9780 <i>80</i>	(-21300)
<sup>168</sup> Hf	(-55300)	(1354960)	(-6700)	(17700)	(8290)	(-25340)
<sup>168</sup> Ta	(-48600)	(1347500)	(-3800)	(18600)	(7100)	(-30000)
<sup>168</sup> W	(-44840)	(1342930)	(-9100)	(19080)	(5600)	(-33700)
<sup>168</sup> Re	(-35800)	(1333100)	(-5800)	(20000)	(4200)	
<sup>168</sup> Os	-29960 <i>30</i>	1326490 <i>30</i>	(-11300)	(20510)	2640 <i>40</i>	
<sup>168</sup> Ir	(-18700)	(1314400)	(-7520)	(21300)	(1400)	
<sup>168</sup> Pt	(-11100)	(1306100)			(100)	
<sup>169</sup> Gd	(-43900)	(1357900)	(6200)	(9300)		(17000)
<sup>169</sup> Tb	(-50100)	(1363300)	(5500)	(10400)	(20900)	(11200)
<sup>169</sup> Dy	-55600 <i>300</i>	1368000 <i>300</i>	3200 <i>300</i>	11800 <i>300</i>	(19500)	4800 <i>300</i>
<sup>169</sup> Ho	-58807 <i>20</i>	1370443 <i>20</i>	2124 <i>20</i>	12657 <i>21</i>	(17500)	-727 <i>21</i>
<sup>169</sup> Er	-60931 <i>3</i>	1371784 <i>3</i>	351.1 <i>11</i>	13774.2 <i>4</i>	15570 <i>60</i>	-6120 <i>80</i>
<sup>169</sup> Tm	-61282 <i>3</i>	1371353 <i>3</i>	-909 <i>4</i>	14873.7 <i>11</i>	13567 <i>5</i>	(-10910)
<sup>169</sup> Yb	-60373 <i>4</i>	1369662 <i>4</i>	-2293 <i>3</i>	15919 <i>5</i>	11651 <i>4</i>	(-15400)
<sup>169</sup> Lu	-58080 <i>5</i>	1366586 <i>5</i>	-3270 <i>80</i>	16760 <i>100</i>	10107 <i>5</i>	(-19730)
<sup>169</sup> Hf	-54810 <i>80</i>	1362530 <i>80</i>	(-4440)	(17490)	8790 <i>80</i>	-24140 <i>120</i>
<sup>169</sup> Ta	(-50380)	(1357320)	(-5400)	(18100)	(7490)	(-28380)
<sup>169</sup> W	(-44900)	(1351100)	(-6600)	(18900)	(6000)	(-32300)
<sup>169</sup> Re	(-38350)	(1343730)	(-7680)	(19620)	(4500)	
<sup>169</sup> Os	-30670 <i>90</i>	1335260 <i>90</i>	-8680 <i>120</i>	(20300)	(3000)	
<sup>169</sup> Ir	-21990 <i>90</i>	1325800 <i>90</i>	(-9300)	(20940)	(1700)	
<sup>169</sup> Pt	(-12600)	(1315700)			(700)	
<sup>170</sup> Tb	(-46300)	(1367600)	(7100)	(10000)		(13500)
<sup>170</sup> Dy	(-53400)	(1373900)	(2800)	(11100)	(19900)	(7400)
<sup>170</sup> Ho	-56250 <i>50</i>	1375960 <i>50</i>	3870 <i>50</i>	12310 <i>60</i>	(18300)	1060 <i>50</i>
<sup>170</sup> Er	-60118 <i>3</i>	1379043 <i>3</i>	-314.4 <i>18</i>	13262.0 <i>16</i>	(16200)	(-3900)
<sup>170</sup> Tm	-59804 <i>3</i>	1377946 <i>3</i>	968.0 <i>8</i>	14626.6 <i>19</i>	14300 <i>30</i>	(-9590)

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>170</sup> Yb	-60772.3	1378132.3	-3459.19	15338.3	12350.9 14	(-13500)
<sup>170</sup> Lu	-57313.19	1373891.19	(-1100)	16350.80	10571.19	(-18300)
<sup>170</sup> Hf	(-56220)	(1372010)	(-6000)	(17060)	(9220)	(-22280)
<sup>170</sup> Ta	(-50220)	(1365230)	(-3000)	(17700)	(7690)	(-26960)
<sup>170</sup> W	(-47200)	(1361500)	(-8300)	(18500)	(6500)	(-30800)
<sup>170</sup> Re	(-39000)	(1352400)	(-5000)	(19400)	(4900)	
<sup>170</sup> Os	-33935.13	1346601.13	(-10680)	20110.40	(3670)	
<sup>170</sup> Ir	(-23260)	(1335140)	-6790.110	(20700)	(2100)	
<sup>170</sup> Pt	(-16460)	(1327560)		(21500)	(1080)	
<sup>171</sup> Tb	(-43500)	(1372800)	(6400)	(9500)		(15700)
<sup>171</sup> Dy	(-49900)	(1378400)	(4700)	(10400)	(20500)	(9500)
<sup>171</sup> Ho	-54500.600	1382300.600	3200.600	11900.600	(19000)	3300.600
<sup>171</sup> Er	-57729.3	1384725.3	1490.5 12	12940.3 16	16700.300	(-2300)
<sup>171</sup> Tm	-59219.3	1385433.3	96.4 10	14079.7 14	14990.20	(-7480)
<sup>171</sup> Yb	-59315.3	1384747.3	-1478.8 19	15085.3	12962.5 14	(-12200)
<sup>171</sup> Lu	-57837.3	1382486.3	(-2400)	15899.5	11132.5 21	(-16400)
<sup>171</sup> Hf	(-55430)	(1379300)	(-3700)	(16770)	(9640)	(-21000)
<sup>171</sup> Ta	(-51740)	(1374820)	(-4700)	(17500)	(8230)	(-25450)
<sup>171</sup> W	(-47100)	(1369400)	-5670.200	(18300)	(6800)	(-29600)
<sup>171</sup> Re	(-41400)	(1362900)	(-7000)	(19200)	(5600)	(-33700)
<sup>171</sup> Os	(-34400)	(1355200)	(-8100)	(19900)	(4100)	
<sup>171</sup> Ir	(-26290)	(1346240)	(-8800)	(20440)	(2520)	
<sup>171</sup> Pt	(-17500)	(1336600)	(-9800)	(21000)	(1400)	
<sup>171</sup> Au	(-7660)	(1326050)			(200)	
<sup>172</sup> Dy	(-47400)	(1384000)	(4000)	(10100)		(11900)
<sup>172</sup> Ho	(-51400)	(1387300)	(5100)	(11300)	(19600)	(5300)
<sup>172</sup> Er	-56493.5	1391561.5	891.5	12517.4	(17700)	-100.50
<sup>172</sup> Tm	-57384.6	1391669.6	1880.5	13722.6	15710.50	-5910.190
<sup>172</sup> Yb	-59264.3	1392767.3	-2519.3 24	14634.5 8	13723.4 15	(-10300)
<sup>172</sup> Lu	-56745.3	1389465.3	-350.50	15574.19	11519.3	(-15100)
<sup>172</sup> Hf	-56390.50	1388330.50	-4920.180	(16320)	10200.50	(-19210)
<sup>172</sup> Ta	-51470.190	1382630.190	(-2500)	(17400)	8740.190	(-24100)
<sup>172</sup> W	(-49000)	(1379300)	(-7300)	(17900)	(7300)	(-27900)
<sup>172</sup> Re	(-41700)	(1371200)	(-4500)	(18800)	(6000)	(-32400)
<sup>172</sup> Os	(-37190)	(1366000)	(-9800)	(19400)	(4500)	
<sup>172</sup> Ir	(-27300)	(1355400)	(-6300)	(20200)	(3000)	
<sup>172</sup> Pt	-21070.30	1348320.30	(-11900)	(20750)	1720.40	
<sup>172</sup> Au	(-9200)	(1335700)			(500)	
<sup>173</sup> Dy	(-43400)	(1388100)	(5700)	(9700)		(14200)
<sup>173</sup> Ho	(-49100)	(1393000)	(4600)	(10700)	(20200)	(7800)
<sup>173</sup> Er	(-53650)	(1396790)	(2610)	(12070)	(18400)	(1630)
<sup>173</sup> Tm	-56262.5	1398618.5	1298.5	13186.5	16300.600	(-3670)
<sup>173</sup> Yb	-57560.3	1399134.3	-670.8 17	14387.3 5	14409.5 16	(-9000)
<sup>173</sup> Lu	-56889.3	1397681.3	(-1610)	15195.3 21	12248.2 19	(-13200)
<sup>173</sup> Hf	(-55280)	(1395290)	(-2690)	(15990)	(10550)	(-17800)
<sup>173</sup> Ta	(-52590)	(1391820)	-4000.300	(17000)	(9340)	(-22500)
<sup>173</sup> W	(-48600)	(1387000)	(-4900)	(17700)	(7700)	(-26700)
<sup>173</sup> Re	(-43700)	(1381400)	(-6300)	(18500)	(6600)	(-31100)
<sup>173</sup> Os	(-37500)	(1374300)	(-7400)	(19200)	(5000)	
<sup>173</sup> Ir	(-30080)	(1366180)	(-8190)	(19900)	(3300)	
<sup>173</sup> Pt	-21890.100	1357210.100	-9220.140	(20600)	(2000)	
<sup>173</sup> Au	-12670.100	1347200.100		(21200)	(960)	
<sup>174</sup> Ho	(-45500)	(1397500)	(6300)	(10200)		(10100)
<sup>174</sup> Er	(-51800)	(1403100)	(2000)	(11500)	(19000)	(4000)
<sup>174</sup> Tm	-53870.40	1404300.40	3080.40	12630.50	(17100)	-1870.90
<sup>174</sup> Yb	-56953.3	1406599.3	-1374.3 16	13832.2 5	15038.4	(-6800)
<sup>174</sup> Lu	-55579.3	1404442.3	273.3 22	14977.1 23	12773.6	(-11900)
<sup>174</sup> Hf	-55852.3	1403933.3	-3850.80	15600.50	11166.4 24	(-15900)
<sup>174</sup> Ta	-52010.80	1399310.80	(-1900)	16680.200	9840.80	(-21100)
<sup>174</sup> W	(-50200)	(1396700)	(-6500)	(17300)	(8300)	(-24800)
<sup>174</sup> Re	(-43700)	(1389400)	(-3700)	(18200)	(6800)	(-29600)
<sup>174</sup> Os	(-39900)	(1384900)	(-9000)	(18900)	(5500)	
<sup>174</sup> Ir	(-30900)	(1375100)	(-5600)	(19700)	(3800)	
<sup>174</sup> Pt	-25326.13	1368713.13	(-11280)	20390.40	(2720)	
<sup>174</sup> Au	(-14050)	(1356650)		(21000)	(1300)	
<sup>175</sup> Ho	(-42800)	(1402900)	(5700)	(9800)		(12400)
<sup>175</sup> Er	(-48500)	(1407800)	(3800)	(11000)	(19700)	(6000)
<sup>175</sup> Tm	-52320.50	1410820.50	2390.50	12200.50	(17800)	(170)
<sup>175</sup> Yb	-54704.3	1412421.3	470.0 13	13286.93 16	(15630)	(-5120)
<sup>175</sup> Lu	-55174.3	1412109.3	-684.7 20	14427.8 11	13490.5	(-9900)

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>175</sup> Hf	-54490 3	1410642 3	(-2000)	(15350)	11507.5 24	(-14500)
<sup>175</sup> Ta	(-52490)	(1407860)	(-2910)	(16040)	(10180)	(-19200)
<sup>175</sup> W	(-49580)	(1404170)	(-4300)	(17100)	(8880)	(-23800)
<sup>175</sup> Re	(-45300)	(1399100)	(-5300)	(17700)	(7300)	(-28100)
<sup>175</sup> Os	(-40000)	(1393000)	(-6700)	(18700)	(6000)	(-32000)
<sup>175</sup> Ir	(-33300)	(1385500)	(-7400)	(19300)	(4100)	
<sup>175</sup> Pt	(-25800)	(1377300)	(-8600)	(20100)	(2900)	
<sup>175</sup> Au	(-17190)	(1367860)	(-9200)	(20700)	(1700)	
<sup>175</sup> Hg	(-8000)	(1357900)			(700)	
<sup>176</sup> Er	(-46300)	(1413700)	(3100)	(10600)		(8300)
<sup>176</sup> Tm	-49380 100	1415950 100	4120 100	11650 110	(18500)	2100 140
<sup>176</sup> Yb	-53497 3	1419285 3	-106.2 17	12686.5 11	(16200)	(-2820)
<sup>176</sup> Lu	-53391 3	1418397 3	1192.8 9	13954.7 10	14100 40	(-8280)
<sup>176</sup> Hf	-54584 3	1418807 3	-3110 100	14874.3 17	12208.5 16	(-12620)
<sup>176</sup> Ta	-51470 100	1414910 100	(-790)	15610 130	10470 100	(-17500)
<sup>176</sup> W	(-50680)	(1413340)	(-5600)	(16700)	(9410)	(-21800)
<sup>176</sup> Re	(-45110)	(1406990)	(-3100)	(17600)	(7680)	(-26700)
<sup>176</sup> Os	(-41960)	(1403060)	(-8000)	(18200)	(6400)	(-30240)
<sup>176</sup> Ir	(-34000)	(1394300)	(-5100)	(19200)	(4900)	
<sup>176</sup> Pt	(-28880)	(1388410)	(-10500)	(19690)	(3500)	
<sup>176</sup> Au	(-18400)	(1377100)	(-6700)	(20500)	(2000)	
<sup>176</sup> Hg	-11720 40	1369690 40			980 40	
<sup>177</sup> Er	(-42500)	(1417900)	(5000)	(10100)		(10400)
<sup>177</sup> Tm	(-47500)	(1422100)	(3500)	(11300)	(19200)	(4300)
<sup>177</sup> Yb	-50993 3	1424852 3	1399.2 20	12431.0 16	(17100)	(-1300)
<sup>177</sup> Lu	-52392 3	1425469 3	498.3 8	13360.2 6	14650 50	(-6070)
<sup>177</sup> Hf	-52890 3	1425185 3	-1166 3	14543.3 21	12763.8 16	(-11000)
<sup>177</sup> Ta	-51724 4	1423237 4	(-2000)	(15380)	11128 3	(-15600)
<sup>177</sup> W	(-49700)	(1420500)	(-3400)	(16300)	(9800)	(-20300)
<sup>177</sup> Re	(-46320)	(1416270)	(-4400)	(17200)	(8410)	(-25100)
<sup>177</sup> Os	(-41900)	(1411000)	(-5700)	(18000)	(6900)	(-29100)
<sup>177</sup> Ir	(-36200)	(1404600)	(-6800)	(19000)	(5500)	(-33300)
<sup>177</sup> Pt	(-29400)	(1397000)	(-8200)	(19700)	(4000)	
<sup>177</sup> Au	(-21220)	(1388040)	(-8500)	(20200)	(2500)	
<sup>177</sup> Hg	-12730 110	1378760 110	(-9820)	(20900)	(1500)	
<sup>177</sup> Tl	(-2910)	(1368160)			(300)	
<sup>178</sup> Tm	(-44100)	(1426800)	(5600)	(10900)		(6400)
<sup>178</sup> Yb	-49701 10	1431632 10	645 10	12347 10	(18000)	740 100
<sup>178</sup> Lu	-50346 3	1431494 3	2099.2 21	13097.6 20	15550 100	-4560 210
<sup>178</sup> Hf	-52445 3	1432811 3	-1910 100	14004.0 13	13526.0 18	-8990 200
<sup>178</sup> Ta	-50530 100	1430120 100	-91.3 20	15200 140	11720 100	(-14300)
<sup>178</sup> W	-50440 100	1429240 100	-4660 180	(15900)	10440 100	(-18500)
<sup>178</sup> Re	-45780 210	1423800 210	-2300 300	(16800)	8890 230	(-23400)
<sup>178</sup> Os	-43460 200	1420690 200	(-7200)	(17600)	(7400)	-27130 200
<sup>178</sup> Ir	(-36300)	(1412700)	(-4300)	(18400)	(5700)	(-31800)
<sup>178</sup> Pt	(-31900)	(1407600)	(-9600)	(19200)	(4600)	
<sup>178</sup> Au	(-22400)	(1397300)	(-6100)	(20100)	(3000)	
<sup>178</sup> Hg	-16323 15	1390430 15	(-11880)	20740 40	(2030)	
<sup>178</sup> Tl	(-4450)	(1377770)			(600)	
<sup>179</sup> Tm	(-41600)	(1432400)	(4800)	(10300)		(8800)
<sup>179</sup> Yb	(-46400)	(1436400)	(2700)	(11600)	(18500)	(2900)
<sup>179</sup> Lu	-49067 6	1438287 6	1406 5	12818 5	(16200)	-2470 50
<sup>179</sup> Hf	-50473 3	1438910 3	-111 5	13725.4 3	14058.2 22	(-7580)
<sup>179</sup> Ta	-50362 6	1438017 6	-1060 16	14780 6	12548 6	(-12300)
<sup>179</sup> W	-49302 16	1436175 16	-2710 50	(15700)	10990 16	(-17100)
<sup>179</sup> Re	-46590 50	1432680 50	(-3700)	(16410)	9450 50	(-21800)
<sup>179</sup> Os	(-42890)	(1428200)	(-4800)	(17200)	(7700)	(-25900)
<sup>179</sup> Ir	(-38100)	(1422600)	(-5900)	(18000)	(6300)	(-30100)
<sup>179</sup> Pt	(-32200)	(1415900)	(-7400)	(18900)	(4900)	
<sup>179</sup> Au	(-24800)	(1407700)	(-7800)	(19700)	(3200)	
<sup>179</sup> Hg	(-17000)	(1399100)	(-9000)	(20400)	(2200)	
<sup>179</sup> Tl	(-7950)	(1389350)		(21200)	(1300)	
<sup>180</sup> Yb	(-44400)	(1442500)	(2300)	(10800)		(5200)
<sup>180</sup> Lu	-46690 70	1443980 70	3100 70	12480 70	(17100)	-850 80
<sup>180</sup> Hf	-49790 3	1446298 3	-854 3	13486.9 3	14666 10	(-5410)
<sup>180</sup> Ta	-48935 3	1444662 3	708 4	14540 100	13167 4	(-10980)
<sup>180</sup> W	-49643 5	1444587 5	-3800 30	15340 100	11776 5	(-15380)
<sup>180</sup> Re	-45840 30	1440000 30	(-1460)	16200 210	9890 110	(-20100)
<sup>180</sup> Os	(-44390)	(1437760)	(-6430)	(17100)	(8520)	(-24200)
<sup>180</sup> Ir	(-37960)	(1430550)	(-3690)	(17800)	(6800)	(-28800)

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>180</sup> Pt	(-34270)	(1426080)	(-8600)	(18500)	(5400)	
<sup>180</sup> Au	(-25700)	(1416700)	(-5500)	(19500)	(4000)	
<sup>180</sup> Hg	(-20190)	(1410440)	(-11100)	(20010)	(2800)	
<sup>180</sup> Tl	(-9100)	(1398600)		(20800)	(1300)	
<sup>181</sup> Yb	(-40800)	(1447000)	(3900)	(10600)		(7400)
<sup>181</sup> Lu	(-44700)	(1450100)	(2700)	(11800)	(17700)	(1800)
<sup>181</sup> Hf	-47414.3	1451994.3	1027.3	13083.67	(15600)	-3890.200
<sup>181</sup> Ta	-48441.3	1452239.3	-188.5	14222.5	13952.6	-8990.210
<sup>181</sup> W	-48253.5	1451269.5	-1739.15	15093.16	12358.5	(-14000)
<sup>181</sup> Re	-46515.14	1448748.14	-2990.200	16060.50	10730.15	(-18500)
<sup>181</sup> Os	-43520.200	1444980.200	-4070.60	(16800)	8800.200	(-22900)
<sup>181</sup> Ir	-39460.210	1440120.210	(-5200)	(17500)	7440.220	(-27300)
<sup>181</sup> Pt	(-34300)	(1434200)	(-6300)	(18300)	(6000)	(-31200)
<sup>181</sup> Au	(-28000)	(1427100)	(-7300)	(19400)	(4500)	
<sup>181</sup> Hg	(-20700)	(1419000)	(-8500)	(19800)	(3100)	
<sup>181</sup> Tl	(-12200)	(1409700)	(-9100)	(20400)	(2000)	
<sup>181</sup> Pb	(-3060)	(1399820)			(700)	
<sup>182</sup> Lu	(-41700)	(1455200)	(4300)	(11200)		(3700)
<sup>182</sup> Hf	-46060.7	1458711.7	373.7	12413.6	(16200)	-1520.30
<sup>182</sup> Ta	-46433.3	1458302.3	1813.518	13640.013	14320.70	-7430.140
<sup>182</sup> W	-48246.3	1459333.3	-2800.100	14746.4	13035.3	-12170.200
<sup>182</sup> Re	-45450.100	1455750.100	-910.100	15750.110	11090.100	(-17100)
<sup>182</sup> Os	-44538.25	1454060.25	-5530.140	(16300)	9473.25	(-21000)
<sup>182</sup> Ir	-39000.140	1447740.140	-2920.140	(17190)	7740.150	(-25600)
<sup>182</sup> Pt	-36080.200	1444040.200	(-7800)	(18000)	(6300)	-29260.200
<sup>182</sup> Au	(-28300)	(1435500)	(-4800)	(18700)	(4900)	
<sup>182</sup> Hg	(-23500)	(1429900)	(-10100)	(19500)	(3800)	
<sup>182</sup> Tl	(-13400)	(1419000)	(-6600)	(20400)	(2300)	
<sup>182</sup> Pb	-6822.17	1411650.17			(1210)	
<sup>183</sup> Lu	(-39500)	(1461000)	(3800)	(10900)		(6300)
<sup>183</sup> Hf	-43290.30	1464010.30	2010.30	12010.30	(17000)	(390)
<sup>183</sup> Ta	-45296.3	1465236.3	1070.018	12997.13	(15100)	(-5070)
<sup>183</sup> W	-46366.3	1465524.3	-556.8	14255.5	13530.3	(-10720)
<sup>183</sup> Re	-45810.8	1464185.8	(-2130)	15438.16	11946.8	(-15600)
<sup>183</sup> Os	(-43680)	(1461270)	-3450.100	(16300)	(10000)	(-20000)
<sup>183</sup> Ir	(-40230)	(1457040)	(-4600)	(16900)	(8290)	(-24100)
<sup>183</sup> Pt	(-35650)	(1451680)	(-5500)	(17500)	(6700)	(-28100)
<sup>183</sup> Au	(-30200)	(1445400)	(-6500)	(18300)	(5300)	
<sup>183</sup> Hg	(-23700)	(1438200)	(-7600)	(19200)	(4000)	
<sup>183</sup> Tl	(-16100)	(1429800)	(-8600)	(20100)	(2700)	
<sup>183</sup> Pb	(-7500)	(1420400)		(20600)	(1400)	
<sup>184</sup> Lu	(-36200)	(1465700)	(5300)	(10600)		(8100)
<sup>184</sup> Hf	-41500.40	1470290.40	1340.30	11580.40		2750.40
<sup>184</sup> Ta	-42840.30	1470850.30	2870.30	12550.30	(15700)	-3100.300
<sup>184</sup> W	-45706.3	1472935.3	-1483.4	13602.410	14224.7	(-8350)
<sup>184</sup> Re	-44223.5	1470670.5	31.4	14920.100	12369.5	(-13930)
<sup>184</sup> Os	-44255.3	1469919.3	-4600.300	15859.25	10586.217	(-18080)
<sup>184</sup> Ir	-39700.300	1464600.300	(-2300)	16800.300	8800.300	(-22700)
<sup>184</sup> Pt	(-37360)	(1461460)	(-7060)	(17400)	(7400)	(-26400)
<sup>184</sup> Au	(-30300)	(1453620)	(-4120)	(18100)	(5870)	
<sup>184</sup> Hg	(-26180)	(1448710)	(-9200)	(18800)	(4700)	
<sup>184</sup> Tl	(-17000)	(1438700)	(-6000)	(19700)	(3300)	
<sup>184</sup> Pb	(-10990)	(1431960)		(20310)	(2100)	
<sup>185</sup> Hf	(-38400)	(1475300)	(3000)	(11300)		(4400)
<sup>185</sup> Ta	-41396.14	1477479.14	1992.14	12244.14	(16500)	(-960)
<sup>185</sup> W	-43388.3	1478689.3	433.09	13165.54	14680.30	-6830.210
<sup>185</sup> Re	-43821.3	1478340.3	-1012.84	14154.8	13103.820	-11970.210
<sup>185</sup> Os	-42809.3	1476545.3	(-2370)	(15270)	11021.010	(-16700)
<sup>185</sup> Ir	(-40440)	(1473390)	(-3900)	(16350)	(9200)	(-21000)
<sup>185</sup> Pt	-36560.210	1468730.210	-4710.40	(17100)	(7460)	(-25000)
<sup>185</sup> Au	-31850.210	1463240.210	(-5800)	(17800)	(6200)	(-29700)
<sup>185</sup> Hg	(-26100)	(1456700)	(-6600)	(18500)	(5000)	
<sup>185</sup> Tl	(-19500)	(1449300)	(-7900)	(19500)	(3900)	
<sup>185</sup> Pb	(-11600)	(1440600)	(-9400)	(20200)	(2500)	
<sup>185</sup> Bi	(-2140)	(1430400)			(600)	
<sup>186</sup> Hf	(-36400)	(1481300)	(2200)	(11000)		(6600)
<sup>186</sup> Ta	-38610.60	1482760.60	3900.60	11910.70	(17000)	560.60
<sup>186</sup> W	-42511.3	1485883.3	-581.617	12948.017	15590.40	-4720.30
<sup>186</sup> Re	-41930.3	1484519.3	1069.59	13849.4	13670.30	-10260.140



Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>186</sup> Os	-42999.3	1484807.3	-3831.20	14887.4 15	11871.2 14	-14550.200
<sup>186</sup> Ir	-39168.20	1480193.20	-1380.40	15600.300	9523.20	(-19200)
<sup>186</sup> Pt	-37790.30	1478030.30	-6120.140	(16570)	8110.30	(-23200)
<sup>186</sup> Au	-31670.140	1471130.140	-3230.140	(17520)	6600.300	(-28400)
<sup>186</sup> Hg	-28450.200	1467130.200	(-8500)	(18400)	(5700)	
<sup>186</sup> Tl	(-20000)	(1457900)	(-5400)	(19100)	(4300)	
<sup>186</sup> Pb	(-14600)	(1451700)	(-11300)	(19800)	(3000)	
<sup>186</sup> Bi	(-3300)	(1439600)			(900)	
<sup>187</sup> Ta	(-36900)	(1489100)	(3000)	(11600)		(2800)
<sup>187</sup> W	-39907.3	1491350.3	1311.2 13	12660.9 17	(16100)	(-3170)
<sup>187</sup> Re	-41218.3	1491879.3	2.663 19	13539.1 14	14399.14	(-8210)
<sup>187</sup> Os	-41221.3	1491099.3	-1502.6	14554.5 15	12410.0 15	(-13080)
<sup>187</sup> Ir	-39718.7	1488814.7	(-2980)	(15430)	10475.6	(-17500)
<sup>187</sup> Pt	(-36740)	(1485050)	(-3730)	(16300)	(8510)	(-21900)
<sup>187</sup> Au	(-33010)	(1480540)	(-4900)	(17300)	(7150)	(-26900)
<sup>187</sup> Hg	(-28150)	(1474890)	(-5900)	(18200)	(6200)	
<sup>187</sup> Tl	(-22200)	(1468200)	(-7300)	(18900)	(4900)	
<sup>187</sup> Pb	(-14900)	(1460100)	(-8800)	(19400)	(3400)	
<sup>187</sup> Bi	(-6100)	(1450500)		(20100)	(1200)	
<sup>188</sup> Ta	(-33800)	(1494100)	(4900)	(11300)		(4500)
<sup>188</sup> W	-38669.4	1498184.4	349.3	12300.3	(16800)	-846.6
<sup>188</sup> Re	-39018.3	1497750.3	2120.4 4	13231.0 14	14990.60	(-6500)
<sup>188</sup> Os	-41139.3	1499088.3	-2809.7	14281.9 14	13205.1 13	(-10920)
<sup>188</sup> Ir	-38329.7	1495497.7	-506.7	15304.21	10977.7	(-15900)
<sup>188</sup> Pt	-37823.6	1494208.6	(-5300)	16180.30	9401.5	(-20180)
<sup>188</sup> Au	(-32520)	(1488130)	(-2300)	(16990)	(7930)	(-25200)
<sup>188</sup> Hg	(-30220)	(1485040)	(-7800)	(17900)	(7010)	
<sup>188</sup> Tl	(-22430)	(1476470)	(-4800)	(18600)	(5300)	
<sup>188</sup> Pb	(-17640)	(1470900)	(-10400)	(19200)	(3800)	
<sup>188</sup> Bi	(-7300)	(1459800)		(20200)	(1900)	
<sup>189</sup> W	-35480.200	1503060.200	2500.200	11710.200		1010.200
<sup>189</sup> Re	-37979.9	1504782.9	1009.8	12903.8	(15700)	(-4340)
<sup>189</sup> Os	-38988.3	1505009.3	-532.13	13909.9 6	13659.0 14	(-9300)
<sup>189</sup> Ir	-38455.13	1503694.13	-1971.14	14880.14	11815.13	(-13900)
<sup>189</sup> Pt	-36485.11	1500941.11	(-2850)	(15890)	9842.11	(-18700)
<sup>189</sup> Au	(-33640)	(1497310)	(-3950)	(16770)	(8500)	(-23900)
<sup>189</sup> Hg	(-29700)	(1492600)	-5180.200	(17700)	(7500)	
<sup>189</sup> Tl	(-24500)	(1486600)	(-6700)	(18500)	(6100)	
<sup>189</sup> Pb	(-17800)	(1479100)	(-8000)	(19100)	(4200)	
<sup>189</sup> Bi	(-9800)	(1470300)		(19800)	(2200)	
<sup>190</sup> W	-34300.220	1509960.220	1270.70	11770.220		3030.220
<sup>190</sup> Re	-35570.210	1510440.210	3140.210	12690.210	(16300)	-2690.210
<sup>190</sup> Os	-38708.3	1512801.3	-2000.200	13712.2 10	14617.3	(-7300)
<sup>190</sup> Ir	-36710.200	1510020.200	620.200	14520.200	12270.200	(-12300)
<sup>190</sup> Pt	-37325.6	1509853.6	-4442.15	15645.7	10764.6	-17000.200
<sup>190</sup> Au	-32883.16	1504628.16	(-1470)	(16500)	9132.17	(-22200)
<sup>190</sup> Hg	(-31410)	(1502380)	-7000.400	(17330)	(8170)	(-26900)
<sup>190</sup> Tl	(-24400)	(1494600)	(-4100)	(18100)	(6500)	
<sup>190</sup> Pb	-20330.200	1489720.200	(-9600)	(18800)	(4700)	
<sup>190</sup> Bi	(-10700)	(1479300)	(-6100)	(19500)	(2800)	
<sup>190</sup> Po	(-4600)	(1472400)			(1500)	
<sup>191</sup> Re	-34350.11	1517296.11	2045.10	12514.13		-490.50
<sup>191</sup> Os	-36395.3	1518559.3	313.7 11	13550.2 9	15490.200	-5710.90
<sup>191</sup> Ir	-36709.3	1518091.3	-1019.4	14396.13	13308.8	(-10520)
<sup>191</sup> Pt	-35691.5	1516290.5	-1830.50	15348.11	11281.4	(-15380)
<sup>191</sup> Au	-33860.50	1513680.50	-3180.70	(16370)	9980.50	(-20900)
<sup>191</sup> Hg	-30680.90	1509710.90	(-4490)	(17100)	8770.90	(-25700)
<sup>191</sup> Tl	(-26190)	(1504440)	(-5900)	(17800)	(7100)	
<sup>191</sup> Pb	(-20310)	(1497780)	(-7300)	(18600)	(5200)	
<sup>191</sup> Bi	(-13000)	(1489700)	(-8000)	(19400)	(3100)	
<sup>191</sup> Po	(-5000)	(1480900)			(1700)	
<sup>192</sup> Re	(-31710)	(1522730)	(4170)	(12300)		(1070)
<sup>192</sup> Os	-35882.3	1526117.4	-1046.2 23	13316.6 21	16160.220	(-3800)
<sup>192</sup> Ir	-34836.3	1524289.3	1459.7 19	14270.200	13850.210	(-8890)
<sup>192</sup> Pt	-36296.3	1524966.3	-3516.16	15113.6	12165.4 22	(-13720)
<sup>192</sup> Au	-32779.16	1520667.16	(-700)	16039.22	10650.200	(-19150)
<sup>192</sup> Hg	(-32100)	(1519200)	(-6120)	(16800)	(9300)	(-24200)
<sup>192</sup> Tl	(-25950)	(1512270)	(-3400)	(17700)	(7640)	
<sup>192</sup> Pb	(-22580)	(1508120)	(-8900)	(18400)	(5740)	

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>192</sup> Bi	(-13630)	(1498390)	(-5700)	(19100)	(3800)	
<sup>192</sup> Po	(-7900)	(1491870)		(19500)	(2200)	
<sup>193</sup> Os	-33396 4	1531702 4	1140.5 24	13143.1 22		-2325 19
<sup>193</sup> Ir	-34536 3	1532060 3	-56.6 3	13969.9 3	14764 10	(-7100)
<sup>193</sup> Pt	-34480 3	1531222 3	-1069 9	14932 3	12662.3 12	(-12200)
<sup>193</sup> Au	-33411 9	1529371 9	-2340 17	15690 50	11280 9	(-17600)
<sup>193</sup> Hg	-31071 19	1526248 19	(-3640)	16530 90	9958 19	(-22800)
<sup>193</sup> Tl	(-27430)	(1521830)	(-5200)	(17400)	(8150)	(-27600)
<sup>193</sup> Pb	(-22280)	(1515890)	(-6500)	(18100)	(6180)	
<sup>193</sup> Bi	(-15800)	(1508600)	(-7500)	(18900)	(4200)	
<sup>193</sup> Po	(-8300)	(1500300)	(-8500)	(19500)	(2600)	
<sup>193</sup> At	(200)	(1491100)			(1400)	
<sup>194</sup> Os	-32435 4	1538813 4	96.6 20	12696 3		-189 23
<sup>194</sup> Ir	-32532 3	1538127 3	2246.8 16	13838.7 4	(15400)	(-5570)
<sup>194</sup> Pt	-34779 3	1539592 3	-2492 11	14625.8 24	13475 3	(-10530)
<sup>194</sup> Au	-32287 12	1536317 12	-40 20	15650 19	12029 11	(-16200)
<sup>194</sup> Hg	-32247 23	1535495 23	(-5280)	(16300)	10529 23	-21330 200
<sup>194</sup> Tl	(-26960)	(1529430)	(-2700)	(17200)	(8760)	(-26000)
<sup>194</sup> Pb	(-24250)	(1525930)	-8200 400	(17820)	(6800)	
<sup>194</sup> Bi	(-16100)	(1517000)	(-5200)	(18600)	(4700)	
<sup>194</sup> Po	-10910 200	1511030 200	(-10000)	(19200)	(2900)	
<sup>194</sup> At	(-1000)	(1500300)			(1900)	
<sup>195</sup> Os	-29700 500	1544100 500	2000 500	12400 500		1400 500
<sup>195</sup> Ir	-31692 3	1545359 3	1120.0 16	13298.7 4		(-3420)
<sup>195</sup> Pt	-32812 3	1545697 3	-226.8 10	14475.3 16	13994 3	(-9000)
<sup>195</sup> Au	-32586 3	1544688 3	-1510 50	15317 9	12627.2 19	(-14660)
<sup>195</sup> Hg	-31080 50	1542400 50	(-2810)	16150 50	11170 50	(-19940)
<sup>195</sup> Tl	(-28270)	(1538810)	(-4500)	(16980)	(9440)	(-25100)
<sup>195</sup> Pb	(-23800)	(1533500)	(-5900)	(17600)	(7300)	
<sup>195</sup> Bi	(-17930)	(1526900)	(-6800)	(18300)	(5100)	
<sup>195</sup> Po	(-11140)	(1519330)	(-7900)	(19000)	(3400)	
<sup>195</sup> At	(-3200)	(1510600)		(19500)	(2000)	
<sup>196</sup> Os	-28300 40	1550820 40	1160 60	12000 40		3550 40
<sup>196</sup> Ir	-29450 40	1551190 40	3210 40	13060 40		(-1990)
<sup>196</sup> Pt	-32663 3	1553619 3	-1506 3	14026.94 19	14806 3	(-7240)
<sup>196</sup> Au	-31157 4	1551331 4	686 3	15013 12	13203 3	(-13090)
<sup>196</sup> Hg	-31843 4	1551234 4	(-4380)	15739 23	11643 3	(-18350)
<sup>196</sup> Tl	(-27470)	(1546070)	(-2050)	(16650)	(9760)	(-23500)
<sup>196</sup> Pb	(-25420)	(1543250)	(-7360)	(17310)	(7750)	(-27570)
<sup>196</sup> Bi	(-18060)	(1535110)	(-4600)	(18100)	(5700)	
<sup>196</sup> Po	(-13500)	(1529760)	(-9500)	(18700)	(3820)	
<sup>196</sup> At	(-4000)	(1519480)	(-6200)	(19200)	(2500)	
<sup>196</sup> Rn	(2150)	(1512550)			(1500)	
<sup>197</sup> Ir	-28283 20	1558093 20	2155 20	12734 20		90 40
<sup>197</sup> Pt	-30438 3	1559465 3	718.9 6	13768.3 3	15300 500	(-5640)
<sup>197</sup> Au	-31157 3	1559402 3	-600 3	14714.0 12	14042.5 17	-11530 240
<sup>197</sup> Hg	-30557 4	1558020 4	-2180 30	15620 50	13232 3	(-17110)
<sup>197</sup> Tl	-28380 30	1555060 30	(-3580)	(16250)	10370 30	(-22100)
<sup>197</sup> Pb	(-24800)	(1550690)	(-5200)	(17200)	(8300)	(-26300)
<sup>197</sup> Bi	-19620 240	1544740 240	(-6200)	(17800)	(5930)	
<sup>197</sup> Po	(-13450)	(1537780)	(-7200)	(18500)	(4200)	
<sup>197</sup> At	(-6300)	(1529800)	(-7800)	(19200)	(2900)	
<sup>197</sup> Rn	(1500)	(1521200)			(1900)	
<sup>198</sup> Ir	(-25820)	(1563700)	(4100)	(12510)		(1690)
<sup>198</sup> Pt	-29923 4	1567022 4	-325 3	13403 3	16200 40	(-3820)
<sup>198</sup> Au	-29598 3	1565914 3	1372.5 5	14583 3	14720 40	-10060 180
<sup>198</sup> Hg	-30970 3	1566504 3	-3460 80	15270 3	12885.5 9	(-15450)
<sup>198</sup> Tl	-27510 80	1562260 80	(-1410)	(16190)	10930 80	(-20800)
<sup>198</sup> Pb	(-26100)	(1560070)	(-6560)	(16820)	(8840)	(-24960)
<sup>198</sup> Bi	-19540 180	1552730 180	(-4020)	(17600)	(6650)	
<sup>198</sup> Po	(-15520)	(1547920)	-8800 400	(18160)	(4670)	
<sup>198</sup> At	(-6800)	(1538400)	(-5600)	(18900)	(3300)	
<sup>198</sup> Rn	-1140 200	1531980 200		(19400)	(2200)	
<sup>199</sup> Ir	-24420 40	1570370 40	2990 40	12280 50		3700 110
<sup>199</sup> Pt	-27408 4	1572578 4	1703 3	13113 3		-2170 70
<sup>199</sup> Au	-29111 3	1573498 3	452.3 7	14096.71 19	15406 20	-8220 120
<sup>199</sup> Hg	-29563 3	1573168 3	-1450 100	15149 3	13703.2 9	(-14300)
<sup>199</sup> Tl	-28120 100	1570940 100	-2880 90	15880 100	11540 100	(-19390)
<sup>199</sup> Pb	-25230 70	1567280 70	-4350 120	(16580)	9260 70	(-23660)

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>199</sup> Bi	-20890 120	1562140 120	(-5600)	17410 230	7090 120	
<sup>199</sup> Po	(-15300)	(1555800)	(-6600)	(18000)	(5100)	
<sup>199</sup> At	(-8730)	(1548420)	(-7200)	(18600)	(3700)	
<sup>199</sup> Rn	(-1580)	(1540490)		(19300)	(2700)	
<sup>200</sup> Pt	-26618 20	1579860 20	660 60	12838 20		-365 24
<sup>200</sup> Au	-27280 50	1579730 50	2240 50	13820 50	(16030)	-6920 110
<sup>200</sup> Hg	-29520 3	1581197 3	-2456 6	14692.4 6	14175 3	(-12510)
<sup>200</sup> Tl	-27064 6	1577958 6	-811 14	15700 80	12044 6	(-18020)
<sup>200</sup> Pb	-26254 13	1576365 13	-5890 90	(16300)	9861 13	(-22230)
<sup>200</sup> Bi	-20360 90	1569690 90	(-3350)	16960 160	7430 120	(-26410)
<sup>200</sup> Po	(-17010)	(1565560)	(-7970)	(17640)	(5490)	
<sup>200</sup> At	(-9040)	(1556810)	(-5000)	(18400)	(4100)	
<sup>200</sup> Rn	(-4030)	(1551010)	(-10100)	(19000)	(3090)	
<sup>200</sup> Fr	(6050)	(1540150)			(1800)	
<sup>201</sup> Pt	-23760 50	1585070 50	2660 50	12490 50		1540 60
<sup>201</sup> Au	-26416 4	1586946 4	1263 3	13448 3	16580 40	-4960 30
<sup>201</sup> Hg	-27679 3	1587427 3	-483 15	14258.4 6	14849 3	(-11110)
<sup>201</sup> Tl	-27196 15	1586161 15	-1900 30	15220 100	12663 15	-16470 240
<sup>201</sup> Pb	-25290 30	1583480 30	-3840 40	16200 70	10310 30	(-21130)
<sup>201</sup> Bi	-21450 30	1578850 30	(-4880)	16710 120	7910 100	(-25200)
<sup>201</sup> Po	(-16570)	(1573190)	(-5800)	(17400)	(5920)	
<sup>201</sup> At	-10720 240	1566560 240	(-6600)	(18100)	4420 230	
<sup>201</sup> Rn	(-4160)	(1559210)	(-7900)	(18700)	(3500)	
<sup>201</sup> Fr	(3700)	(1550600)			(2100)	
<sup>202</sup> Pt	(-22600)	(1592000)	(1800)	(12100)		(3400)
<sup>202</sup> Au	-24420 170	1593020 170	2950 170	13280 170		-3620 170
<sup>202</sup> Hg	-27362 3	1595181 3	-1365 15	13984.5 6	15322 20	(-9390)
<sup>202</sup> Tl	-25997 15	1593034 15	-50 15	15076 16	13300 50	-15240 180
<sup>202</sup> Pb	-25948 10	1592202 10	-5150 50	15837 16	11006 10	(-19630)
<sup>202</sup> Bi	-20800 50	1586270 50	(-2820)	16580 110	8310 50	(-23900)
<sup>202</sup> Po	(-17980)	(1582660)	(-7210)	(17100)	(6300)	
<sup>202</sup> At	-10760 180	1574670 180	(-4440)	(17900)	4980 160	
<sup>202</sup> Rn	(-6320)	(1569440)	-9400 400	(18430)	(3880)	
<sup>202</sup> Fr	(3100)	(1559300)		(19100)	(2500)	
<sup>203</sup> Au	-23159 4	1599832 4	2124 4	12886 4		-1612 22
<sup>203</sup> Hg	-25283 3	1601174 3	491.8 12	13747.0 17	16110 50	-7970 70
<sup>203</sup> Tl	-25775 3	1600883 3	-975 6	14722 15	13937 3	-13520 120
<sup>203</sup> Pb	-24801 7	1599126 7	-3253 22	15650 30	11699 6	(-18600)
<sup>203</sup> Bi	-21547 21	1595090 21	-4230 60	16240 40	8930 30	(-22520)
<sup>203</sup> Po	-17310 70	1590070 70	-5060 120	(16880)	6600 70	(-25890)
<sup>203</sup> At	-12250 120	1584230 120	(-6000)	17670 230	5380 120	
<sup>203</sup> Rn	(-6200)	(1577400)	(-7200)	(18200)	(4200)	
<sup>203</sup> Fr	(980)	(1569440)	(-7600)	(18900)	(2900)	
<sup>203</sup> Ra	(8580)	(1561050)			(1800)	
<sup>204</sup> Au	(-20770)	(1605510)	(3940)	(12500)		(-90)
<sup>204</sup> Hg	-24707 3	1608669 3	-347.5 15	13487.8 9	(16700)	-6363 13
<sup>204</sup> Tl	-24360 3	1607539 3	763.72 18	14505 15	14520 170	-12490 90
<sup>204</sup> Pb	-25124 3	1607520 3	-4450 30	15318 9	12339.4 12	(-17080)
<sup>204</sup> Bi	-20670 30	1602290 30	-2330 30	16020 60	9250 30	(-21230)
<sup>204</sup> Po	-18344 13	1599176 13	-6480 90	(16510)	6974 16	(-24380)
<sup>204</sup> At	-11870 90	1591920 90	(-3820)	17250 160	5650 110	
<sup>204</sup> Rn	(-8040)	(1587310)	(-8600)	(17870)	(4650)	
<sup>204</sup> Fr	(550)	(1577930)	(-5500)	(18700)	(3300)	
<sup>204</sup> Ra	(6030)	(1571670)			(2230)	
<sup>205</sup> Au	(-19000)	(1611800)	(3300)	(12000)		(2100)
<sup>205</sup> Hg	-22304 5	1614337 5	1531 4	13163 4		-4760 30
<sup>205</sup> Tl	-23835 3	1615085 3	-51.1 5	14202.2 5	15253 3	-10830 30
<sup>205</sup> Pb	-23784 3	1614252 3	-2708 7	15126 6	13078.2 13	(-16020)
<sup>205</sup> Bi	-21075 8	1610761 8	-3530 30	15671 22	9878 7	-19830 240
<sup>205</sup> Po	-17540 30	1606450 30	-4540 40	16370 70	7320 30	(-23310)
<sup>205</sup> At	-13010 30	1601130 30	(-5250)	16900 120	6040 40	
<sup>205</sup> Rn	(-7760)	(1595100)	(-6500)	(17700)	(5030)	
<sup>205</sup> Fr	-1240 240	1587800 240	(-7000)	(18400)	3570 220	
<sup>205</sup> Ra	(5760)	(1580010)		(19000)	(2600)	
<sup>206</sup> Hg	-20960 21	1621064 21	1307 20	12395 20		-2763 23
<sup>206</sup> Tl	-22267 3	1621589 3	1533.5 7	14049.9 6	(16080)	-9780 50
<sup>206</sup> Pb	-23801 3	1622340 3	-3758 8	14819.7 4	13671.3 15	(-14640)
<sup>206</sup> Bi	-20043 8	1617800 8	-1847 12	15510 30	10261 8	-18630 180
<sup>206</sup> Po	-18197 10	1615171 10	-5710 50	15995 16	7651 9	(-21720)

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>206</sup> At	-12480.50	1608680.50	(-3320)	16760.110	6390.60	
<sup>206</sup> Rn	(-9170)	(1604580)	(-7760)	(17270)	(5400)	
<sup>206</sup> Fr	-1410.180	1596040.180	(-4930)	(18100)	4120.160	
<sup>206</sup> Ra	(3520)	(1590320)		(18650)	(3010)	
<sup>207</sup> Hg	-16230.150	1624410.150	4820.150	10070.150		930.150
<sup>207</sup> Tl	-21044.6	1628438.6	1423.5	13352.5	(16600)	-7795.22
<sup>207</sup> Pb	-22467.3	1629078.3	-2398.2.21	14826.0.4	14741.4	-13830.70
<sup>207</sup> Bi	-20069.4	1625897.4	-2909.6	15136.7	10812.0.21	-17140.120
<sup>207</sup> Po	-17160.7	1622206.7	-3910.22	15760.30	7954.6	(-20600)
<sup>207</sup> At	-13250.21	1617514.21	-4610.60	16390.40	6752.22	(-24520)
<sup>207</sup> Rn	-8640.70	1612120.70	-5710.120	(17020)	5670.70	
<sup>207</sup> Fr	-2930.120	1605620.120	(-6400)	17820.210	4500.110	
<sup>207</sup> Ra	(3500)	(1598400)	(-7800)	(18400)	(3300)	
<sup>207</sup> Ac	(11270)	(1589870)			(2100)	
<sup>208</sup> Hg	(-13100)	(1629300)	(3700)	(8300)		(4400)
<sup>208</sup> Tl	-16763.3	1632227.3	5001.0.17	10638.1.18		-4260.30
<sup>208</sup> Pb	-21764.3	1636446.3	-2879.1.20	14105.61.14	15382.20	-12105.13
<sup>208</sup> Bi	-18884.4	1632784.4	-1401.3.24	14984.8	11195.3.20	-16210.80
<sup>208</sup> Po	-17483.3	1630601.3	-4980.30	15429.10	8260.5.14	(-19140)
<sup>208</sup> At	-12500.30	1624830.30	-2840.30	16160.60	7030.30	(-23200)
<sup>208</sup> Rn	-9658.13	1621211.14	-6990.80	(16640)	6040.16	
<sup>208</sup> Fr	-2670.80	1613440.80	(-4320)	17400.160	4770.90	
<sup>208</sup> Ra	(1650)	(1608330)	(-9040)	(18010)	(3760)	
<sup>208</sup> Ac	(10700)	(1598510)			(2500)	
<sup>209</sup> Tl	-13647.10	1637183.10	3982.10	8745.11		-754.12
<sup>209</sup> Pb	-17629.3	1640382.3	644.2.11	11304.3.13	15980.150	-8660.30
<sup>209</sup> Bi	-18273.3	1640244.3	-1893.3.16	14346.7.20	11806.6	-14470.30
<sup>209</sup> Po	-16380.3	1637568.3	-3486.7	15362.7	8490.5.14	(-18190)
<sup>209</sup> At	-12893.8	1633300.8	-3930.30	15786.22	7402.8	-21810.240
<sup>209</sup> Rn	-8960.30	1628590.30	-5160.40	16470.70	6380.30	
<sup>209</sup> Fr	-3800.30	1622650.30	(-5620)	17020.110	5130.40	
<sup>209</sup> Ra	(1810)	(1616250)	(-7100)	(17800)	(4130)	
<sup>209</sup> Ac	8910.240	1608360.240		(18500)	2740.220	
<sup>210</sup> Tl	-9254.11	1640861.11	5489.11	8634.11		2733.14
<sup>210</sup> Pb	-14743.3	1645568.3	63.5.5	9121.7.9	(16200)	-5129.10
<sup>210</sup> Bi	-14806.3	1644849.3	1162.1.8	12064.3.19	12621.5.19	-11451.22
<sup>210</sup> Po	-15968.3	1645228.3	-3981.8	14627.7.14	8782.61.16	(-16380)
<sup>210</sup> At	-11987.8	1640465.8	-2374.12	15630.30	7681.8	-20610.190
<sup>210</sup> Rn	-9613.10	1637309.10	-6258.24	16097.16	6708.10	(-23610)
<sup>210</sup> Fr	-3355.22	1630268.22	(-3770)	16830.80	5430.30	
<sup>210</sup> Ra	(420)	(1625720)	(-8210)	(17380)	(4500)	
<sup>210</sup> Ac	8620.190	1616730.190	(-5380)	(18200)	3290.160	
<sup>210</sup> Th	(14000)	(1610570)			(2230)	
<sup>211</sup> Pb	-10497.3	1649393.3	1372.6	9011.3		-1727.7
<sup>211</sup> Bi	-11869.6	1649983.6	579.6	9739.6	12800.11	-7705.21
<sup>211</sup> Po	-12448.3	1649779.3	-786.3	12210.7.15	9396.9.14	-13280.70
<sup>211</sup> At	-11662.4	1648211.4	-2892.7	14911.8	7966.6.24	-18790.130
<sup>211</sup> Rn	-8770.7	1644536.7	-4605.21	15950.30	6968.7	(-22600)
<sup>211</sup> Fr	-4164.21	1639149.21	-5000.60	16500.40	5849.22	
<sup>211</sup> Ra	830.70	1633370.70	-6290.130	(17120)	4780.70	
<sup>211</sup> Ac	7120.130	1626300.130	(-6700)	17930.230	3650.120	
<sup>211</sup> Th	(13800)	(1618800)			(2500)	
<sup>212</sup> Pb	-7557.3	1654524.3	573.8.20	8957.3		1116.4
<sup>212</sup> Bi	-8131.3	1654316.3	2254.0.17	9467.0.19	13455.11	-4590.30
<sup>212</sup> Po	-10385.3	1655787.3	-1754.3	10558.94.19	10219.8.9	-10183.13
<sup>212</sup> At	-8631.4	1653251.4	43.4	12786.8	8402.3	-15910.90
<sup>212</sup> Rn	-8673.4	1652511.4	-5130.30	15203.10	7283.3	(-20710)
<sup>212</sup> Fr	-3540.30	1646600.30	-3340.30	16330.30	6140.30	
<sup>212</sup> Ra	-202.14	1642475.14	-7480.90	(16760)	5166.16	
<sup>212</sup> Ac	7280.90	1634210.90	(-4760)	17490.170	3950.90	
<sup>212</sup> Th	(12030)	(1628680)		(18110)	(2960)	
<sup>213</sup> Pb	(-3260)	(1658300)	(1980)	(8910)		(2450)
<sup>213</sup> Bi	-5240.8	1659496.8	1427.7	9513.9		-1677.11
<sup>213</sup> Po	-6667.4	1660141.4	-73.5	10362.3	10749.4	-6990.30
<sup>213</sup> At	-6594.6	1659286.6	-882.8	11075.5	9303.7	-12720.60
<sup>213</sup> Rn	-5712.7	1657621.7	-2148.10	13085.9	7842.7	(-17790)
<sup>213</sup> Fr	-3563.8	1654690.8	-3890.30	15541.22	6479.8	-23300.250
<sup>213</sup> Ra	320.30	1650020.30	-5800.70	16650.70	5490.30	
<sup>213</sup> Ac	6120.60	1643440.60	(-5950)	17140.130	4290.60	

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>213</sup> Th	(12070)	(1636710)	(-7700)	(17900)	(3340)	
<sup>213</sup> Pa	19730 250	1628270 250			1970 230	
<sup>214</sup> Pb	-188 3	1663298 3	1024 11	8773.9 21		4147 10
<sup>214</sup> Bi	-1212 11	1663540 11	3272 11	9224 11		-239 14
<sup>214</sup> Po	-4484 3	1666030 3	-1090 4	10242.4 9	11505 3	-4569 10
<sup>214</sup> At	-3394 5	1664157 5	941 10	10906 5	9841 4	-9810 50
<sup>214</sup> Rn	-4335 10	1664316 10	-3361 13	11804 10	8528 9	(-15000)
<sup>214</sup> Fr	-974 9	1660172 9	-1059 14	13570 30	6921 9	-20290 190
<sup>214</sup> Ra	85 11	1658331 11	-6340 60	15856 17	5820 11	
<sup>214</sup> Ac	6420 50	1651210 50	(-4250)	17000 110	4610 60	
<sup>214</sup> Th	(10670)	(1646190)	(-8650)	(17510)	(3710)	
<sup>214</sup> Pa	19320 190	1636750 190			2540 180	
<sup>215</sup> Bi	1710 100	1668690 100	2250 100	9200 100		1400 100
<sup>215</sup> Po	-545 3	1670162 3	720 7	10021 4	(11860)	-3064 8
<sup>215</sup> At	-1266 7	1670100 7	-82 10	10814 8	10604 10	-7270 50
<sup>215</sup> Rn	-1184 8	1669236 8	-1487 10	11615 10	9095 8	-12110 70
<sup>215</sup> Fr	304 8	1666966 8	-2215 10	12276 10	7680 8	-17490 140
<sup>215</sup> Ra	2519 8	1663968 8	-3490 50	13950 30	6347 10	
<sup>215</sup> Ac	6010 50	1659700 50	-4910 80	16260 80	5010 50	
<sup>215</sup> Th	10920 70	1654000 70	-6870 140	(17290)	3980 70	
<sup>215</sup> Pa	17790 140	1646350 140		18090 240	2910 140	
<sup>216</sup> Bi	(5780)	(1672700)	(4000)	(9160)		(2810)
<sup>216</sup> Po	1775 3	1675913 3	-469 4	9884 3	12615.2 20	-1503 9
<sup>216</sup> At	2244 4	1674662 4	2003 8	10505 5	11122 12	-5880 30
<sup>216</sup> Rn	240 8	1675883 8	-2729 14	11567 12	9853 7	-10053 17
<sup>216</sup> Fr	2969 13	1672372 13	-308 15	12200 15	8214 13	-14830 110
<sup>216</sup> Ra	3277 9	1671281 9	-4850 30	12950 14	6966 13	
<sup>216</sup> Ac	8120 30	1665650 30	-2170 30	14440 60	5480 30	
<sup>216</sup> Th	10294 16	1662700 16	-7510 110	(16520)	4369 19	
<sup>216</sup> Pa	17800 110	1654410 110		17660 190	3200 120	
<sup>217</sup> Po	(5830)	(1679930)	(1440)	(9770)		(-50)
<sup>217</sup> At	4387 8	1680590 8	741 8	10490 10	11900 100	-4306 15
<sup>217</sup> Rn	3646 5	1680548 5	-654 8	11313 9	10386 5	-8520 30
<sup>217</sup> Fr	4300 7	1679112 7	-1574 11	12146 9	9012 9	-12740 80
<sup>217</sup> Ra	5874 10	1676756 10	-2819 16	12788 12	7520 12	
<sup>217</sup> Ac	8693 13	1673154 13	-3480 30	13460 60	6188 14	
<sup>217</sup> Th	12170 30	1668890 30	-4860 80	14890 70	4930 30	
<sup>217</sup> Pa	17040 80	1663250 80		16900 150	3550 90	
<sup>218</sup> Po	8352 3	1685479 3	265 12	9565.8 20		1716 11
<sup>218</sup> At	8087 12	1684962 12	2883 12	10300 12	(12270)	-2740 50
<sup>218</sup> Rn	5204 3	1687062 3	-1842 5	11180 7	11149 3	-7155 14
<sup>218</sup> Fr	7045 5	1684438 5	409 12	12067 13	9777 6	-11590 70
<sup>218</sup> Ra	6636 11	1684065 11	-4190 50	12784 14	8182 13	(-15240)
<sup>218</sup> Ac	10830 50	1679090 50	-1530 50	13440 60	6720 50	
<sup>218</sup> Th	12359 14	1676778 14	-6280 80	14078 21	5496 16	
<sup>218</sup> Pa	18640 70	1669720 70	(-3240)	15310 130	4060 80	
<sup>218</sup> U	(21880)	(1665690)			(2990)	
<sup>219</sup> At	10520 80	1690600 80	1700 80	10010 80		-1030 100
<sup>219</sup> Rn	8826 3	1691512 3	218 7	10963 5	(11580)	-5630 50
<sup>219</sup> Fr	8608 7	1690947 7	-771 11	11835 10	10357 10	-9910 70
<sup>219</sup> Ra	9379 9	1689394 9	-2180 50	12638 12	8845 9	-13830 80
<sup>219</sup> Ac	11560 50	1686440 50	-2900 70	13280 50	7320 50	
<sup>219</sup> Th	14460 50	1682750 50	-4060 90	13860 60	5990 50	
<sup>219</sup> Pa	18520 70	1677910 70	-4690 110	14660 110	4750 70	
<sup>219</sup> U	23210 80	1672430 80			3540 90	
<sup>220</sup> At	(14250)	(1694940)	(3650)	(9980)		(510)
<sup>220</sup> Rn	10604 3	1697804 3	-865 4	10742 3	12325.2 20	-4051 22
<sup>220</sup> Fr	11469 5	1696157 5	1209 11	11718 6	11195 12	-8910 60
<sup>220</sup> Ra	10260 10	1696584 10	-3480 50	12518 15	9521 10	(-12760)
<sup>220</sup> Ac	13740 50	1692320 50	-910 60	13230 70	7880 50	
<sup>220</sup> Th	14655 22	1690624 22	-5720 60	13850 30	6559 25	
<sup>220</sup> Pa	20380 60	1684120 60	(-2640)	14400 90	5030 80	
<sup>220</sup> U	(23020)	(1680700)		(15000)	(3920)	
<sup>221</sup> At	(16900)	(1700400)	(2500)	(9800)		(2400)
<sup>221</sup> Rn	(14400)	(1702080)	(1130)	(10570)		(-2530)
<sup>221</sup> Fr	13270 8	1702428 8	315 9	11481 10	11830 80	-7100 50
<sup>221</sup> Ra	12955 7	1701960 7	-1550 50	12567 10	10449 7	(-11590)
<sup>221</sup> Ac	14510 50	1699620 50	-2420 50	13190 70	8680 50	
<sup>221</sup> Th	16927 10	1696424 10	-3440 50	13670 50	7030 13	

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>221</sup> Pa	20370 50	1692200 50	(-4180)	14300 90	5770 70	
<sup>221</sup> U	(24550)	(1687240)		(14810)	(4490)	
<sup>222</sup> At	(20800)	(1704500)	(4400)	(9600)		(4200)
<sup>222</sup> Rn	16367 3	1708185 3	25 21	10380.1 20		-823 13
<sup>222</sup> Fr	16342 21	1707427 21	2033 21	11270 21	(12490)	(-5760)
<sup>222</sup> Ra	14309 5	1708677 5	-2298 7	12093 11	10873 5	(-9970)
<sup>222</sup> Ac	16607 6	1705597 6	-582 14	13280 50	9440 6	
<sup>222</sup> Th	17190 13	1704232 13	(-4910)	13608 25	7648 16	
<sup>222</sup> Pa	(22100)	(1698540)	(-2180)	(14420)	(6220)	
<sup>222</sup> U	(24280)	(1695570)		(14880)	(4950)	
<sup>223</sup> At	(23600)	(1709800)	(3300)	(9400)		(5800)
<sup>223</sup> Rn	(20300)	(1712300)	(1900)	(10200)		(900)
<sup>223</sup> Fr	18379 3	1713461 3	1149.1 9	11033 8	(13100)	-3940 70
<sup>223</sup> Ra	17230 3	1713828 3	-586 7	11868 7	(11740)	-8590 70
<sup>223</sup> Ac	17816 7	1712460 7	-1555 12	12840 50	10032 10	
<sup>223</sup> Th	19371 10	1710123 10	-2950 70	13699 14	8162 11	
<sup>223</sup> Pa	22320 70	1706390 70	-3500 100	14190 90	6760 90	
<sup>223</sup> U	25820 70	1702100 70		(14870)	5680 70	
<sup>224</sup> Rn	(22400)	(1718300)	(800)	(10100)		(2500)
<sup>224</sup> Fr	21640 50	1718270 50	2830 50	10840 50	(13700)	-2220 70
<sup>224</sup> Ra	18818 3	1720311 3	-1403 4	11634 5	12126.7 20	-6882 25
<sup>224</sup> Ac	20221 5	1718126 5	232 13	12529 6	10699 21	
<sup>224</sup> Th	19989 12	1717575 12	-3870 50	13343 17	8898 13	
<sup>224</sup> Pa	23860 50	1712920 50	-1840 60	(14380)	7330 50	
<sup>224</sup> U	25700 25	1710300 25		(14730)	6070 30	
<sup>225</sup> Rn	(26500)	(1722300)	(2600)	(9900)		(4200)
<sup>225</sup> Fr	23853 10	1724130 10	1865 10	10669 10	(14300)	-470 70
<sup>225</sup> Ra	21987 3	1725213 3	358 7	11385 3	(12900)	-5380 50
<sup>225</sup> Ac	21630 8	1724788 8	-671 10	12329 10	11327 8	-9950 70
<sup>225</sup> Th	22301 7	1723335 7	-2020 70	13212 11	9507 7	
<sup>225</sup> Pa	24330 70	1720530 70	-3050 90	14140 100	8070 70	
<sup>225</sup> U	27370 50	1716700 50	-4210 90	14600 90	6580 50	
<sup>225</sup> Np	31580 70	1711710 70			5320 100	
<sup>226</sup> Rn	(28800)	(1728100)	(1400)	(9800)		(5600)
<sup>226</sup> Fr	27330 90	1728720 90	3670 90	10450 100		1310 90
<sup>226</sup> Ra	23662.3 25	1731610 3	-640 3	11298.4 20	(13400)	-3667 19
<sup>226</sup> Ac	24303 4	1730187 4	1117 5	12061 5	11920 50	(-8420)
<sup>226</sup> Th	23186 5	1730522 5	-2834 12	12946 13	10210 5	
<sup>226</sup> Pa	26019 12	1726906 12	-1311 22	13980 50	8780 12	
<sup>226</sup> U	27330 19	1724813 19	(-5390)	14510 30	7237 22	
<sup>226</sup> Np	(32720)	(1718640)			(5720)	
<sup>227</sup> Rn	(33000)	(1731900)	(3300)	(9700)		(7200)
<sup>227</sup> Fr	29650 100	1734470 100	2480 100	10340 100		2830 100
<sup>227</sup> Ra	27172 3	1736171 3	1326.2 24	10958 3	(13900)	-1834 17
<sup>227</sup> Ac	25846 3	1736715 3	44.8 8	11926 8	12584 10	-6720 70
<sup>227</sup> Th	25801 3	1735977 3	-1019 8	12643 7	10764 3	
<sup>227</sup> Pa	26821 8	1734176 8	-2186 18	13650 70	9387 10	
<sup>227</sup> U	29007 17	1731207 17	-3560 70	14510 50	7872 18	
<sup>227</sup> Np	32560 70	1726870 70		15160 100	6340 100	
<sup>228</sup> Rn	(35500)	(1737500)	(2200)	(9400)		(8700)
<sup>228</sup> Fr	(33280)	(1738920)	(4340)	(10200)		(4370)
<sup>228</sup> Ra	28936.0 25	1742479 3	45.9 9	10869.0 24	(14400)	-282 16
<sup>228</sup> Ac	28890 3	1741742 3	2127 3	11555 4	13020 90	(-4810)
<sup>228</sup> Th	26763 3	1743087 3	-2148 4	12565 5	11477.2 20	-9310 30
<sup>228</sup> Pa	28911 5	1740157 5	-307 16	13251 12	9970 5	
<sup>228</sup> U	29218 16	1739068 16	(-4480)	14255 24	8546 16	
<sup>228</sup> Np	(33700)	(1733800)	(-2370)	(15160)	(6900)	
<sup>228</sup> Pu	36070 30	1730650 30			5830 40	
<sup>229</sup> Fr	(35800)	(1744500)	(3400)	(10000)		(5900)
<sup>229</sup> Ra	32430 60	1747050 60	1760 40	10880 60	(15100)	1230 60
<sup>229</sup> Ac	30670 50	1748030 50	1100 50	11310 50	13560 110	-3090 100
<sup>229</sup> Th	29580 3	1748341 3	-310 9	12364 3	12170 3	-7810 70
<sup>229</sup> Pa	29890 9	1747248 9	-1311 11	13073 11	10534 9	
<sup>229</sup> U	31201 8	1745155 8	-2560 90	13948 18	9178 8	
<sup>229</sup> Np	33760 90	1741810 90	-3630 110	14940 110	7630 90	
<sup>229</sup> Pu	37390 70	1737400 70			6200 70	
<sup>230</sup> Fr	(39600)	(1748700)	(5100)	(9800)		(7400)
<sup>230</sup> Ra	34540 30	1753010 30	990 110	10530 30	(15500)	2940 30

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>230</sup> Ac	33560 100	1753220 100	2700 100	11480 100	(14300)	-1670 110
<sup>230</sup> Th	30857.2 20	1755135.3 20	-1310 3	12048.5 13	12656.8 19	-6072 24
<sup>230</sup> Pa	32167 3	1753043 3	564 5	12887 5	11301 4	
<sup>230</sup> U	31603 5	1752825 5	-3620 50	13757 16	9738 5	
<sup>230</sup> Np	35220 50	1748420 50	-1710 60	(14620)	8270 50	
<sup>230</sup> Pu	36930 24	1745933 24		15290 40	6870 30	
<sup>231</sup> Fr	(42300)	(1754100)	(3900)	(9600)		(8900)
<sup>231</sup> Ra	(38400)	(1757200)	(2500)	(10200)		(4600)
<sup>231</sup> Ac	35910 100	1758940 100	2100 100	10910 110	(14500)	300 110
<sup>231</sup> Th	33810.5 20	1760253.3 20	389.5 17	11912.1 23	13200 60	(-4620)
<sup>231</sup> Pa	33421 3	1759860 3	-382 3	12612 9	11830 50	(-9000)
<sup>231</sup> U	33803 4	1758696 4	-1810 50	13541 9	10355 4	
<sup>231</sup> Np	35610 50	1756100 50	(-2820)	14290 100	8850 50	
<sup>231</sup> Pu	(38430)	(1752500)	(-4000)	(15100)	(7350)	
<sup>231</sup> Am	(42400)	(1747700)			(5900)	
<sup>232</sup> Fr	(46300)	(1758200)	(5600)	(9500)		(10300)
<sup>232</sup> Ra	(40700)	(1763000)	(1600)	(10000)		(6100)
<sup>232</sup> Ac	39140 100	1763770 100	3700 100	10560 140	(15000)	(1790)
<sup>232</sup> Th	35443.7 20	1766691.4 21	-495 8	11556.2 12	13680 30	-2915 19
<sup>232</sup> Pa	35939 8	1765414 8	1337 7	12371 8	12200 100	(-7500)
<sup>232</sup> U	34602 3	1765969 3	(-2750)	13144 5	10833.6 13	
<sup>232</sup> Np	(37350)	(1762440)	(-1010)	(14010)	(9390)	
<sup>232</sup> Pu	38358 19	1760647 19	(-5000)	14710 30	7823 19	
<sup>232</sup> Am	(43400)	(1754800)			(6400)	
<sup>233</sup> Ra	(44700)	(1767100)	(3200)	(9800)		(7800)
<sup>233</sup> Ac	(41500)	(1769500)	(2800)	(10600)	(15400)	(3600)
<sup>233</sup> Th	38728.6 20	1771477.8 21	1245.1 14	11224.5 12	(14200)	-1310 50
<sup>233</sup> Pa	37483.5 23	1771940.5 23	570.1 20	12080.1 22	13000 100	(-5810)
<sup>233</sup> U	36913 3	1771728 3	-1030 50	13032 4	11475.0 21	(-10400)
<sup>233</sup> Np	37940 50	1769920 50	-2100 70	13810 70	10060 50	
<sup>233</sup> Pu	40040 50	1767030 50	(-3250)	(14530)	8340 50	
<sup>233</sup> Am	(43290)	(1763010)	(-4000)	(15300)	(6900)	
<sup>233</sup> Cm	(47300)	(1758200)			(5700)	
<sup>234</sup> Ra	(47100)	(1772800)	(2000)	(9800)		(8900)
<sup>234</sup> Ac	(45100)	(1774000)	(4500)	(10200)	(15700)	(5200)
<sup>234</sup> Th	40609 4	1777669 4	273 3	10977 3	(14700)	271 8
<sup>234</sup> Pa	40336 5	1777160 5	2195 4	11745 9	13390 100	(-4180)
<sup>234</sup> U	38140.6 20	1778572.5 20	-1810 8	12603.6 17	11881.0 11	(-8700)
<sup>234</sup> Np	39950 9	1775980 9	-388 11	(13540)	10566 11	
<sup>234</sup> Pu	40338 7	1774810 7	(-4180)	14163 20	8841 7	
<sup>234</sup> Am	(44520)	(1769850)	(-2300)	(15000)	(7410)	
<sup>234</sup> Cm	(46800)	(1766800)			(6100)	
<sup>235</sup> Ac	(47600)	(1779500)	(3400)	(10000)		(6600)
<sup>235</sup> Th	44250 50	1782100 50	1930 70	10620 50	(15000)	2070 50
<sup>235</sup> Pa	42320 50	1783240 50	1410 50	11300 50	(13800)	(-2420)
<sup>235</sup> U	40914.1 20	1783870.3 20	-123.7 9	12142.0 21	12392.5 11	(-7140)
<sup>235</sup> Np	41037.8 21	1782964.3 22	-1142 21	13050 50	11023.7 16	(-11700)
<sup>235</sup> Pu	42179 21	1781040 21	(-2560)	14010 50	9312 21	
<sup>235</sup> Am	(44740)	(1777700)	(-3300)	(14700)	(7780)	
<sup>235</sup> Cm	(48060)	(1773600)	(-4600)	(15400)	(6560)	
<sup>235</sup> Bk	(52700)	(1768200)			(5200)	
<sup>236</sup> Ac	(51400)	(1783800)	(5100)	(9800)		(8000)
<sup>236</sup> Th	(46300)	(1788100)	(1000)	(10400)	(15400)	(3400)
<sup>236</sup> Pa	45340 200	1788300 200	2900 200	11140 200	(14300)	(-830)
<sup>236</sup> U	42440.6 19	1790415.0 20	-930 50	11842.6 6	12746 3	(-5440)
<sup>236</sup> Np	43370 50	1788700 50	480 50	12720 50	11540 50	(-10000)
<sup>236</sup> Pu	42894 3	1788398 3	(-3280)	13587 7	9825.0 17	
<sup>236</sup> Am	(46170)	(1784340)	(-1710)	(14490)	(8360)	
<sup>236</sup> Cm	(47880)	(1781840)	(-5500)	(15100)	(7030)	
<sup>236</sup> Bk	(53400)	(1775500)			(5700)	
<sup>237</sup> Th	(50200)	(1792300)	(2600)	(10200)		(5100)
<sup>237</sup> Pa	47640 100	1794070 100	2250 100	10830 110	(14500)	1090 110
<sup>237</sup> U	45386.1 20	1795540.9 20	518.6 6	11670.6 7	13440 50	(-3880)
<sup>237</sup> Np	44867.5 20	1795277.1 20	-220.3 13	12312.9 11	12030 50	(-8300)
<sup>237</sup> Pu	45087.8 23	1794274.5 24	-1460 50	13234 21	10404.2 14	(-12700)
<sup>237</sup> Am	46550 50	1792030 50	(-2720)	(14330)	9070 50	
<sup>237</sup> Cm	(49270)	(1788530)	(-3900)	(14900)	(7490)	
<sup>237</sup> Bk	(53200)	(1783800)	(-4600)	(15600)	(6100)	
<sup>237</sup> Cf	(57800)	(1778400)			(4800)	

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>238</sup> Th	(52400)	(1798200)	(1600)	(10100)		(6200)
<sup>238</sup> Pa	50760 60	1799020 60	3460 60	10720 210	(15200)	2350 80
<sup>238</sup> U	47303.7 20	1801694.6 20	-147.1 11	11279.6 11	(13600)	-2080 40
<sup>238</sup> Np	47450.7 20	1800765.3 20	1292.0 7	12060 50	12470 200	(-6800)
<sup>238</sup> Pu	46158.7 20	1801274.9 20	-2260 50	12877.5 18	10859.9 6	(-11000)
<sup>238</sup> Am	48420 50	1798230 50	-970 60	(13900)	9530 70	
<sup>238</sup> Cm	49380 40	1796480 40	(-4900)	(14640)	8090 40	
<sup>238</sup> Bk	(54300)	(1790800)	(-2900)	(15300)	(6500)	
<sup>238</sup> Cf	(57200)	(1787100)			(5300)	
<sup>239</sup> Pa	(53200)	(1804600)	(2600)	(10600)		(3800)
<sup>239</sup> U	50568.7 20	1806500.9 20	1263.5 15	10960.0 12	(14200)	(-620)
<sup>239</sup> Np	49305.3 21	1806982.0 22	721.8 9	11704.9 10	12910 100	(-5100)
<sup>239</sup> Pu	48583.5 20	1806921.5 20	-802.9 20	12647.0 14	11380.5 7	(-9710)
<sup>239</sup> Am	49386 3	1805336 3	(-1800)	13300 50	10059.0 21	
<sup>239</sup> Cm	(51190)	(1802750)	(-3200)	(14220)	(8480)	
<sup>239</sup> Bk	(54400)	(1798800)	(-3900)	(15000)	(6800)	
<sup>239</sup> Cf	(58290)	(1794080)		(15700)	(5600)	
<sup>240</sup> Pa	(56800)	(1809100)	(4100)	(10100)		(5300)
<sup>240</sup> U	52709 5	1812432 5	388 16	10737 5	(14300)	994 5
<sup>240</sup> Np	52321 15	1812038 15	2200 15	11272 15	13020 60	(-3340)
<sup>240</sup> Pu	50121.3 19	1813454.9 20	-1379 14	12180.0 6	11760.3 11	(-7910)
<sup>240</sup> Am	51500 14	1811294 14	-215 14	13060 50	10528 14	(-12700)
<sup>240</sup> Cm	51716 3	1810296 3	(-3940)	13810 40	9021.0 19	
<sup>240</sup> Bk	(55660)	(1805570)	(-2370)	(14800)	(7340)	
<sup>240</sup> Cf	(58030)	(1802420)	(-6200)	(15300)	(5940)	
<sup>240</sup> Es	(64200)	(1795500)			(4700)	
<sup>241</sup> U	(56200)	(1817000)	(1900)	(10500)		(2500)
<sup>241</sup> Np	54260 70	1818170 70	1310 70	11190 70	(13500)	(-1840)
<sup>241</sup> Pu	52951.0 19	1818696.5 20	20.82 20	11775.1 6	12195.6 11	(-6400)
<sup>241</sup> Am	52930.2 20	1817935.0 20	-767.4 12	12598.8 21	10953.0 10	(-11000)
<sup>241</sup> Cm	53697.6 23	1816385.3 23	(-2400)	(13630)	9463.8 13	
<sup>241</sup> Bk	(56100)	(1813200)	(-3300)	(14400)	(7870)	
<sup>241</sup> Cf	(59400)	(1809200)	(-4600)	(15100)	(6400)	
<sup>241</sup> Es	(64000)	(1803800)			(5000)	
<sup>242</sup> U	(58610)	(1822670)	(1200)	(10240)		(3820)
<sup>242</sup> Np	(57410)	(1823090)	(2700)	(11050)	(14000)	(-400)
<sup>242</sup> Pu	54713.0 20	1825005.9 20	-751.0 7	11551.0 7	12574 5	-4610 40
<sup>242</sup> Am	55464.0 20	1823472.6 20	664.8 7	12179 14	11435 15	(-9500)
<sup>242</sup> Cm	54799.2 20	1823355.0 20	(-3000)	13059.1 19	9900.1 6	(-13600)
<sup>242</sup> Bk	(57800)	(1819570)	(-1530)	(14000)	(8280)	
<sup>242</sup> Cf	59330 40	1817260 40	(-5600)	(14840)	6970 40	
<sup>242</sup> Es	(64900)	(1810900)	(-3500)	(15400)	(5300)	
<sup>242</sup> Fm	(68400)	(1806600)			(4200)	
<sup>243</sup> Np	(59870)	(1828700)	(2120)	(10530)		(1180)
<sup>243</sup> Pu	57750 3	1830040 3	582 3	11344 3	(13000)	(-3190)
<sup>243</sup> Am	57168.3 22	1829839.6 22	-8.9 14	11904.6 11	11670 70	(-7700)
<sup>243</sup> Cm	57177.2 22	1829048.4 22	-1508 5	12663.0 16	10351.8 11	(-12230)
<sup>243</sup> Bk	58686 5	1826758 5	(-2250)	(13560)	8823 5	
<sup>243</sup> Cf	(60940)	(1823720)	(-3900)	(14600)	(7340)	
<sup>243</sup> Es	(64900)	(1819000)	(-4500)	(15200)	(5800)	
<sup>243</sup> Fm	(69410)	(1813690)			(4500)	
<sup>244</sup> Np	(63200)	(1833400)	(3400)	(10400)		(2500)
<sup>244</sup> Pu	59800 5	1836062 5	-76 5	11056 5	(13390)	-1670 5
<sup>244</sup> Am	59875.9 21	1835203.3 21	1428.1 9	11730.7 9	(12120)	(-6230)
<sup>244</sup> Cm	58447.8 19	1835849.0 20	-2256 14	12494.0 6	10843.1 7	(-10600)
<sup>244</sup> Bk	60703 14	1832811 14	-766 15	(13240)	9338 14	
<sup>244</sup> Cf	61470 3	1831263 3	(-4640)	14000 40	7907 3	
<sup>244</sup> Es	(66110)	(1825840)	(-2900)	(15000)	(6300)	
<sup>244</sup> Fm	(69000)	(1822200)		(15500)	(4900)	
<sup>245</sup> Pu	63098 14	1840835 14	1205 15	10794 14		(-280)
<sup>245</sup> Am	61893 4	1841257 4	894 3	11417 4	(12550)	(-4540)
<sup>245</sup> Cm	60999 3	1841369 3	-810.2 24	12320.4 22	11328 3	(-9200)
<sup>245</sup> Bk	61809.6 25	1839776.1 25	(-1570)	13019 5	9936.6 18	(-13700)
<sup>245</sup> Cf	(63380)	(1837430)	(-3050)	(13700)	(8380)	
<sup>245</sup> Es	(66430)	(1833590)	(-3800)	(14600)	(6830)	
<sup>245</sup> Fm	(70200)	(1829000)	(-5300)	(15300)	(5300)	
<sup>245</sup> Md	(75500)	(1823000)			(4000)	
<sup>246</sup> Pu	65389 15	1846615 15	401 14	10553 15		1304 15
<sup>246</sup> Am	64989 18	1846233 18	2376 18	11030 18	(12800)	(-2980)



Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>246</sup> Cm	62612.7 22	1847826.8 22	-1350 60	11977.8 12	11765 5	-7510 40
<sup>246</sup> Bk	63960 60	1845690 60	-120 60	12880 60	10490 60	(-12400)
<sup>246</sup> Cf	64085.7 22	1844789.1 22	(-3880)	13527 3	8940.1 12	
<sup>246</sup> Es	(67970)	(1840130)	(-2160)	(14300)	(7320)	
<sup>246</sup> Fm	70120 40	1837190 40	(-6200)	(15000)	5920 40	
<sup>246</sup> Md	(76300)	(1830200)			(4400)	
<sup>247</sup> Pu	(69000)	(1851100)	(1800)	(10200)		(2900)
<sup>247</sup> Am	(67150)	(1852150)	(1620)	(10890)		(-1460)
<sup>247</sup> Cm	65528 4	1852983 4	45 7	11614 4	12148 14	(-6030)
<sup>247</sup> Bk	65483 6	1852246 6	-646 6	12470 5	10989 6	(-10700)
<sup>247</sup> Cf	66129 8	1850818 8	(-2480)	(13390)	9449 8	
<sup>247</sup> Es	(68600)	(1847560)	(-2950)	(13970)	(7780)	
<sup>247</sup> Fm	(71560)	(1843830)	(-4600)	(14800)	(6400)	
<sup>247</sup> Md	(76200)	(1838400)		(15400)	(4800)	
<sup>248</sup> Am	(70560)	(1856810)	(3170)	(10580)		(270)
<sup>248</sup> Cm	67386 5	1859196 5	(-690)	11369 5	12581 15	-4510 13
<sup>248</sup> Bk	(68070)	(1857730)	(840)	(12030)	(11490)	(-9160)
<sup>248</sup> Cf	67233 5	1857784 5	(-3060)	12995 5	9957 5	
<sup>248</sup> Es	(70290)	(1853950)	(-1610)	(13820)	(8250)	
<sup>248</sup> Fm	71897 12	1851556 12	(-5330)	14370 40	6767 12	
<sup>248</sup> Md	(77230)	(1845440)		(15200)	(5300)	
<sup>249</sup> Am	(73100)	(1862300)	(2400)	(10200)		(1900)
<sup>249</sup> Cm	70744 5	1863909 5	901 5	10926 5	(12800)	(-2870)
<sup>249</sup> Bk	69843 3	1864028 3	124.0 14	11782 6	(11880)	(-7470)
<sup>249</sup> Cf	69719 3	1863369 3	(-1450)	12552 8	10386 4	(-12100)
<sup>249</sup> Es	(71170)	(1861140)	(-2440)	(13580)	(8890)	
<sup>249</sup> Fm	(73610)	(1857910)	(-3700)	(14090)	(7100)	
<sup>249</sup> Md	(77320)	(1853430)	(-4500)	(15000)	(5870)	
<sup>249</sup> No	(81800)	(1848200)			(4300)	
<sup>250</sup> Cm	72983 11	1869742 11	37 12	10546 10		-1084 16
<sup>250</sup> Bk	72946 4	1868997 4	1780 3	(11270)	(12190)	(-5800)
<sup>250</sup> Cf	71166.1 22	1869994.0 22	(-2100)	12210 5	10798 5	(-10330)
<sup>250</sup> Es	(73270)	(1867110)	(-800)	(13170)	(9390)	
<sup>250</sup> Fm	74068 12	1865528 12	(-4600)	13972 17	7744 13	
<sup>250</sup> Md	(78700)	(1860100)	(-2800)	(14700)	(6200)	
<sup>250</sup> No	(81500)	(1856530)			(4980)	
<sup>251</sup> Cm	76641 23	1874155 23	1420 20	10246 23		663 24
<sup>251</sup> Bk	75221 11	1874792 11	1093 10	10765 11	(12500)	(-3880)
<sup>251</sup> Cf	74128 5	1875103 5	-376 7	11734 5	11194 5	(-8740)
<sup>251</sup> Es	74504 6	1873945 6	-1474 7	(12810)	9917 6	(-13400)
<sup>251</sup> Fm	75979 8	1871688 8	(-3120)	(13780)	8319 8	
<sup>251</sup> Md	(79100)	(1867780)	(-3800)	(14400)	(6650)	
<sup>251</sup> No	(82870)	(1863240)	(-5000)	(15100)	(5320)	
<sup>251</sup> Lr	(87900)	(1857400)			(4000)	
<sup>252</sup> Cm	(79100)	(1879800)	(500)	(10100)		(2200)
<sup>252</sup> Bk	(78530)	(1879560)	(2500)	(10560)		(-2200)
<sup>252</sup> Cf	76028 5	1881275 5	-1260 50	11281 5	11533 10	-6843 14
<sup>252</sup> Es	77290 50	1879230 50	480 50	(12120)	10240 50	(-11500)
<sup>252</sup> Fm	76811 6	1878927 6	(-3880)	13399 13	8933 6	
<sup>252</sup> Md	(80700)	(1874260)	(-2180)	(14100)	(7150)	
<sup>252</sup> No	82871 13	1871302 13	(-5900)	(14770)	5774 17	
<sup>252</sup> Lr	(88800)	(1864600)			(4500)	
<sup>253</sup> Bk	(80900)	(1885200)	(1600)	(10400)		(-400)
<sup>253</sup> Cf	79295 6	1886079 6	288 6	10976 6	11924 23	(-5140)
<sup>253</sup> Es	79007 3	1885584 3	-334 4	11639 6	10792 11	(-9730)
<sup>253</sup> Fm	79341 5	1884468 5	(-1960)	12780 9	9365 6	(-14400)
<sup>253</sup> Md	(81300)	(1881730)	(-3100)	(13900)	(7780)	
<sup>253</sup> No	(84440)	(1877810)	(-4300)	(14600)	(6120)	
<sup>253</sup> Lr	(88730)	(1872730)	(-5000)	(15300)	(4900)	
<sup>253</sup> Rf	(93800)	(1866900)			(3700)	
<sup>254</sup> Bk	(84400)	(1889800)	(3100)	(10300)		(800)
<sup>254</sup> Cf	81335 12	1892111 12	-652 13	10836 11	(12300)	-3384 21
<sup>254</sup> Es	81986 4	1890677 4	1088 3	11440 50	(11120)	(-8000)
<sup>254</sup> Fm	80898 3	1890983 3	(-2680)	12056 6	9708 5	(-12400)
<sup>254</sup> Md	(83580)	(1887520)	(-1140)	(13260)	(8290)	
<sup>254</sup> No	84718 18	1885598 18	(-5300)	14296 22	6671 18	
<sup>254</sup> Lr	(90000)	(1879600)	(-3300)	(15000)	(5300)	
<sup>254</sup> Rf	(93300)	(1875400)			(4100)	

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>255</sup> Cf	(84800)	(1896710)	(720)	(10640)		(-2040)
<sup>255</sup> Es	84083 <i>11</i>	1896652 <i>11</i>	290 <i>10</i>	11067 <i>11</i>	(11400)	(-6060)
<sup>255</sup> Fm	83793 <i>5</i>	1896159 <i>5</i>	-1043 <i>8</i>	11691 <i>6</i>	10080 <i>6</i>	(-10750)
<sup>255</sup> Md	84836 <i>7</i>	1894334 <i>7</i>	-2009 <i>11</i>	(12610)	8749 <i>7</i>	(-15200)
<sup>255</sup> No	86845 <i>12</i>	1891542 <i>12</i>	(-3300)	(13740)	7074 <i>13</i>	
<sup>255</sup> Lr	(90140)	(1887470)	(-4400)	(14700)	(5700)	
<sup>255</sup> Rf	(94540)	(1882280)	(-5500)	(15400)	(4500)	
<sup>255</sup> Ha	(100000)	(1876000)			(3300)	
<sup>256</sup> Cf	(87000)	(1902500)	(-100)	(10400)		(-800)
<sup>256</sup> Es	(87180)	(1901630)	(1700)	(10950)	(11800)	(-4820)
<sup>256</sup> Fm	85480 <i>7</i>	1902543 <i>7</i>	-2130 <i>50</i>	11561 <i>7</i>	10432 <i>12</i>	-8770 <i>30</i>
<sup>256</sup> Md	87610 <i>50</i>	1899630 <i>50</i>	-210 <i>50</i>	(12110)	8950 <i>50</i>	(-13100)
<sup>256</sup> No	87817 <i>8</i>	1898641 <i>8</i>	(-4180)	13043 <i>19</i>	7659 <i>8</i>	
<sup>256</sup> Lr	(92000)	(1893680)	(-2250)	(14100)	(6160)	
<sup>256</sup> Rf	94250 <i>30</i>	1890650 <i>30</i>	(-6500)	(15200)	5050 <i>30</i>	
<sup>256</sup> Ha	(100700)	(1883400)			(3800)	
<sup>257</sup> Es	(89400)	(1907500)	(800)	(10800)		(-3400)
<sup>257</sup> Fm	88584 <i>6</i>	1907511 <i>6</i>	-406 <i>7</i>	11352 <i>6</i>	(10800)	(-7400)
<sup>257</sup> Md	88990 <i>3</i>	1906322 <i>3</i>	-1230 <i>30</i>	11989 <i>7</i>	9671 <i>11</i>	(-11480)
<sup>257</sup> No	90220 <i>30</i>	1904310 <i>30</i>	(-2560)	12770 <i>30</i>	8150 <i>30</i>	
<sup>257</sup> Lr	(92780)	(1900970)	(-3200)	(13500)	(6630)	
<sup>257</sup> Rf	(96000)	(1897000)	(-4500)	(14700)	(5400)	
<sup>257</sup> Ha	(100470)	(1891710)		(15700)	(4200)	
<sup>258</sup> Fm	(90420)	(1913750)	(-1260)	(11200)	(11200)	(-6100)
<sup>258</sup> Md	91683 <i>5</i>	1911701 <i>5</i>	(210)	12070 <i>50</i>	(10080)	(-10300)
<sup>258</sup> No	(91470)	(1911130)	(-3430)	(12490)	(8590)	(-13900)
<sup>258</sup> Lr	(94900)	(1906920)	(-1570)	(13240)	(7280)	
<sup>258</sup> Rf	(96470)	(1904560)	(-5500)	(13920)	(5920)	
<sup>258</sup> Ha	(101900)	(1898300)	(-3500)	(14900)	(4600)	
<sup>258</sup> Sg	(105400)	(1894100)			(3400)	
<sup>259</sup> Fm	(93700)	(1918500)	(100)	(11000)		(-4700)
<sup>259</sup> Md	(93620)	(1917840)	(-490)	(11520)	(10400)	(-8600)
<sup>259</sup> No	(94100)	(1916570)	(-1830)	(12260)	(9060)	(-12700)
<sup>259</sup> Lr	(95940)	(1913960)	(-2460)	(12990)	(7630)	
<sup>259</sup> Rf	(98390)	(1910720)	(-3800)	(13800)	(6400)	
<sup>259</sup> Ha	(102200)	(1906100)	(-4600)	(14400)	(5200)	
<sup>259</sup> Sg	(106800)	(1900750)			(3800)	
<sup>260</sup> Md	(96500)	(1923000)	(900)	(11300)		(-7200)
<sup>260</sup> No	(95610)	(1923140)	(-2740)	(12000)	(9400)	(-10990)
<sup>260</sup> Lr	(98340)	(1919620)	(-800)	(12710)	(7920)	(-15100)
<sup>260</sup> Rf	(99140)	(1918040)	(-4700)	(13500)	(6900)	
<sup>260</sup> Ha	(103790)	(1912600)	(-2800)	(14300)	(5690)	
<sup>260</sup> Sg	106600 <i>40</i>	1909020 <i>40</i>	(-6900)	(14900)	(4460)	
<sup>260</sup> Ns	(113500)	(1901400)			(3100)	
<sup>261</sup> No	(98500)	(1928300)	(-1100)	(11700)	(9800)	(-9700)
<sup>261</sup> Lr	(99620)	(1926420)	(-1690)	(12460)	(8600)	(-13800)
<sup>261</sup> Rf	(101300)	(1923950)	(-3100)	(13230)	(7380)	
<sup>261</sup> Ha	(104430)	(1920040)	(-3800)	(13900)	(6090)	
<sup>261</sup> Sg	(108200)	(1915400)	(-5200)	(14700)	(4700)	
<sup>261</sup> Ns	(113460)	(1909450)			(3300)	
<sup>262</sup> No	(100200)	(1934700)	(-2000)	(11600)		(-8300)
<sup>262</sup> Lr	(102200)	(1931900)	(-200)	(12300)	(8900)	(-12400)
<sup>262</sup> Rf	(102400)	(1930900)	(-3900)	(12900)	(7800)	
<sup>262</sup> Ha	(106330)	(1926210)	(-2200)	(13600)	(6590)	
<sup>262</sup> Sg	(108500)	(1923300)	(-6100)	(14200)	(5200)	
<sup>262</sup> Ns	(114600)	(1916400)		(15000)	(3800)	
<sup>263</sup> Lr	(103800)	(1938400)	(-1100)	(12000)		(-10900)
<sup>263</sup> Rf	(104830)	(1936560)	(-2360)	(12610)	(8200)	(-15100)
<sup>263</sup> Ha	(107190)	(1933420)	(-3010)	(13400)	(7000)	
<sup>263</sup> Sg	(110210)	(1929620)	(-4500)	(14200)	(5670)	
<sup>263</sup> Ns	(114700)	(1924300)	(-5200)	(14900)	(4300)	
<sup>263</sup> Hs	(119900)	(1918400)			(2900)	
<sup>264</sup> Rf	(106200)	(1943300)	(-3300)	(12400)	(8600)	(-13400)
<sup>264</sup> Ha	(109430)	(1939260)	(-1400)	(13100)	(7300)	
<sup>264</sup> Sg	(110800)	(1937100)	(-5400)	(13900)	(6200)	
<sup>264</sup> Ns	(116200)	(1930900)	(-3400)	(14500)	(4700)	
<sup>264</sup> Hs	119610 <i>50</i>	1926720 <i>50</i>			(3500)	
<sup>265</sup> Ha	(110500)	(1946200)	(-2200)	(12800)	(7800)	(-16700)

Isotope	Mass Excess	Binding Energy	$Q_{\beta^-}$	$S_n$	$S_p$	$Q_{\alpha}$
<sup>265</sup> Sg	(112770)	(1943200)	(-3800)	(13580)	(6640)	
<sup>265</sup> Ns	(116600)	(1938600)	(-4500)	(14200)	(5200)	
<sup>265</sup> Hs	(121100)	(1933300)	(-6100)	(14900)	(3700)	
<sup>265</sup> Mt	(127200)	(1926400)			(2100)	
<sup>266</sup> Sg	(113600)	(1950500)	(-4700)	(13300)	(7200)	
<sup>266</sup> Ns	(118300)	(1945000)	(-2800)	(14000)	(5700)	
<sup>266</sup> Hs	(121100)	(1941300)	(-7400)	(14600)	(4200)	
<sup>266</sup> Mt	(128500)	(1933200)			(2300)	
<sup>267</sup> Ns	(119000)	(1952300)	(-3800)	(13800)	(6100)	
<sup>267</sup> Hs	(122750)	(1947800)	(-5400)	(14500)	(4600)	
<sup>267</sup> Mt	(128100)	(1941700)	(-6000)	(15200)	(3100)	
<sup>267</sup> 10	(134100)	(1934900)			(1600)	
<sup>268</sup> Hs	(123100)	(1955500)	(-6200)	(14200)	(5100)	
<sup>268</sup> Mt	(129300)	(1948500)	(-4400)	(15300)	(3600)	
<sup>268</sup> 10	(133700)	(1943400)			(2000)	
<sup>269</sup> Hs	(124900)	(1961800)	(-4600)	(14000)		
<sup>269</sup> Mt	(129600)	(1956300)	(-5600)	(14700)	(4000)	
<sup>269</sup> 10	(135200)	(1949900)		(15000)	(2100)	
<sup>270</sup> Mt	(131100)	(1962900)	(-3600)	(14400)		
<sup>270</sup> 10	(134700)	(1958500)		(15100)	(3000)	
<sup>271</sup> Mt	(131600)	(1970500)	(-4500)	(14200)		
<sup>271</sup> 10	(136070)	(1965200)		(15300)	(3400)	
<sup>272</sup> 10	(136300)	(1973100)	(-6700)	(14600)		
<sup>272</sup> 11	(143000)	(1965600)			(2700)	
<sup>273</sup> 10	(139000)	(1978400)		(13200)		