

P.J. Masson and J. Janecke Masses

† Nuclide is unstable to one-particle emission

‡ Nuclide is unstable to two-particle, but not one particle emission

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁷ O	-0.810	²¹ Mg	10.570	³⁹ Si	0.730	⁴⁶ S	-2.090	⁴⁶ Ar	-30.000	⁴⁴ Ca	-41.900
¹⁸ O	-0.780	²² Mg	-0.650	⁴⁰ Si	3.390	⁴⁷ S	4.500	⁴⁷ Ar	-25.700	⁴⁵ Ca	-41.320
¹⁹ O	3.410	²³ Mg	-5.290	⁴¹ Si	9.440	⁴⁸ S	8.860	⁴⁸ Ar	-23.250	⁴⁶ Ca	-43.660
²⁰ O	3.210	²⁴ Mg	-13.360	⁴² Si	12.080	⁴⁹ S	16.440	⁴⁹ Ar	-17.920	⁴⁷ Ca	-42.420
²¹ O	8.440	²⁵ Mg	-12.970	⁴³ Si	19.820	⁵⁰ S	21.430	⁵⁰ Ar	-14.820	⁴⁸ Ca	-43.800
²² O	9.660	²⁶ Mg	-16.350	⁴⁴ Si	24.790	⁵¹ S	30.060 †	⁵¹ Ar	-8.190	⁴⁹ Ca	-40.810
²³ O	16.410	²⁷ Mg	-14.530	⁴⁵ Si	32.920 †	⁵² S	35.720	⁵² Ar	-4.370	⁵⁰ Ca	-39.670
²⁴ O	20.830	²⁸ Mg	-14.900	⁴⁶ Si	38.310	⁵³ S	44.810 †	⁵³ Ar	2.900	⁵¹ Ca	-35.330
²⁵ O	29.810 †	²⁹ Mg	-10.850	⁴⁷ Si	47.080 †	⁵⁴ S	51.020	⁵⁴ Ar	7.350	⁵² Ca	-33.450
²⁶ O	36.140	³⁰ Mg	-9.620	⁴⁸ Si	53.270	⁵⁵ S	60.630 †	⁵⁵ Ar	15.220	⁵³ Ca	-28.220
²⁷ O	46.650 †	³¹ Mg	-3.950	⁴⁹ Si	62.780 †	⁵⁶ S	67.780 ‡	⁵⁶ Ar	20.240	⁵⁴ Ca	-25.640
²⁸ O	54.810 †	³² Mg	-0.830	⁵⁰ Si	69.560 ‡	⁵⁷ S	78.510 †	⁵⁷ Ar	28.870 †	⁵⁵ Ca	-19.630
		³³ Mg	6.540	⁵¹ Si	79.970 †	⁵⁸ S	86.260 ‡	⁵⁸ Ar	34.790	⁵⁶ Ca	-16.400
¹⁷ F	2.050	³⁴ Mg	9.940	⁵² Si	87.320 ‡	⁵⁹ S	97.240 †	⁵⁹ Ar	44.080 †	⁵⁷ Ca	-9.540
¹⁹ F	-1.570 ‡	³⁵ Mg	17.180	⁵³ Si	98.120 †	⁶⁰ S	105.270 ‡	⁶⁰ Ar	50.480	⁵⁸ Ca	-5.790
²⁰ F	0.200	³⁶ Mg	20.960			⁶¹ S	116.690 †	⁶¹ Ar	60.140 †	⁵⁹ Ca	1.390
²¹ F	-0.480	³⁷ Mg	28.100	²³ P	44.630 †			⁶² Ar	66.840 ‡	⁶⁰ Ca	5.930
²² F	3.000	³⁸ Mg	32.120	²⁴ P	34.040 †	²⁷ Cl	39.770 †	⁶³ Ar	77.080 †	⁶¹ Ca	13.890
²³ F	3.770	³⁹ Mg	39.340	²⁵ P	20.020 †	²⁸ Cl	28.070 †	⁶⁴ Ar	84.440 ‡	⁶² Ca	18.940
²⁴ F	8.840	⁴⁰ Mg	43.140	²⁶ P	11.120 †	²⁹ Cl	14.180 †	⁶⁵ Ar	95.540 †	⁶³ Ca	27.420 †
²⁵ F	13.060	⁴¹ Mg	52.330 †	²⁷ P	-0.540	³⁰ Cl	4.810 †	⁶⁶ Ar	103.710 †	⁶⁴ Ca	32.860
²⁶ F	20.290	⁴² Mg	59.180	²⁸ P	-7.550	³¹ Cl	-6.820	⁶⁷ Ar	115.480 †	⁶⁵ Ca	42.120 †
²⁷ F	25.610	⁴³ Mg	69.020 †	²⁹ P	-16.720	³² Cl	-13.550			⁶⁶ Ca	48.470
²⁸ F	34.370 †	⁴⁴ Mg	75.740 ‡	³¹ P	-24.530	³³ Cl	-21.180	³¹ K	33.430 †	⁶⁷ Ca	58.500 †
²⁹ F	41.980 ‡	⁴⁵ Mg	85.960 †	³² P	-24.520	³⁵ Cl	-29.110	³² K	21.720 †	⁶⁸ Ca	65.960 ‡
		⁴⁶ Mg	93.100 ‡	³³ P	-26.150	³⁶ Cl	-29.350	³³ K	7.720 †	⁶⁹ Ca	76.930 †
¹⁸ Ne	5.440			³⁴ P	-24.540	³⁷ Cl	-31.490	³⁴ K	-1.340 †	⁷⁰ Ca	85.400 †
¹⁹ Ne	1.780	²¹ Al	26.790 †	³⁵ P	-24.490	³⁸ Cl	-29.590	³⁵ K	-11.000 †		
²⁰ Ne	-6.690	²² Al	18.390 †	³⁶ P	-20.660	³⁹ Cl	-30.050	³⁶ K	-17.160	³⁴ Sc	42.990 †
²¹ Ne	-5.670	²³ Al	6.510	³⁷ P	-19.350	⁴⁰ Cl	-27.480	³⁷ K	-24.930	³⁵ Sc	26.780 †
²² Ne	-8.330	²⁴ Al	-0.090	³⁸ P	-15.010	⁴¹ Cl	-27.080	³⁹ K	-33.500	³⁶ Sc	15.770 †
²³ Ne	-5.470	²⁵ Al	-8.680	³⁹ P	-13.040	⁴² Cl	-24.180	⁴⁰ K	-33.550	³⁷ Sc	4.010 †
²⁴ Ne	-6.510	²⁷ Al	-17.270	⁴⁰ P	-8.560	⁴³ Cl	-23.270	⁴¹ K	-35.790	³⁸ Sc	-4.240 †
²⁵ Ne	-1.740	²⁸ Al	-17.230	⁴¹ P	-5.990	⁴⁴ Cl	-20.450	⁴² K	-35.000	³⁹ Sc	-13.980 †
²⁶ Ne	0.690	²⁹ Al	-18.050	⁴² P	-1.230	⁴⁵ Cl	-19.640	⁴³ K	-36.470	⁴⁰ Sc	-20.460
²⁷ Ne	6.910	³⁰ Al	-15.880	⁴³ P	1.240	⁴⁶ Cl	-15.080	⁴⁴ K	-35.720	⁴¹ Sc	-28.660
²⁸ Ne	10.500	³¹ Al	-15.250	⁴⁴ P	7.260	⁴⁷ Cl	-11.770	⁴⁵ K	-36.700	⁴² Sc	-32.680
²⁹ Ne	18.770 †	³² Al	-11.270	⁴⁵ P	12.150	⁴⁸ Cl	-6.030	⁴⁶ K	-35.260	⁴³ Sc	-36.410
³⁰ Ne	24.380	³³ Al	-8.930	⁴⁶ P	18.960	⁴⁹ Cl	-2.070	⁴⁷ K	-35.870	⁴⁴ Sc	-37.610
³¹ Ne	35.000 †	³⁴ Al	-3.320	⁴⁷ P	24.150	⁵⁰ Cl	4.660	⁴⁸ K	-32.440	⁴⁵ Sc	-40.980
³² Ne	40.940 ‡	³⁵ Al	-0.250	⁴⁸ P	32.110	⁵¹ Cl	9.580	⁴⁹ K	-30.420	⁴⁶ Sc	-41.820
³³ Ne	49.990 †	³⁶ Al	5.760	⁴⁹ P	37.940	⁵² Cl	17.120	⁵⁰ K	-25.970	⁴⁷ Sc	-44.580
³⁴ Ne	55.040	³⁷ Al	9.250	⁵⁰ P	46.630 †	⁵³ Cl	22.510	⁵¹ K	-22.970	⁴⁸ Sc	-44.520
³⁵ Ne	63.410 †	³⁸ Al	15.240	⁵¹ P	53.360	⁵⁴ Cl	30.680 †	⁵² K	-17.440	⁴⁹ Sc	-46.120
³⁶ Ne	68.590	³⁹ Al	19.120	⁵² P	62.710 †	⁵⁵ Cl	36.600	⁵³ K	-13.910	⁵⁰ Sc	-44.140
³⁷ Ne	76.820 †	⁴⁰ Al	25.200	⁵³ P	69.830 ‡	⁵⁶ Cl	45.320 †	⁵⁴ K	-7.590	⁵¹ Sc	-43.170
³⁸ Ne	81.650	⁴¹ Al	29.050	⁵⁴ P	79.730 †	⁵⁷ Cl	52.390	⁵⁵ K	-3.440	⁵² Sc	-39.940
		⁴² Al	37.010	⁵⁵ P	87.760 ‡	⁵⁸ Cl	61.970 †	⁵⁶ K	3.520	⁵³ Sc	-38.300
¹⁹ Na	13.270 †	⁴³ Al	43.670	⁵⁶ P	98.560 †	⁵⁹ Cl	69.440 ‡	⁵⁷ K	8.440	⁵⁴ Sc	-33.920
²⁰ Na	7.170	⁴⁴ Al	51.850 †	⁵⁷ P	107.450 †	⁶⁰ Cl	79.360 †	⁵⁸ K	15.910	⁵⁵ Sc	-31.530
²¹ Na	-2.070	⁴⁵ Al	58.540			⁶¹ Cl	87.130 ‡	⁵⁹ K	21.540	⁵⁶ Sc	-26.280
²³ Na	-9.340	⁴⁶ Al	67.490 †	²⁴ S	54.540 †	⁶² Cl	97.480 †	⁶⁰ K	29.760 †	⁵⁷ Sc	-23.000
²⁴ Na	-8.440	⁴⁷ Al	74.480	²⁵ S	43.720 †	⁶³ Cl	105.990 †	⁶¹ K	35.890	⁵⁸ Sc	-17.150
²⁵ Na	-9.870	⁴⁸ Al	84.330 †	²⁶ S	27.880 †	⁶⁴ Cl	116.910 †	⁶² K	44.470 †	⁵⁹ Sc	-13.550
²⁶ Na	-6.950	⁴⁹ Al	91.910 ‡	²⁷ S	17.920 ‡			⁶³ K	51.070	⁶⁰ Sc	-7.330
²⁷ Na	-5.580			²⁸ S	4.490	²⁸ Ar	49.460 †	⁶⁴ K	60.160 †	⁶¹ Sc	-2.950
²⁸ Na	-1.090	²² Si	32.830 ‡	²⁹ S	-2.980	²⁹ Ar	37.280 †	⁶⁵ K	67.690 ‡	⁶² Sc	3.990
²⁹ Na	2.050	²³ Si	23.940	³⁰ S	-14.030	³⁰ Ar	21.470 †	⁶⁶ K	77.600 †	⁶³ Sc	8.980
³⁰ Na	8.380	²⁴ Si	10.230	³¹ S	-19.170	³¹ Ar	11.470	⁶⁷ K	85.900 †	⁶⁴ Sc	16.280
³¹ Na	13.260	²⁵ Si	3.220	³² S	-26.230	³² Ar	-1.810	⁶⁸ K	96.820 †	⁶⁵ Sc	21.830
³² Na	21.620 †	²⁶ Si	-7.330	³³ S	-26.780	³³ Ar	-9.180			⁶⁶ Sc	29.800
³³ Na	26.690	²⁷ Si	-12.550	³⁴ S	-30.000	³⁴ Ar	-18.410	³² Ca	43.230 †	⁶⁷ Sc	36.090
³⁴ Na	34.170	²⁸ Si	-21.250	³⁵ S	-28.810	³⁵ Ar	-23.120	³³ Ca	30.720 †	⁶⁸ Sc	45.040 †
³⁵ Na	39.090	²⁹ Si	-21.670	³⁶ S	-30.300	³⁶ Ar	-30.360	³⁴ Ca	14.940 ‡	⁶⁹ Sc	52.240 ‡
³⁶ Na	46.420	³⁰ Si	-24.360	³⁷ S	-26.990	³⁷ Ar	-31.130	³⁵ Ca	5.330	⁷⁰ Sc	61.910 †
³⁷ Na	51.500	³¹ Si	-22.760	³⁸ S	-27.040	³⁸ Ar	-34.750	³⁶ Ca	-5.900	⁷¹ Sc	70.140 †
³⁸ Na	58.770	³² Si	-23.770	³⁹ S	-23.050	³⁹ Ar	-33.300	³⁷ Ca	-12.710	⁷² Sc	81.190 †
³⁹ Na	63.630	³³ Si	-20.480	⁴⁰ S	-22.430	⁴⁰ Ar	-35.230	³⁸ Ca	-21.980	⁷³ Sc	91.620 †
⁴⁰ Na	72.760 †	³⁴ Si	-19.910	⁴¹ S	-18.120	⁴¹ Ar	-32.930	³⁹ Ca	-26.930	⁷⁴ Sc	104.270 †
⁴¹ Na	80.810 ‡	³⁵ Si	-14.710	⁴² S	-16.910	⁴² Ar	-34.000	⁴⁰ Ca	-34.760		
⁴² Na	90.810 †	³⁶ Si	-12.950	⁴³ S	-12.380	⁴³ Ar	-31.450	⁴¹ Ca	-35.160	³⁵ Ti	53.130 †
		³⁷ Si	-7.310	⁴⁴ S	-11.560	⁴⁴ Ar	-32.300	⁴² Ca	-38.940	³⁶ Ti	35.570 †
²⁰ Mg	17.190	³⁸ Si	-5.040	⁴⁵ S	-5.640	⁴⁵ Ar	-29.550	⁴³ Ca	-38.580	³⁷ Ti	24.080 †

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
⁸² Ge	-65.660	⁶⁸ Se	-56.510	⁹⁹ Br	-19.730	⁷⁸ Rb	-70.740	¹⁰⁶ Sr	-32.130	⁸¹ Zr	-57.850		
⁸³ Ge	-60.030	⁷⁰ Se	-61.690	¹⁰⁰ Br	-12.210	⁸⁰ Rb	-72.110	¹⁰⁷ Sr	-25.260	⁸² Zr	-63.540		
⁸⁴ Ge	-56.610	⁷¹ Se	-63.150	¹⁰¹ Br	-6.070	⁸¹ Rb	-75.590	¹⁰⁸ Sr	-20.230	⁸³ Zr	-65.950		
⁸⁵ Ge	-50.790	⁷² Se	-67.660	¹⁰² Br	2.370 †	⁸² Rb	-76.360	¹⁰⁹ Sr	-12.470	⁸⁴ Zr	-71.260		
⁸⁶ Ge	-47.390	⁷³ Se	-68.540	¹⁰³ Br	9.320	⁸³ Rb	-79.170	¹¹⁰ Sr	-6.840	⁸⁵ Zr	-73.170		
⁸⁷ Ge	-41.200	⁷⁴ Se	-72.110	¹⁰⁴ Br	18.650 †	⁸⁴ Rb	-79.550	¹¹¹ Sr	1.460 †	⁸⁶ Zr	-78.000		
⁸⁸ Ge	-37.290	⁷⁵ Se	-72.160	¹⁰⁵ Br	26.700 ‡	⁸⁵ Rb	-82.010	¹¹² Sr	7.510	⁸⁷ Zr	-79.510		
⁸⁹ Ge	-30.370	⁷⁶ Se	-75.120	¹⁰⁶ Br	37.070 †	⁸⁶ Rb	-82.280	¹¹³ Sr	16.040 †	⁸⁸ Zr	-83.820		
⁹⁰ Ge	-25.470	⁷⁷ Se	-74.630	¹⁰⁷ Br	46.050 †	⁸⁷ Rb	-84.440	¹¹⁴ Sr	22.440	⁸⁹ Zr	-84.990		
⁹¹ Ge	-17.670	⁷⁸ Se	-77.040	¹⁰⁸ Br	57.220 †	⁸⁸ Rb	-82.560	¹¹⁵ Sr	31.100 †	⁹⁰ Zr	-88.750		
⁹² Ge	-12.120	⁷⁹ Se	-76.040	¹⁰⁹ Br	66.920 †	⁸⁹ Rb	-81.890	¹¹⁶ Sr	37.520	⁹¹ Zr	-87.790		
⁹³ Ge	-3.630 †	⁸⁰ Se	-77.830			⁹⁰ Rb	-79.290	¹¹⁷ Sr	45.810 †	⁹² Zr	-88.670		
⁹⁴ Ge	2.860	⁸¹ Se	-76.360	⁶³ Kr	23.280 †	⁹¹ Rb	-78.040	¹¹⁸ Sr	51.510	⁹³ Zr	-87.110		
⁹⁵ Ge	12.290 †	⁸² Se	-77.590	⁶⁴ Kr	9.270 †	⁹² Rb	-74.610			⁹⁴ Zr	-87.490		
⁹⁶ Ge	19.910 ‡	⁸³ Se	-75.660	⁶⁵ Kr	0.660 †	⁹³ Rb	-72.810	⁷⁰ Y	12.970 †	⁹⁵ Zr	-85.280		
⁹⁷ Ge	30.570 †	⁸⁴ Se	-76.390	⁶⁶ Kr	-10.050 †	⁹⁴ Rb	-68.650	⁷¹ Y	2.150 †	⁹⁶ Zr	-85.130		
⁹⁸ Ge	39.620 †	⁸⁵ Se	-72.180	⁶⁷ Kr	-17.310 †	⁹⁵ Rb	-66.140	⁷² Y	-6.010 †	⁹⁷ Zr	-82.270		
⁹⁹ Ge	51.820 †	⁸⁶ Se	-70.230	⁶⁸ Kr	-26.770 ‡	⁹⁶ Rb	-61.440	⁷³ Y	-15.880 †	⁹⁸ Zr	-81.360		
¹⁰⁰ Ge	62.130 †	⁸⁷ Se	-65.710	⁶⁹ Kr	-32.630	⁹⁷ Rb	-58.740	⁷⁴ Y	-23.060 †	⁹⁹ Zr	-77.830		
		⁸⁸ Se	-63.380	⁷⁰ Kr	-41.290	⁹⁸ Rb	-53.670	⁷⁵ Y	-32.190 †	¹⁰⁰ Zr	-76.940		
⁵⁹ As	2.780 †	⁸⁹ Se	-58.250	⁷¹ Kr	-46.240	⁹⁹ Rb	-50.370	⁷⁶ Y	-38.630 †	¹⁰¹ Zr	-73.250		
⁶⁰ As	-6.850 †	⁹⁰ Se	-55.260	⁷² Kr	-54.220	¹⁰⁰ Rb	-45.020	⁷⁷ Y	-46.980 †	¹⁰² Zr	-72.000		
⁶¹ As	-18.460 †	⁹¹ Se	-49.300	⁷³ Kr	-56.750	¹⁰¹ Rb	-41.230	⁷⁸ Y	-52.510	¹⁰³ Zr	-68.080		
⁶² As	-25.600 †	⁹² Se	-45.380	⁷⁴ Kr	-62.370	¹⁰² Rb	-35.220	⁷⁹ Y	-58.050	¹⁰⁴ Zr	-66.330		
⁶³ As	-33.710 †	⁹³ Se	-38.770	⁷⁵ Kr	-64.430	¹⁰³ Rb	-30.820	⁸⁰ Y	-60.920	¹⁰⁵ Zr	-61.790		
⁶⁴ As	-39.650 †	⁹⁴ Se	-34.450	⁷⁶ Kr	-69.100	¹⁰⁴ Rb	-24.050	⁸¹ Y	-65.820	¹⁰⁶ Zr	-59.400		
⁶⁵ As	-46.840 †	⁹⁵ Se	-27.370	⁷⁷ Kr	-70.120	¹⁰⁵ Rb	-18.800	⁸² Y	-68.060	¹⁰⁷ Zr	-54.360		
⁶⁶ As	-51.730	⁹⁶ Se	-22.400	⁷⁸ Kr	-73.940	¹⁰⁶ Rb	-11.320	⁸³ Y	-72.440	¹⁰⁸ Zr	-51.340		
⁶⁷ As	-56.660	⁹⁷ Se	-14.660	⁷⁹ Kr	-74.420	¹⁰⁷ Rb	-5.320	⁸⁴ Y	-74.240	¹⁰⁹ Zr	-45.660		
⁶⁸ As	-58.810	⁹⁸ Se	-8.800	⁸⁰ Kr	-77.800	¹⁰⁸ Rb	3.010 †	⁸⁵ Y	-78.040	¹¹⁰ Zr	-42.170		
⁶⁹ As	-62.910	⁹⁹ Se	0.030 †	⁸¹ Kr	-77.810	¹⁰⁹ Rb	9.980	⁸⁶ Y	-79.520	¹¹¹ Zr	-35.840		
⁷⁰ As	-64.380	¹⁰⁰ Se	6.750	⁸² Kr	-80.500	¹¹⁰ Rb	18.750 †	⁸⁷ Y	-83.000	¹¹² Zr	-31.660		
⁷¹ As	-67.780	¹⁰¹ Se	16.530 †	⁸³ Kr	-79.980	¹¹¹ Rb	26.140 ‡	⁸⁸ Y	-84.130	¹¹³ Zr	-25.030		
⁷² As	-68.580	¹⁰² Se	24.330 ‡	⁸⁴ Kr	-82.320	¹¹² Rb	35.360 †	⁸⁹ Y	-87.200	¹¹⁴ Zr	-20.490		
⁷³ As	-71.030	¹⁰³ Se	34.980 †	⁸⁵ Kr	-81.550	¹¹³ Rb	42.930 ‡	⁹⁰ Y	-86.180	¹¹⁵ Zr	-13.610		
⁷⁴ As	-70.970	¹⁰⁴ Se	43.940 †	⁸⁶ Kr	-83.620	¹¹⁴ Rb	52.420 †	⁹¹ Y	-86.370	¹¹⁶ Zr	-8.770		
⁷⁵ As	-72.910	¹⁰⁵ Se	55.810 †	⁸⁷ Kr	-80.800	¹¹⁵ Rb	59.890 ‡	⁹² Y	-84.610	¹¹⁷ Zr	-1.480		
⁷⁶ As	-72.440	¹⁰⁶ Se	65.920 †	⁸⁸ Kr	-79.980			⁹³ Y	-84.330	¹¹⁸ Zr	3.480		
⁷⁷ As	-73.950			⁸⁹ Kr	-76.580	⁶⁸ Sr	10.040 †	⁹⁴ Y	-81.830	¹¹⁹ Zr	10.400		
⁷⁸ As	-72.860	⁶² Br	13.410 †	⁹⁰ Kr	-75.210	⁶⁹ Sr	1.590 †	⁹⁵ Y	-81.040	¹²⁰ Zr	14.870		
⁷⁹ As	-73.720	⁶³ Br	0.590 †	⁹¹ Kr	-71.020	⁷⁰ Sr	-9.180 †	⁹⁶ Y	-77.870	¹²¹ Zr	20.920		
⁸⁰ As	-72.100	⁶⁴ Br	-8.060 †	⁹² Kr	-68.950	⁷¹ Sr	-16.200 †	⁹⁷ Y	-76.390	¹²² Zr	24.580		
⁸¹ As	-72.470	⁶⁵ Br	-17.430 †	⁹³ Kr	-64.060	⁷² Sr	-25.970 ‡	⁹⁸ Y	-72.660	¹²³ Zr	30.830		
⁸² As	-70.290	⁶⁶ Br	-24.640 †	⁹⁴ Kr	-61.200	⁷³ Sr	-32.060	⁹⁹ Y	-70.840	¹²⁴ Zr	36.800		
⁸³ As	-69.930	⁶⁷ Br	-33.090 †	⁹⁵ Kr	-55.770	⁷⁴ Sr	-41.100	¹⁰⁰ Y	-67.030				
⁸⁴ As	-65.420	⁶⁸ Br	-38.840 †	⁹⁶ Kr	-52.660	⁷⁵ Sr	-46.560	¹⁰¹ Y	-64.930	⁷⁴ Nb	14.250 †		
⁸⁵ As	-62.280	⁶⁹ Br	-46.420 †	⁹⁷ Kr	-46.890	⁷⁶ Sr	-54.990	¹⁰² Y	-60.720	⁷⁵ Nb	3.140 †		
⁸⁶ As	-57.610	⁷⁰ Br	-51.450	⁹⁸ Kr	-43.240	⁷⁷ Sr	-57.940	¹⁰³ Y	-58.270	⁷⁶ Nb	-5.170 †		
⁸⁷ As	-54.330	⁷¹ Br	-56.540	⁹⁹ Kr	-36.790	⁷⁸ Sr	-63.440	¹⁰⁴ Y	-53.470	⁷⁷ Nb	-15.280 †		
⁸⁸ As	-49.060	⁷² Br	-59.060	¹⁰⁰ Kr	-32.670	⁷⁹ Sr	-65.410	¹⁰⁵ Y	-50.280	⁷⁸ Nb	-22.560 †		
⁸⁹ As	-45.270	⁷³ Br	-63.630	¹⁰¹ Kr	-25.590	⁸⁰ Sr	-70.190	¹⁰⁶ Y	-44.840	⁷⁹ Nb	-31.850 †		
⁹⁰ As	-39.160	⁷⁴ Br	-65.610	¹⁰² Kr	-20.640	⁸¹ Sr	-71.660	¹⁰⁷ Y	-41.080	⁸⁰ Nb	-38.340 †		
⁹¹ As	-34.430	⁷⁵ Br	-69.280	¹⁰³ Kr	-12.880	⁸² Sr	-75.900	¹⁰⁸ Y	-35.060	⁸¹ Nb	-46.450 †		
⁹² As	-27.470	⁷⁶ Br	-70.340	¹⁰⁴ Kr	-7.060	⁸³ Sr	-76.790	¹⁰⁹ Y	-30.470	⁸² Nb	-51.540		
⁹³ As	-22.310	⁷⁷ Br	-73.270	¹⁰⁵ Kr	1.540 †	⁸⁴ Sr	-80.500	¹¹⁰ Y	-23.910	⁸³ Nb	-57.430		
⁹⁴ As	-14.730	⁷⁸ Br	-73.680	¹⁰⁶ Kr	8.290	⁸⁵ Sr	-80.970	¹¹¹ Y	-18.620	⁸⁴ Nb	-60.810		
⁹⁵ As	-8.840	⁷⁹ Br	-76.170	¹⁰⁷ Kr	17.740 †	⁸⁶ Sr	-84.440	¹¹² Y	-11.530	⁸⁵ Nb	-66.280		
⁹⁶ As	-0.440 †	⁸⁰ Br	-76.070	¹⁰⁸ Kr	25.430 ‡	⁸⁷ Sr	-84.740	¹¹³ Y	-6.050	⁸⁶ Nb	-69.260		
⁹⁷ As	6.390	⁸¹ Br	-77.990	¹⁰⁹ Kr	35.700 †	⁸⁸ Sr	-87.760	¹¹⁴ Y	1.430	⁸⁷ Nb	-74.160		
⁹⁸ As	15.910 †	⁸² Br	-77.320	¹¹⁰ Kr	43.710 ‡	⁸⁹ Sr	-86.000	¹¹⁵ Y	7.130	⁸⁸ Nb	-76.530		
⁹⁹ As	24.100 †	⁸³ Br	-78.730	¹¹¹ Kr	54.430 †	⁹⁰ Sr	-86.100	¹¹⁶ Y	14.840	⁸⁹ Nb	-80.900		
¹⁰⁰ As	34.630 †	⁸⁴ Br	-77.800	¹¹² Kr	62.850 †	⁹¹ Sr	-83.610	¹¹⁷ Y	20.760	⁹⁰ Nb	-82.770		
¹⁰¹ As	43.970 †	⁸⁵ Br	-78.760			⁹² Sr	-83.120	¹¹⁸ Y	28.030	⁹¹ Nb	-86.570		
¹⁰² As	55.660 †	⁸⁶ Br	-75.760	⁶⁶ Rb	12.090 †	⁹³ Sr	-79.930	¹¹⁹ Y	33.330	⁹² Nb	-86.270		
¹⁰³ As	66.160 †	⁸⁷ Br	-73.980	⁶⁷ Rb	1.330 †	⁹⁴ Sr	-78.840	¹²⁰ Y	39.690	⁹³ Nb	-87.330		
		⁸⁸ Br	-70.430	⁶⁸ Rb	-6.960 †	⁹⁵ Sr	-75.000	¹²¹ Y	43.910	⁹⁴ Nb	-86.400		
⁵⁹ Se	25.140 †	⁸⁹ Br	-68.250	⁶⁹ Rb	-16.570 †	⁹⁶ Sr	-73.190			⁹⁵ Nb	-87.050		
⁶⁰ Se	11.690 †	⁹⁰ Br	-63.920	⁷⁰ Rb	-23.560 †	⁹⁷ Sr	-68.850	⁷² Zr	11.020 †	⁹⁶ Nb	-85.450		
⁶¹ Se	1.810 †	⁹¹ Br	-61.080	⁷¹ Rb	-32.220 †	⁹⁸ Sr	-66.790	⁷³ Zr	2.740 †	⁹⁷ Nb	-85.590		
⁶² Se	-10.900 †	⁹² Br	-55.910	⁷² Rb	-38.230 †	⁹⁹ Sr	-62.010	⁷⁴ Zr	-8.240 †	⁹⁸ Nb	-83.280		
⁶³ Se	-18.250 †	⁹³ Br	-52.290	⁷³ Rb	-46.230 †	¹⁰⁰ Sr	-59.740	⁷⁵ Zr	-15.530 †	⁹⁹ Nb	-82.550		
⁶⁴ Se	-27.650 ‡	⁹⁴ Br	-46.470	⁷⁴ Rb	-51.640	¹⁰¹ Sr	-54.630	⁷⁶ Zr	-25.670 ‡	¹⁰⁰ Nb	-79.920		
⁶⁵ Se	-33.530	⁹⁵ Br	-42.580	⁷⁵ Rb	-57.300	¹⁰² Sr	-51.820	⁷⁷ Zr	-32.060	¹⁰¹ Nb	-79.120		
⁶⁶ Se	-41.970	⁹⁶ Br	-36.350	⁷⁶ Rb	-60.330	¹⁰³ Sr	-46.240	⁷⁸ Zr	-41.290	¹⁰² Nb	-76.230		
⁶⁷ Se	-46.780	⁹⁷ Br	-31.930	⁷⁷ Rb	-64.950	¹⁰⁴ Sr	-42.710	⁷⁹ Zr	-46.870	¹⁰³ Nb	-75.220		
⁶⁸ Se	-54.340	⁹⁸ Br	-25.040	⁷⁸ Rb	-66.860	¹⁰⁵ Sr	-36.390	⁸⁰ Zr	-54.850	¹⁰⁴ Nb	-71.940		

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁰⁵ Nb	-70.390	¹²⁹ Mo	35.540 †	⁹⁶ Ru	-85.990	¹¹⁵ Rh	-74.670	¹³⁵ Pd	-3.550	⁹⁷ Cd	-57.280		
¹⁰⁶ Nb	-66.590	¹³⁰ Mo	43.200 ‡	⁹⁷ Ru	-86.150	¹¹⁶ Rh	-71.280	¹³⁶ Pd	2.590	⁹⁸ Cd	-66.690		
¹⁰⁷ Nb	-64.520			⁹⁸ Ru	-88.190	¹¹⁷ Rh	-69.430	¹³⁷ Pd	10.870 †	⁹⁹ Cd	-68.980		
¹⁰⁸ Nb	-60.140	⁷⁹ Tc	3.950 †	⁹⁹ Ru	-87.540	¹¹⁸ Rh	-65.710	¹³⁸ Pd	17.370	¹⁰⁰ Cd	-73.440		
¹⁰⁹ Nb	-57.370	⁸⁰ Tc	-4.290 †	¹⁰⁰ Ru	-89.220	¹¹⁹ Rh	-63.620	¹³⁹ Pd	26.090 †	¹⁰¹ Cd	-75.390		
¹¹⁰ Nb	-52.700	⁸¹ Tc	-14.610 †	¹⁰¹ Ru	-87.970	¹²⁰ Rh	-59.590	¹⁴⁰ Pd	33.170	¹⁰² Cd	-79.430		
¹¹¹ Nb	-49.360	⁸² Tc	-21.990 †	¹⁰² Ru	-88.910	¹²¹ Rh	-57.240	¹⁴¹ Pd	42.440 †	¹⁰³ Cd	-80.790		
¹¹² Nb	-44.040	⁸³ Tc	-31.060 †	¹⁰³ Ru	-87.260	¹²² Rh	-52.800	¹⁴² Pd	50.020 ‡	¹⁰⁴ Cd	-84.160		
¹¹³ Nb	-40.230	⁸⁴ Tc	-37.330 †	¹⁰⁴ Ru	-87.970	¹²³ Rh	-50.110			¹⁰⁵ Cd	-84.620		
¹¹⁴ Nb	-34.450	⁸⁵ Tc	-45.400 †	¹⁰⁵ Ru	-85.960	¹²⁴ Rh	-45.710	⁸⁷ Ag	5.010 †	¹⁰⁶ Cd	-87.090		
¹¹⁵ Nb	-30.440	⁸⁶ Tc	-50.690	¹⁰⁶ Ru	-86.290	¹²⁵ Rh	-42.980	⁸⁸ Ag	-3.440 †	¹⁰⁷ Cd	-86.930		
¹¹⁶ Nb	-24.340	⁸⁷ Tc	-57.510	¹⁰⁷ Ru	-83.990	¹²⁶ Rh	-38.750	⁸⁹ Ag	-13.820 †	¹⁰⁸ Cd	-89.040		
¹¹⁷ Nb	-19.860	⁸⁸ Tc	-61.630	¹⁰⁸ Ru	-83.850	¹²⁷ Rh	-36.050	⁹⁰ Ag	-21.370 †	¹⁰⁹ Cd	-88.360		
¹¹⁸ Nb	-13.470	⁸⁹ Tc	-67.630	¹⁰⁹ Ru	-80.950	¹²⁸ Rh	-29.130	⁹¹ Ag	-30.740 †	¹¹⁰ Cd	-90.180		
¹¹⁹ Nb	-8.810	⁹⁰ Tc	-70.940	¹¹⁰ Ru	-80.450	¹²⁹ Rh	-23.450	⁹² Ag	-36.880 †	¹¹¹ Cd	-89.110		
¹²⁰ Nb	-2.700	⁹¹ Tc	-76.210	¹¹¹ Ru	-77.100	¹³⁰ Rh	-16.220	⁹³ Ag	-44.470 †	¹¹² Cd	-90.450		
¹²¹ Nb	1.450	⁹² Tc	-78.920	¹¹² Ru	-76.110	¹³¹ Rh	-10.530	⁹⁴ Ag	-48.440 †	¹¹³ Cd	-89.070		
¹²² Nb	6.930	⁹³ Tc	-83.650	¹¹³ Ru	-72.560	¹³² Rh	-3.360	⁹⁵ Ag	-56.910 †	¹¹⁴ Cd	-89.890		
¹²³ Nb	10.460	⁹⁴ Tc	-84.070	¹¹⁴ Ru	-71.050	¹³³ Rh	2.330	⁹⁶ Ag	-62.690	¹¹⁵ Cd	-88.220		
¹²⁴ Nb	17.310	⁹⁵ Tc	-85.960	¹¹⁵ Ru	-67.090	¹³⁴ Rh	10.330	⁹⁷ Ag	-70.620	¹¹⁶ Cd	-88.670		
¹²⁵ Nb	23.950	⁹⁶ Tc	-85.860	¹¹⁶ Ru	-65.070	¹³⁵ Rh	16.830	⁹⁸ Ag	-72.660	¹¹⁷ Cd	-86.600		
¹²⁶ Nb	32.850 †	⁹⁷ Tc	-87.380	¹¹⁷ Ru	-60.610	¹³⁶ Rh	25.480 †	⁹⁹ Ag	-76.140	¹¹⁸ Cd	-86.680		
¹²⁷ Nb	40.960 †	⁹⁸ Tc	-86.580	¹¹⁸ Ru	-58.340	¹³⁷ Rh	32.670	¹⁰⁰ Ag	-77.930	¹¹⁹ Cd	-84.210		
		⁹⁹ Tc	-87.410	¹¹⁹ Ru	-53.570	¹³⁸ Rh	41.770 †	¹⁰¹ Ag	-81.120	¹²⁰ Cd	-83.860		
⁷⁷ Mo	3.560 †	¹⁰⁰ Tc	-86.110	¹²⁰ Ru	-50.930	¹³⁹ Rh	49.670 ‡	¹⁰² Ag	-82.210	¹²¹ Cd	-81.240		
⁷⁸ Mo	-7.450 †	¹⁰¹ Tc	-86.310	¹²¹ Ru	-45.880			¹⁰³ Ag	-84.940	¹²² Cd	-80.720		
⁷⁹ Mo	-14.800 †	¹⁰² Tc	-84.490	¹²² Ru	-42.930	⁸⁵ Pd	4.950 †	¹⁰⁴ Ag	-85.230	¹²³ Cd	-77.830		
⁸⁰ Mo	-25.000 ‡	¹⁰³ Tc	-84.640	¹²³ Ru	-37.970	⁸⁶ Pd	-6.220 †	¹⁰⁵ Ag	-87.040	¹²⁴ Cd	-76.980		
⁸¹ Mo	-31.600 ‡	¹⁰⁴ Tc	-82.530	¹²⁴ Ru	-35.140	⁸⁷ Pd	-13.810 †	¹⁰⁶ Ag	-86.670	¹²⁵ Cd	-73.610		
⁸² Mo	-40.510	¹⁰⁵ Tc	-82.240	¹²⁵ Ru	-30.350	⁸⁸ Pd	-24.070 ‡	¹⁰⁷ Ag	-88.260	¹²⁶ Cd	-72.380		
⁸³ Mo	-45.800	¹⁰⁶ Tc	-79.760	¹²⁶ Ru	-27.690	⁸⁹ Pd	-30.780 ‡	¹⁰⁸ Ag	-87.510	¹²⁷ Cd	-68.960		
⁸⁴ Mo	-53.640	¹⁰⁷ Tc	-79.100	¹²⁷ Ru	-20.190	⁹⁰ Pd	-39.900	¹⁰⁹ Ag	-88.540	¹²⁸ Cd	-67.600		
⁸⁵ Mo	-57.240	¹⁰⁸ Tc	-76.110	¹²⁸ Ru	-14.180	⁹¹ Pd	-45.050	¹¹⁰ Ag	-87.570	¹²⁹ Cd	-64.130		
⁸⁶ Mo	-63.850	¹⁰⁹ Tc	-74.770	¹²⁹ Ru	-6.130	⁹² Pd	-52.030	¹¹¹ Ag	-88.180	¹³⁰ Cd	-62.430		
⁸⁷ Mo	-66.960	¹¹⁰ Tc	-71.460	¹³⁰ Ru	0.190	⁹³ Pd	-57.190	¹¹² Ag	-86.720	¹³¹ Cd	-57.230		
⁸⁸ Mo	-72.770	¹¹¹ Tc	-69.650	¹³¹ Ru	8.360 †	⁹⁴ Pd	-64.810	¹¹³ Ag	-86.990	¹³² Cd	-53.950		
⁸⁹ Mo	-75.250	¹¹² Tc	-65.920	¹³² Ru	14.360	⁹⁵ Pd	-69.380	¹¹⁴ Ag	-85.100	¹³³ Cd	-48.590		
⁹⁰ Mo	-80.380	¹¹³ Tc	-63.740	¹³³ Ru	22.630 †	⁹⁶ Pd	-76.400	¹¹⁵ Ag	-85.070	¹³⁴ Cd	-44.400		
⁹¹ Mo	-82.330	¹¹⁴ Tc	-59.440	¹³⁴ Ru	29.340	⁹⁷ Pd	-77.870	¹¹⁶ Ag	-82.920	¹³⁵ Cd	-37.940		
⁹² Mo	-86.820	¹¹⁵ Tc	-56.800	¹³⁵ Ru	38.370 †	⁹⁸ Pd	-81.140	¹¹⁷ Ag	-82.350	¹³⁶ Cd	-33.030		
⁹³ Mo	-86.650	¹¹⁶ Tc	-52.140	¹³⁶ Ru	45.960 ‡	⁹⁹ Pd	-82.010	¹¹⁸ Ag	-79.770	¹³⁷ Cd	-25.920		
⁹⁴ Mo	-88.330	¹¹⁷ Tc	-49.100	¹³⁷ Ru	55.760 †	¹⁰⁰ Pd	-85.090	¹¹⁹ Ag	-78.750	¹³⁸ Cd	-20.800		
⁹⁵ Mo	-87.640	¹¹⁸ Tc	-44.110	¹³⁸ Ru	64.050 †	¹⁰¹ Pd	-85.380	¹²⁰ Ag	-75.890	¹³⁹ Cd	-13.540		
⁹⁶ Mo	-88.890	¹¹⁹ Tc	-40.720			¹⁰² Pd	-87.880	¹²¹ Ag	-74.780	¹⁴⁰ Cd	-8.180		
⁹⁷ Mo	-87.570	¹²⁰ Tc	-35.370	⁸³ Rh	4.660 †	¹⁰³ Pd	-87.580	¹²² Ag	-71.620	¹⁴¹ Cd	-0.460		
⁹⁸ Mo	-88.240	¹²¹ Tc	-31.810	⁸⁴ Rh	-3.770 †	¹⁰⁴ Pd	-89.260	¹²³ Ag	-70.160	¹⁴² Cd	5.560		
⁹⁹ Mo	-86.090	¹²² Tc	-26.610	⁸⁵ Rh	-13.920 †	¹⁰⁵ Pd	-88.270	¹²⁴ Ag	-66.600	¹⁴³ Cd	13.840 †		
¹⁰⁰ Mo	-86.240	¹²³ Tc	-23.250	⁸⁶ Rh	-21.430 †	¹⁰⁶ Pd	-89.680	¹²⁵ Ag	-64.670	¹⁴⁴ Cd	20.600		
¹⁰¹ Mo	-83.670	¹²⁴ Tc	-18.430	⁸⁷ Rh	-30.760 †	¹⁰⁷ Pd	-88.440	¹²⁶ Ag	-61.080	¹⁴⁵ Cd	29.750 †		
¹⁰² Mo	-83.640	¹²⁵ Tc	-15.290	⁸⁸ Rh	-37.280 †	¹⁰⁸ Pd	-89.420	¹²⁷ Ag	-59.100	¹⁴⁶ Cd	37.630 ‡		
¹⁰³ Mo	-80.950	¹²⁶ Tc	-7.900	⁸⁹ Rh	-45.450 †	¹⁰⁹ Pd	-87.660	¹²⁸ Ag	-55.480				
¹⁰⁴ Mo	-80.540	¹²⁷ Tc	-1.310	⁹⁰ Rh	-50.220 †	¹¹⁰ Pd	-88.380	¹²⁹ Ag	-53.300	⁹² In	-3.250 †		
¹⁰⁵ Mo	-77.420	¹²⁸ Tc	7.080 †	⁹¹ Rh	-57.550	¹¹¹ Pd	-86.190	¹³⁰ Ag	-47.510	⁹³ In	-13.810 †		
¹⁰⁶ Mo	-76.550	¹²⁹ Tc	14.240	⁹² Rh	-62.100	¹¹² Pd	-86.370	¹³¹ Ag	-43.250	⁹⁴ In	-21.310 †		
¹⁰⁷ Mo	-73.000	¹³⁰ Tc	23.050 †	⁹³ Rh	-68.670	¹¹³ Pd	-83.910	¹³² Ag	-37.620	⁹⁵ In	-30.610 †		
¹⁰⁸ Mo	-71.540	¹³¹ Tc	30.060	⁹⁴ Rh	-72.590	¹¹⁴ Pd	-83.650	¹³³ Ag	-33.200	⁹⁶ In	-36.630 †		
¹⁰⁹ Mo	-67.340	¹³² Tc	38.650 †	⁹⁵ Rh	-78.590	¹¹⁵ Pd	-80.990	¹³⁴ Ag	-26.570	⁹⁷ In	-44.150		
¹¹⁰ Mo	-65.520	¹³³ Tc	45.660	⁹⁶ Rh	-79.790	¹¹⁶ Pd	-80.310	¹³⁵ Ag	-21.320	⁹⁸ In	-48.020 †		
¹¹¹ Mo	-60.920	¹³⁴ Tc	54.920 †	⁹⁷ Rh	-82.520	¹¹⁷ Pd	-77.060	¹³⁶ Ag	-13.870	⁹⁹ In	-58.900 †		
¹¹² Mo	-58.510	¹³⁵ Tc	62.900 ‡	⁹⁸ Rh	-83.210	¹¹⁸ Pd	-75.910	¹³⁷ Ag	-8.090	¹⁰⁰ In	-62.240		
¹¹³ Mo	-53.490			⁹⁹ Rh	-85.400	¹¹⁹ Pd	-72.350	¹³⁸ Ag	-0.490	¹⁰¹ In	-66.930		
¹¹⁴ Mo	-50.450	⁸¹ Ru	4.320 †	¹⁰⁰ Rh	-85.620	¹²⁰ Pd	-70.980	¹³⁹ Ag	5.660	¹⁰² In	-69.810		
¹¹⁵ Mo	-45.130	⁸² Ru	-6.770 †	¹⁰¹ Rh	-87.350	¹²¹ Pd	-67.220	¹⁴⁰ Ag	13.580	¹⁰³ In	-74.190		
¹¹⁶ Mo	-41.830	⁸³ Ru	-14.290 †	¹⁰² Rh	-86.860	¹²² Pd	-65.490	¹⁴¹ Ag	20.440	¹⁰⁴ In	-76.270		
¹¹⁷ Mo	-36.040	⁸⁴ Ru	-24.300 ‡	¹⁰³ Rh	-87.970	¹²³ Pd	-61.320	¹⁴² Ag	28.860 †	¹⁰⁵ In	-79.870		
¹¹⁸ Mo	-32.410	⁸⁵ Ru	-30.740 ‡	¹⁰⁴ Rh	-86.880	¹²⁴ Pd	-59.210	¹⁴³ Ag	36.280	¹⁰⁶ In	-81.050		
¹¹⁹ Mo	-26.290	⁸⁶ Ru	-39.940	¹⁰⁵ Rh	-87.680	¹²⁵ Pd	-54.960	¹⁴⁴ Ag	45.520 †	¹⁰⁷ In	-83.770		
¹²⁰ Mo	-22.420	⁸⁷ Ru	-45.450	¹⁰⁶ Rh	-86.280	¹²⁶ Pd	-52.850	¹⁴⁵ Ag	53.900 †	¹⁰⁸ In	-84.180		
¹²¹ Mo	-16.620	⁸⁸ Ru	-53.320	¹⁰⁷ Rh	-86.770	¹²⁷ Pd	-48.680			¹⁰⁹ In	-86.390		
¹²² Mo	-13.050	⁸⁹ Ru	-57.740	¹⁰⁸ Rh	-84.970	¹²⁸ Pd	-46.440	⁹⁰ Cd	-6.000 †	¹¹⁰ In	-86.530		
¹²³ Mo	-7.750	⁹⁰ Ru	-64.680	¹⁰⁹ Rh	-84.890	¹²⁹ Pd	-39.830	⁹¹ Cd	-13.700 †	¹¹¹ In	-88.270		
¹²⁴ Mo	-4.640	⁹¹ Ru	-68.240	¹¹⁰ Rh	-82.790	¹³⁰ Pd	-34.970	⁹² Cd	-23.930 ‡	¹¹² In	-87.940		
¹²⁵ Mo	2.890	⁹² Ru	-74.360	¹¹¹ Rh	-82.230	¹³¹ Pd	-28.360	⁹³ Cd	-30.530	¹¹³ In	-89.360		
¹²⁶ Mo	9.370	⁹³ Ru	-77.390	¹¹² Rh	-79.660	¹³² Pd	-23.660	⁹⁴ Cd	-39.170	¹¹⁴ In	-88.530		
¹²⁷ Mo	18.360 †	⁹⁴ Ru	-82.890	¹¹³ Rh	-78.810	¹³³ Pd	-16.780	⁹⁵ Cd	-43.980	¹¹⁵ In	-89.560		
¹²⁸ Mo	25.870 ‡	⁹⁵ Ru	-83.510	¹¹⁴ Rh	-75.880	¹³⁴ Pd	-11.350	⁹⁶ Cd	-50.370	¹¹⁶ In	-88.360		

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹¹⁷ In	-88.880	¹³⁶ Sn	-61.200	¹⁵⁵ Sb	64.470 †	¹¹⁸ I	-81.340	¹³⁸ Xe	-79.920	¹⁵⁸ Cs	12.040 †		
¹¹⁸ In	-87.430	¹³⁷ Sn	-55.380	¹⁰⁰ Te	-19.480 †	¹¹⁹ I	-83.800	¹³⁹ Xe	-75.530	¹⁵⁹ Cs	20.130 †		
¹¹⁹ In	-87.590	¹³⁸ Sn	-51.440	¹⁰¹ Te	-26.090 †	¹²⁰ I	-84.130	¹⁴⁰ Xe	-72.940	¹⁶⁰ Cs	29.900 †		
¹²⁰ In	-85.770	¹³⁹ Sn	-45.290	¹⁰² Te	-34.760 †	¹²¹ I	-86.260	¹⁴¹ Xe	-68.200	¹⁶¹ Cs	39.140 †		
¹²¹ In	-85.640	¹⁴⁰ Sn	-41.260	¹⁰³ Te	-39.820 †	¹²² I	-86.290	¹⁴² Xe	-65.600	¹⁶² Cs	49.890 †		
¹²² In	-83.590	¹⁴¹ Sn	-34.940	¹⁰⁴ Te	-46.830 ‡	¹²³ I	-88.000	¹⁴³ Xe	-60.710	¹⁶³ Cs	60.310 †		
¹²³ In	-83.330	¹⁴² Sn	-30.570	¹⁰⁵ Te	-51.050	¹²⁴ I	-87.590	¹⁴⁴ Xe	-57.930				
¹²⁴ In	-81.040	¹⁴³ Sn	-23.780	¹⁰⁶ Te	-57.120	¹²⁵ I	-88.750	¹⁴⁵ Xe	-52.890	¹¹¹ Ba	-28.170 †		
¹²⁵ In	-80.380	¹⁴⁴ Sn	-18.510	¹⁰⁷ Te	-60.410	¹²⁶ I	-88.040	¹⁴⁶ Xe	-49.620	¹¹² Ba	-35.860 ‡		
¹²⁶ In	-77.730	¹⁴⁵ Sn	-10.930	¹⁰⁸ Te	-65.570	¹²⁷ I	-89.010	¹⁴⁷ Xe	-44.170	¹¹³ Ba	-39.740 ‡		
¹²⁷ In	-76.700	¹⁴⁶ Sn	-4.700	¹⁰⁹ Te	-67.720	¹²⁸ I	-87.970	¹⁴⁸ Xe	-40.190	¹¹⁴ Ba	-45.560		
¹²⁸ In	-73.950	¹⁴⁷ Sn	3.780 †	¹¹⁰ Te	-72.010	¹²⁹ I	-88.580	¹⁴⁹ Xe	-33.980	¹¹⁵ Ba	-48.800		
¹²⁹ In	-72.800	¹⁴⁸ Sn	11.060	¹¹¹ Te	-73.370	¹³⁰ I	-87.080	¹⁵⁰ Xe	-29.490	¹¹⁶ Ba	-54.280		
¹³⁰ In	-69.900	¹⁴⁹ Sn	20.860 †	¹¹² Te	-77.200	¹³¹ I	-87.290	¹⁵¹ Xe	-22.730	¹¹⁷ Ba	-56.970		
¹³¹ In	-68.420	¹⁵⁰ Sn	29.310 †	¹¹³ Te	-78.260	¹³² I	-85.740	¹⁵² Xe	-17.570	¹¹⁸ Ba	-61.960		
¹³² In	-64.190	¹⁵¹ Sn	40.350 †	¹¹⁴ Te	-81.550	¹³³ I	-85.750	¹⁵³ Xe	-10.030	¹¹⁹ Ba	-64.190		
¹³³ In	-61.160	¹⁵² Sn	50.230 †	¹¹⁵ Te	-82.260	¹³⁴ I	-84.000	¹⁵⁴ Xe	-3.950	¹²⁰ Ba	-68.660		
¹³⁴ In	-56.020			¹¹⁶ Te	-85.090	¹³⁵ I	-83.710	¹⁵⁵ Xe	4.510 †	¹²¹ Ba	-70.460		
¹³⁵ In	-51.990	⁹⁷ Sb	-12.130 †	¹¹⁷ Te	-85.170	¹³⁶ I	-79.490	¹⁵⁶ Xe	11.730	¹²² Ba	-74.340		
¹³⁶ In	-45.860	⁹⁸ Sb	-19.630 †	¹¹⁸ Te	-87.500	¹³⁷ I	-76.600	¹⁵⁷ Xe	21.140 †	¹²³ Ba	-75.620		
¹³⁷ In	-41.280	⁹⁹ Sb	-28.870 †	¹¹⁹ Te	-87.170	¹³⁸ I	-72.070	¹⁵⁸ Xe	29.740 †	¹²⁴ Ba	-78.990		
¹³⁸ In	-34.820	¹⁰⁰ Sb	-35.250 †	¹²⁰ Te	-89.090	¹³⁹ I	-68.880	¹⁵⁹ Xe	40.400 †	¹²⁵ Ba	-79.800		
¹³⁹ In	-30.030	¹⁰¹ Sb	-42.910 †	¹²¹ Te	-88.580	¹⁴⁰ I	-64.090	¹⁶⁰ Xe	50.290 †	¹²⁶ Ba	-82.660		
¹⁴⁰ In	-23.540	¹⁰² Sb	-47.570 †	¹²² Te	-90.110	¹⁴¹ I	-60.800	¹⁶¹ Xe	62.140 †	¹²⁷ Ba	-82.940		
¹⁴¹ In	-18.370	¹⁰³ Sb	-53.680 †	¹²³ Te	-89.200	¹⁴² I	-55.880	¹⁶² Xe	73.150 †	¹²⁸ Ba	-85.230		
¹⁴² In	-11.470	¹⁰⁴ Sb	-57.710 †	¹²⁴ Te	-90.290	¹⁴³ I	-52.520			¹²⁹ Ba	-85.150		
¹⁴³ In	-5.570	¹⁰⁵ Sb	-63.110 †	¹²⁵ Te	-89.030	¹⁴⁴ I	-47.440	¹⁰⁸ Cs	-23.750 †	¹³⁰ Ba	-87.140		
¹⁴⁴ In	2.070	¹⁰⁶ Sb	-66.180	¹²⁶ Te	-89.960	¹⁴⁵ I	-43.680	¹⁰⁹ Cs	-31.250 †	¹³¹ Ba	-86.760		
¹⁴⁵ In	8.760	¹⁰⁷ Sb	-70.800	¹²⁷ Te	-88.440	¹⁴⁶ I	-37.980	¹¹⁰ Cs	-36.740 †	¹³² Ba	-88.420		
¹⁴⁶ In	17.430 †	¹⁰⁸ Sb	-72.850	¹²⁸ Te	-89.000	¹⁴⁷ I	-33.510	¹¹¹ Cs	-42.780 †	¹³³ Ba	-87.570		
¹⁴⁷ In	25.100 ‡	¹⁰⁹ Sb	-76.300	¹²⁹ Te	-87.070	¹⁴⁸ I	-27.210	¹¹² Cs	-46.510 †	¹³⁴ Ba	-88.790		
¹⁴⁸ In	34.850 †	¹¹⁰ Sb	-77.700	¹³⁰ Te	-87.170	¹⁴⁹ I	-21.910	¹¹³ Cs	-51.710 †	¹³⁵ Ba	-88.000		
¹⁴⁹ In	43.920 †	¹¹¹ Sb	-80.730	¹³¹ Te	-85.180	¹⁵⁰ I	-14.960	¹¹⁴ Cs	-54.650 †	¹³⁶ Ba	-88.980		
		¹¹² Sb	-81.630	¹³² Te	-85.160	¹⁵¹ I	-8.950	¹¹⁵ Cs	-59.580	¹³⁷ Ba	-87.880		
⁹⁴ Sn	-5.960 †	¹¹³ Sb	-84.300	¹³³ Te	-82.970	¹⁵² I	-1.210	¹¹⁶ Cs	-62.120	¹³⁸ Ba	-88.400		
⁹⁵ Sn	-13.960 †	¹¹⁴ Sb	-84.700	¹³⁴ Te	-82.490	¹⁵³ I	5.750	¹¹⁷ Cs	-66.420	¹³⁹ Ba	-84.920		
⁹⁶ Sn	-24.290 ‡	¹¹⁵ Sb	-86.980	¹³⁵ Te	-78.210	¹⁵⁴ I	14.550 †	¹¹⁸ Cs	-68.520	¹⁴⁰ Ba	-83.270		
⁹⁷ Sn	-31.230	¹¹⁶ Sb	-86.920	¹³⁶ Te	-75.230	¹⁵⁵ I	22.670 †	¹¹⁹ Cs	-72.320	¹⁴¹ Ba	-79.580		
⁹⁸ Sn	-40.220	¹¹⁷ Sb	-88.560	¹³⁷ Te	-70.290	¹⁵⁶ I	32.570 †	¹²⁰ Cs	-73.890	¹⁴² Ba	-77.770		
⁹⁹ Sn	-45.570	¹¹⁸ Sb	-88.100	¹³⁸ Te	-66.980	¹⁵⁷ I	41.990 †	¹²¹ Cs	-77.230	¹⁴³ Ba	-73.800		
¹⁰⁰ Sn	-52.910	¹¹⁹ Sb	-89.360	¹³⁹ Te	-61.600	¹⁵⁸ I	53.240 †	¹²² Cs	-78.320	¹⁴⁴ Ba	-71.830		
¹⁰¹ Sn	-56.580	¹²⁰ Sb	-88.640	¹⁴⁰ Te	-58.280	¹⁵⁹ I	64.120 †	¹²³ Cs	-81.180	¹⁴⁵ Ba	-67.570		
¹⁰² Sn	-62.290	¹²¹ Sb	-89.640	¹⁴¹ Te	-52.680	¹⁰⁵ Xe	-20.950 †	¹²⁴ Cs	-81.900	¹⁴⁶ Ba	-65.320		
¹⁰³ Sn	-65.600	¹²² Sb	-88.540	¹⁴² Te	-49.310	¹⁰⁶ Xe	-28.830 †	¹²⁵ Cs	-84.190	¹⁴⁷ Ba	-61.010		
¹⁰⁴ Sn	-70.790	¹²³ Sb	-89.140	¹⁴³ Te	-43.660	¹⁰⁷ Xe	-34.340 †	¹²⁶ Cs	-84.420	¹⁴⁸ Ba	-58.450		
¹⁰⁵ Sn	-73.190	¹²⁴ Sb	-87.820	¹⁴⁴ Te	-39.850	¹⁰⁸ Xe	-41.750 ‡	¹²⁷ Cs	-86.190	¹⁴⁹ Ba	-53.550		
¹⁰⁶ Sn	-77.580	¹²⁵ Sb	-88.200	¹⁴⁵ Te	-33.670	¹⁰⁹ Xe	-45.670 ‡	¹²⁸ Cs	-86.030	¹⁵⁰ Ba	-50.420		
¹⁰⁷ Sn	-79.090	¹²⁶ Sb	-86.650	¹⁴⁶ Te	-28.940	¹¹⁰ Xe	-51.760	¹²⁹ Cs	-87.560	¹⁵¹ Ba	-45.140		
¹⁰⁸ Sn	-82.450	¹²⁷ Sb	-86.720	¹⁴⁷ Te	-22.140	¹¹¹ Xe	-54.700	¹³⁰ Cs	-87.030	¹⁵² Ba	-41.610		
¹⁰⁹ Sn	-83.010	¹²⁸ Sb	-84.750	¹⁴⁸ Te	-16.730	¹¹² Xe	-59.740	¹³¹ Cs	-88.210	¹⁵³ Ba	-35.800		
¹¹⁰ Sn	-86.090	¹²⁹ Sb	-84.440	¹⁴⁹ Te	-8.930	¹¹³ Xe	-62.060	¹³² Cs	-87.300	¹⁵⁴ Ba	-31.600		
¹¹¹ Sn	-86.180	¹³⁰ Sb	-82.350	¹⁵⁰ Te	-2.700	¹¹⁴ Xe	-66.680	¹³³ Cs	-88.020	¹⁵⁵ Ba	-25.150		
¹¹² Sn	-88.700	¹³¹ Sb	-81.920	¹⁵¹ Te	5.930 †	¹¹⁵ Xe	-68.670	¹³⁴ Cs	-86.990	¹⁵⁶ Ba	-20.150		
¹¹³ Sn	-88.470	¹³² Sb	-79.720	¹⁵² Te	13.130	¹¹⁶ Xe	-72.820	¹³⁵ Cs	-87.690	¹⁵⁷ Ba	-12.910		
¹¹⁴ Sn	-90.450	¹³³ Sb	-78.810	¹⁵³ Te	22.870 †	¹¹⁷ Xe	-74.230	¹³⁶ Cs	-86.420	¹⁵⁸ Ba	-6.800		
¹¹⁵ Sn	-89.840	¹³⁴ Sb	-74.680	¹⁵⁴ Te	31.390 †	¹¹⁸ Xe	-77.890	¹³⁷ Cs	-86.520	¹⁵⁹ Ba	1.410 †		
¹¹⁶ Sn	-91.330	¹³⁵ Sb	-71.680	¹⁵⁵ Te	42.250 †	¹¹⁹ Xe	-78.800	¹³⁸ Cs	-82.870	¹⁶⁰ Ba	8.680		
¹¹⁷ Sn	-90.180	¹³⁶ Sb	-66.680	¹⁵⁶ Te	52.240 †	¹²⁰ Xe	-81.930	¹³⁹ Cs	-80.580	¹⁶¹ Ba	17.880 †		
¹¹⁸ Sn	-91.310	¹³⁷ Sb	-62.990			¹²¹ Xe	-82.470	¹⁴⁰ Cs	-76.820	¹⁶² Ba	26.110 †		
¹¹⁹ Sn	-89.930	¹³⁸ Sb	-57.530	¹⁰² I	-14.910 †	¹²² Xe	-85.140	¹⁴¹ Cs	-74.290	¹⁶³ Ba	36.360 †		
¹²⁰ Sn	-90.720	¹³⁹ Sb	-53.640	¹⁰³ I	-24.010 †	¹²³ Xe	-85.350	¹⁴² Cs	-70.260	¹⁶⁴ Ba	45.760 †		
¹²¹ Sn	-89.090	¹⁴⁰ Sb	-48.030	¹⁰⁴ I	-29.800 †	¹²⁴ Xe	-87.570	¹⁴³ Cs	-67.700	¹⁶⁵ Ba	57.400 †		
¹²² Sn	-89.520	¹⁴¹ Sb	-43.990	¹⁰⁵ I	-37.000 †	¹²⁵ Xe	-87.220	¹⁴⁴ Cs	-63.400	¹⁶⁶ Ba	68.100 †		
¹²³ Sn	-87.700	¹⁴² Sb	-38.330	¹⁰⁶ I	-42.290 †	¹²⁶ Xe	-88.950	¹⁴⁵ Cs	-60.660				
¹²⁴ Sn	-88.020	¹⁴³ Sb	-33.960	¹⁰⁷ I	-48.580 †	¹²⁷ Xe	-88.280	¹⁴⁶ Cs	-56.110	¹¹³ La	-24.960 †		
¹²⁵ Sn	-85.920	¹⁴⁴ Sb	-27.740	¹⁰⁸ I	-52.410 †	¹²⁸ Xe	-89.750	¹⁴⁷ Cs	-53.080	¹¹⁴ La	-30.390 †		
¹²⁶ Sn	-85.980	¹⁴⁵ Sb	-22.510	¹⁰⁹ I	-57.670 †	¹²⁹ Xe	-88.770	¹⁴⁸ Cs	-48.110	¹¹⁵ La	-36.500 †		
¹²⁷ Sn	-83.540	¹⁴⁶ Sb	-15.440	¹¹⁰ I	-60.650	¹³⁰ Xe	-89.820	¹⁴⁹ Cs	-44.200	¹¹⁶ La	-40.290 †		
¹²⁸ Sn	-83.200	¹⁴⁷ Sb	-9.500	¹¹¹ I	-64.900	¹³¹ Xe	-88.440	¹⁵⁰ Cs	-38.790	¹¹⁷ La	-45.910 †		
¹²⁹ Sn	-80.710	¹⁴⁸ Sb	-1.570	¹¹² I	-67.060	¹³² Xe	-89.100	¹⁵¹ Cs	-34.460	¹¹⁸ La	-49.290 †		
¹³⁰ Sn	-80.190	¹⁴⁹ Sb	5.540	¹¹³ I	-71.050	¹³³ Xe	-87.590	¹⁵² Cs	-28.520	¹¹⁹ La	-54.410 †		
¹³¹ Sn	-77.590	¹⁵⁰ Sb	14.420 †	¹¹⁴ I	-72.730	¹³⁴ Xe	-88.060	¹⁵³ Cs	-23.520	¹²⁰ La	-57.320		
¹³² Sn	-76.700	¹⁵¹ Sb	22.560 †	¹¹⁵ I	-76.330	¹³⁵ Xe	-86.530	¹⁵⁴ Cs	-16.820	¹²¹ La	-62.010		
¹³³ Sn	-72.700	¹⁵² Sb	32.600 †	¹¹⁶ I	-77.590	¹³⁶ Xe	-86.480	¹⁵⁵ Cs	-11.040	¹²² La	-64.350		
¹³⁴ Sn	-69.900	¹⁵³ Sb	42.120 †	¹¹⁷ I	-80.570	¹³⁷ Xe	-82.370	¹⁵⁶ Cs	-3.410	¹²³ La	-68.430		
¹³⁵ Sn	-64.910	¹⁵⁴ Sb	53.450 †					¹⁵⁷ Cs	3.380	¹²⁴ La	-70.230		

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹²⁵ La	-73.690	¹⁴⁶ Ce	-75.660	¹⁶⁹ Pr	29.220 †	¹³⁵ Pm	-69.360	¹⁵⁷ Sm	-66.470	¹⁷⁹ Eu	33.180 ‡		
¹²⁶ La	-75.070	¹⁴⁷ Ce	-72.130	¹⁷⁰ Pr	39.250 †	¹³⁶ Pm	-70.770	¹⁵⁸ Sm	-65.270	¹⁸⁰ Eu	42.790 †		
¹²⁷ La	-78.000	¹⁴⁸ Ce	-70.580	¹⁷¹ Pr	48.410 †	¹³⁷ Pm	-73.940	¹⁵⁹ Sm	-62.000	¹⁸¹ Eu	51.280 †		
¹²⁸ La	-78.810	¹⁴⁹ Ce	-66.780	¹⁷² Pr	59.500 †	¹³⁸ Pm	-74.970	¹⁶⁰ Sm	-60.280	¹⁸² Eu	61.670 †		
¹²⁹ La	-81.180	¹⁵⁰ Ce	-65.030	¹⁷³ Pr	69.540 †	¹³⁹ Pm	-77.620	¹⁶¹ Sm	-56.520	¹⁸³ Eu	71.460 †		
¹³⁰ La	-81.560	¹⁵¹ Ce	-61.000	¹²⁰ Nd	-22.560 †	¹⁴⁰ Pm	-78.500	¹⁶² Sm	-54.340	¹³¹ Gd	-22.920 †		
¹³¹ La	-83.710	¹⁵² Ce	-58.750	¹²¹ Nd	-26.940 ‡	¹⁴¹ Pm	-80.760	¹⁶³ Sm	-49.920	¹³² Gd	-28.970 †		
¹³² La	-83.820	¹⁵³ Ce	-54.330	¹²² Nd	-33.500 ‡	¹⁴² Pm	-81.300	¹⁶⁴ Sm	-46.860	¹³³ Gd	-32.480 ‡		
¹³³ La	-85.560	¹⁵⁴ Ce	-51.660	¹²³ Nd	-37.370	¹⁴³ Pm	-82.900	¹⁶⁵ Sm	-41.860	¹³⁴ Gd	-38.020 ‡		
¹³⁴ La	-85.220	¹⁵⁵ Ce	-46.800	¹²⁴ Nd	-43.330	¹⁴⁴ Pm	-81.530	¹⁶⁶ Sm	-38.060	¹³⁵ Gd	-41.210		
¹³⁵ La	-86.700	¹⁵⁶ Ce	-43.520	¹²⁵ Nd	-46.490	¹⁴⁵ Pm	-81.390	¹⁶⁷ Sm	-32.450	¹³⁶ Gd	-46.210		
¹³⁶ La	-86.210	¹⁵⁷ Ce	-38.110	¹²⁶ Nd	-51.790	¹⁴⁶ Pm	-79.600	¹⁶⁸ Sm	-27.980	¹³⁷ Gd	-49.000		
¹³⁷ La	-87.390	¹⁵⁸ Ce	-34.040	¹²⁷ Nd	-54.350	¹⁴⁷ Pm	-79.200	¹⁶⁹ Sm	-21.810	¹³⁸ Gd	-53.850		
¹³⁸ La	-86.720	¹⁵⁹ Ce	-27.760	¹²⁸ Nd	-59.010	¹⁴⁸ Pm	-77.020	¹⁷⁰ Sm	-16.700	¹³⁹ Gd	-56.270		
¹³⁹ La	-87.300	¹⁶⁰ Ce	-22.740	¹²⁹ Nd	-61.120	¹⁴⁹ Pm	-76.290	¹⁷¹ Sm	-9.580	¹⁴⁰ Gd	-60.770		
¹⁴⁰ La	-84.470	¹⁶¹ Ce	-15.730	¹³⁰ Nd	-65.170	¹⁵⁰ Pm	-73.970	¹⁷² Sm	-3.690	¹⁴¹ Gd	-62.600		
¹⁴¹ La	-82.910	¹⁶² Ce	-9.830	¹³¹ Nd	-66.740	¹⁵¹ Pm	-73.270	¹⁷³ Sm	4.080	¹⁴² Gd	-66.560		
¹⁴² La	-79.940	¹⁶³ Ce	-1.910	¹³² Nd	-70.300	¹⁵² Pm	-71.010	¹⁷⁴ Sm	10.730	¹⁴³ Gd	-68.170		
¹⁴³ La	-78.190	¹⁶⁴ Ce	5.050	¹³³ Nd	-71.480	¹⁵³ Pm	-70.110	¹⁷⁵ Sm	19.530 †	¹⁴⁴ Gd	-71.720		
¹⁴⁴ La	-74.810	¹⁶⁵ Ce	13.820 †	¹³⁴ Nd	-74.790	¹⁵⁴ Pm	-67.560	¹⁷⁶ Sm	26.860	¹⁴⁵ Gd	-72.970		
¹⁴⁵ La	-72.900	¹⁶⁶ Ce	21.580 ‡	¹³⁵ Nd	-75.840	¹⁵⁵ Pm	-66.190	¹⁷⁷ Sm	36.700 †	¹⁴⁶ Gd	-75.850		
¹⁴⁶ La	-69.130	¹⁶⁷ Ce	31.530 †	¹³⁶ Nd	-78.750	¹⁵⁶ Pm	-63.260	¹⁷⁸ Sm	44.970 †	¹⁴⁷ Gd	-75.130		
¹⁴⁷ La	-67.110	¹⁶⁸ Ce	40.440 †	¹³⁷ Nd	-79.270	¹⁵⁷ Pm	-61.600	¹⁷⁹ Sm	55.770 †	¹⁴⁸ Gd	-76.040		
¹⁴⁸ La	-63.270	¹⁶⁹ Ce	51.490 †	¹³⁸ Nd	-81.780	¹⁵⁸ Pm	-58.150	¹⁸⁰ Sm	65.010 †	¹⁴⁹ Gd	-74.850		
¹⁴⁹ La	-60.760	¹⁷⁰ Ce	61.360 †	¹³⁹ Nd	-82.090	¹⁵⁹ Pm	-55.870	¹²⁸ Eu	-21.100 †	¹⁵⁰ Gd	-75.560		
¹⁵⁰ La	-56.630	¹¹⁹ Pr	-29.920 †	¹⁴⁰ Nd	-84.370	¹⁶⁰ Pm	-51.850	¹²⁹ Eu	-27.150 †	¹⁵¹ Gd	-74.120		
¹⁵¹ La	-53.620	¹²⁰ Pr	-34.100 †	¹⁴¹ Nd	-84.280	¹⁶¹ Pm	-48.980	¹³⁰ Eu	-30.880 †	¹⁵² Gd	-74.810		
¹⁵² La	-49.120	¹²¹ Pr	-40.110 †	¹⁴² Nd	-85.910	¹⁶² Pm	-44.420	¹³¹ Eu	-36.380 †	¹⁵³ Gd	-73.210		
¹⁵³ La	-45.690	¹²² Pr	-43.780 †	¹⁴³ Nd	-83.950	¹⁶³ Pm	-40.740	¹³² Eu	-39.730 †	¹⁵⁴ Gd	-73.840		
¹⁵⁴ La	-40.650	¹²³ Pr	-49.220 †	¹⁴⁴ Nd	-83.770	¹⁶⁴ Pm	-35.430	¹³³ Eu	-44.680 †	¹⁵⁵ Gd	-72.310		
¹⁵⁵ La	-36.670	¹²⁴ Pr	-52.280 †	¹⁴⁵ Nd	-81.510	¹⁶⁵ Pm	-30.900	¹³⁴ Eu	-47.510 †	¹⁵⁶ Gd	-72.730		
¹⁵⁶ La	-30.960	¹²⁵ Pr	-56.980	¹⁴⁶ Nd	-80.890	¹⁶⁶ Pm	-24.970	¹³⁵ Eu	-52.120 †	¹⁵⁷ Gd	-71.000		
¹⁵⁷ La	-26.300	¹²⁶ Pr	-59.460	¹⁴⁷ Nd	-78.270	¹⁶⁷ Pm	-19.700	¹³⁶ Eu	-54.590	¹⁵⁸ Gd	-70.820		
¹⁵⁸ La	-19.690	¹²⁷ Pr	-63.580	¹⁴⁸ Nd	-77.520	¹⁶⁸ Pm	-13.150	¹³⁷ Eu	-58.890	¹⁵⁹ Gd	-68.660		
¹⁵⁹ La	-13.960	¹²⁸ Pr	-65.580	¹⁴⁹ Nd	-74.470	¹⁶⁹ Pm	-7.280	¹³⁸ Eu	-61.120	¹⁶⁰ Gd	-68.130		
¹⁶⁰ La	-6.510	¹²⁹ Pr	-69.140	¹⁵⁰ Nd	-73.700	¹⁷⁰ Pm	0.300	¹³⁹ Eu	-64.990	¹⁶¹ Gd	-65.590		
¹⁶¹ La	0.260	¹³⁰ Pr	-70.520	¹⁵¹ Nd	-70.730	¹⁷¹ Pm	7.140	¹⁴⁰ Eu	-66.780	¹⁶² Gd	-64.720		
¹⁶² La	8.520 †	¹³¹ Pr	-73.550	¹⁵² Nd	-69.800	¹⁷² Pm	15.520 †	¹⁴¹ Eu	-70.050	¹⁶³ Gd	-61.680		
¹⁶³ La	16.330	¹³² Pr	-74.620	¹⁵³ Nd	-66.570	¹⁷³ Pm	22.850	¹⁴² Eu	-71.610	¹⁶⁴ Gd	-60.150		
¹⁶⁴ La	25.650 †	¹³³ Pr	-77.370	¹⁵⁴ Nd	-65.080	¹⁷⁴ Pm	32.370 †	¹⁴³ Eu	-74.550	¹⁶⁵ Gd	-56.540		
¹⁶⁵ La	34.420 †	¹³⁴ Pr	-78.110	¹⁵⁵ Nd	-61.520	¹⁷⁵ Pm	40.730 †	¹⁴⁴ Eu	-75.670	¹⁶⁶ Gd	-54.390		
¹⁶⁶ La	44.970 †	¹³⁵ Pr	-80.670	¹⁵⁶ Nd	-59.650	¹⁷⁶ Pm	51.190 †	¹⁴⁵ Eu	-77.940	¹⁶⁷ Gd	-50.300		
¹⁶⁷ La	54.980 †	¹³⁶ Pr	-80.950	¹⁵⁷ Nd	-55.710	¹⁷⁷ Pm	60.590 †	¹⁴⁶ Eu	-77.050	¹⁶⁸ Gd	-47.460		
¹⁶⁸ La	66.730 †	¹³⁷ Pr	-82.970	¹⁵⁸ Nd	-53.210	¹²⁵ Sm	-20.480 †	¹⁴⁷ Eu	-77.560	¹⁶⁹ Gd	-42.860		
¹⁶⁹ La	77.720 †	¹³⁸ Pr	-83.160	¹⁵⁹ Nd	-48.610	¹²⁶ Sm	-27.130 ‡	¹⁴⁸ Eu	-76.390	¹⁷⁰ Gd	-39.360		
¹¹⁶ Ce	-29.160 †	¹³⁹ Pr	-84.890	¹⁶⁰ Nd	-45.440	¹²⁷ Sm	-30.970 ‡	¹⁴⁹ Eu	-76.410	¹⁷¹ Gd	-34.230		
¹¹⁷ Ce	-33.080 ‡	¹⁴⁰ Pr	-84.840	¹⁶¹ Nd	-40.160	¹²⁸ Sm	-36.900 ‡	¹⁵⁰ Eu	-74.940	¹⁷² Gd	-30.330		
¹¹⁸ Ce	-39.380 ‡	¹⁴¹ Pr	-85.860	¹⁶² Nd	-36.300	¹²⁹ Sm	-40.120	¹⁵¹ Eu	-74.970	¹⁷³ Gd	-29.560		
¹¹⁹ Ce	-42.890	¹⁴² Pr	-83.850	¹⁶³ Nd	-30.320	¹³⁰ Sm	-45.410	¹⁵² Eu	-73.390	¹⁷⁴ Gd	-14.730		
¹²⁰ Ce	-48.690	¹⁴³ Pr	-83.080	¹⁶⁴ Nd	-25.430	¹³¹ Sm	-48.220	¹⁵³ Eu	-73.380	¹⁷⁵ Gd	-13.110		
¹²¹ Ce	-51.820	¹⁴⁴ Pr	-80.770	¹⁶⁵ Nd	-18.710	¹³² Sm	-53.010	¹⁵⁴ Eu	-71.790	¹⁷⁶ Gd	-7.940		
¹²² Ce	-57.060	¹⁴⁵ Pr	-79.670	¹⁶⁶ Nd	-13.070	¹³³ Sm	-55.260	¹⁵⁵ Eu	-71.640	¹⁷⁷ Gd	-0.500		
¹²³ Ce	-59.600	¹⁴⁶ Pr	-76.820	¹⁶⁷ Nd	-5.670	¹³⁴ Sm	-59.520	¹⁵⁶ Eu	-69.780	¹⁷⁸ Gd	5.360		
¹²⁴ Ce	-64.200	¹⁴⁷ Pr	-75.630	¹⁶⁸ Nd	0.660	¹³⁵ Sm	-61.610	¹⁵⁷ Eu	-69.180	¹⁷⁹ Gd	13.640 †		
¹²⁵ Ce	-66.090	¹⁴⁸ Pr	-72.550	¹⁶⁹ Nd	9.080 †	¹³⁶ Sm	-65.610	¹⁵⁸ Eu	-66.870	¹⁸⁰ Gd	20.200		
¹²⁶ Ce	-70.130	¹⁴⁹ Pr	-71.040	¹⁷⁰ Nd	16.450	¹³⁷ Sm	-67.300	¹⁵⁹ Eu	-65.840	¹⁸¹ Gd	29.170 †		
¹²⁷ Ce	-71.590	¹⁵⁰ Pr	-67.980	¹⁷¹ Nd	25.870 †	¹³⁸ Sm	-70.990	¹⁶⁰ Eu	-63.100	¹⁸² Gd	36.510 ‡		
¹²⁸ Ce	-75.050	¹⁵¹ Pr	-66.330	¹⁷² Nd	33.890 ‡	¹³⁹ Sm	-72.180	¹⁶¹ Eu	-61.610	¹⁸³ Gd	46.390 †		
¹²⁹ Ce	-75.950	¹⁵² Pr	-63.040	¹⁷³ Nd	44.190 †	¹⁴⁰ Sm	-75.420	¹⁶² Eu	-58.500	¹⁸⁴ Gd	55.180 †		
¹³⁰ Ce	-78.790	¹⁵³ Pr	-60.860	¹⁷⁴ Nd	53.360 †	¹⁴¹ Sm	-76.310	¹⁶³ Eu	-56.420	¹³⁴ Tb	-22.360 †		
¹³¹ Ce	-79.350	¹⁵⁴ Pr	-57.160	¹⁷⁵ Nd	64.940 †	¹⁴² Sm	-79.220	¹⁶⁴ Eu	-52.580	¹³⁵ Tb	-28.260 †		
¹³² Ce	-82.000	¹⁵⁵ Pr	-54.640	¹⁷⁶ Nd	75.070 †	¹⁴³ Sm	-79.760	¹⁶⁵ Eu	-49.790	¹³⁶ Tb	-31.860 †		
¹³³ Ce	-82.200	¹⁵⁶ Pr	-50.460	¹²³ Pm	-23.870 †	¹⁴⁴ Sm	-81.930	¹⁶⁶ Eu	-45.480	¹³⁷ Tb	-37.180 †		
¹³⁴ Ce	-84.470	¹⁵⁷ Pr	-47.450	¹²⁴ Pm	-28.250 †	¹⁴⁵ Sm	-80.590	¹⁶⁷ Eu	-41.940	¹³⁸ Tb	-40.530 †		
¹³⁵ Ce	-84.410	¹⁵⁸ Pr	-42.590	¹²⁵ Pm	-34.310 †	¹⁴⁶ Sm	-80.910	¹⁶⁸ Eu	-37.070	¹³⁹ Tb	-45.590 †		
¹³⁶ Ce	-86.200	¹⁵⁹ Pr	-38.810	¹²⁶ Pm	-38.070 †	¹⁴⁷ Sm	-79.330	¹⁶⁹ Eu	-32.920	¹⁴⁰ Tb	-48.660 †		
¹³⁷ Ce	-85.930	¹⁶⁰ Pr	-33.190	¹²⁷ Pm	-43.440 †	¹⁴⁸ Sm	-79.350	¹⁷⁰ Eu	-27.460	¹⁴¹ Tb	-53.210 †		
¹³⁸ Ce	-87.560	¹⁶¹ Pr	-28.560	¹²⁸ Pm	-46.550 †	¹⁴⁹ Sm	-77.180	¹⁷¹ Eu	-22.740	¹⁴² Tb	-55.760		
¹³⁹ Ce	-86.970	¹⁶² Pr	-22.350	¹²⁹ Pm	-51.330 †	¹⁵⁰ Sm	-77.170	¹⁷² Eu	-16.510	¹⁴³ Tb	-59.790		
¹⁴⁰ Ce	-88.050	¹⁶³ Pr	-16.740	¹³⁰ Pm	-53.930	¹⁵¹ Sm	-74.900	¹⁷³ Eu	-11.150	¹⁴⁴ Tb	-62.030		
¹⁴¹ Ce	-85.310	¹⁶⁴ Pr	-9.610	¹³¹ Pm	-58.180	¹⁵² Sm	-74.900	¹⁷⁴ Eu	-3.980	¹⁴⁵ Tb	-65.730		
¹⁴² Ce	-84.480	¹⁶⁵ Pr	-3.120	¹³² Pm	-60.290	¹⁵³ Sm	-72.650	¹⁷⁵ Eu	2.040	¹⁴⁶ Tb	-67.620		
¹⁴³ Ce	-81.570	¹⁶⁶ Pr	4.730	¹³³ Pm	-63.980	¹⁵⁴ Sm	-72.430	¹⁷⁶ Eu	9.910	¹⁴⁷ Tb	-70.950		
¹⁴⁴ Ce	-80.420	¹⁶⁷ Pr	11.980	¹³⁴ Pm	-65.730	¹⁵⁵ Sm	-69.970	¹⁷⁷ Eu	16.720	¹⁴⁸ Tb	-70.610		
¹⁴⁵ C													

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁴⁹ Tb	-71.480	¹⁷² Dy	-47.220	¹⁴² Er	-20.250 †	¹⁶⁹ Tm	-61.250	¹⁹³ Yb	11.210	¹⁶³ Hf	-49.060		
¹⁵⁰ Tb	-70.960	¹⁷³ Dy	-43.210	¹⁴³ Er	-24.260 †	¹⁷⁰ Tm	-59.570	¹⁹⁴ Yb	16.310	¹⁶⁴ Hf	-51.310		
¹⁵¹ Tb	-71.680	¹⁷⁴ Dy	-40.130	¹⁴⁴ Er	-30.350 †	¹⁷¹ Tm	-58.990	¹⁹⁵ Yb	23.190	¹⁶⁵ Hf	-51.470		
¹⁵² Tb	-70.880	¹⁷⁵ Dy	-35.240	¹⁴⁵ Er	-33.880 †	¹⁷² Tm	-57.030	¹⁹⁶ Yb	29.310	¹⁶⁶ Hf	-53.360		
¹⁵³ Tb	-71.540	¹⁷⁶ Dy	-31.620	¹⁴⁶ Er	-39.460 ‡	¹⁷³ Tm	-56.050	¹⁹⁷ Yb	39.390 †	¹⁶⁷ Hf	-53.310		
¹⁵⁴ Tb	-70.560	¹⁷⁷ Dy	-26.070	¹⁴⁷ Er	-43.090	¹⁷⁴ Tm	-53.510	¹⁹⁸ Yb	47.690 †	¹⁶⁸ Hf	-55.020		
¹⁵⁵ Tb	-71.230	¹⁷⁸ Dy	-22.050	¹⁴⁸ Er	-48.780	¹⁷⁵ Tm	-51.930	¹⁹⁹ Yb	57.570 †	¹⁶⁹ Hf	-54.740		
¹⁵⁶ Tb	-70.240	¹⁷⁹ Dy	-15.840	¹⁴⁹ Er	-52.460	¹⁷⁶ Tm	-49.180	²⁰⁰ Yb	65.630 ‡	¹⁷⁰ Hf	-56.090		
¹⁵⁷ Tb	-70.790	¹⁸⁰ Dy	-11.330	¹⁵⁰ Er	-58.340	¹⁷⁷ Tm	-47.230	¹⁴⁹ Lu	-9.590 †	¹⁷¹ Hf	-55.460		
¹⁵⁸ Tb	-69.460	¹⁸¹ Dy	-4.520	¹⁵¹ Er	-58.520	¹⁷⁸ Tm	-43.820	¹⁵⁰ Lu	-16.000 †	¹⁷² Hf	-56.530		
¹⁵⁹ Tb	-69.390	¹⁸² Dy	0.540	¹⁵² Er	-60.580	¹⁷⁹ Tm	-41.300	¹⁵¹ Lu	-24.390 †	¹⁷³ Hf	-55.680		
¹⁶⁰ Tb	-67.710	¹⁸³ Dy	8.140	¹⁵³ Er	-60.560	¹⁸⁰ Tm	-37.460	¹⁵² Lu	-31.730 †	¹⁷⁴ Hf	-56.070		
¹⁶¹ Tb	-67.350	¹⁸⁴ Dy	14.290	¹⁵⁴ Er	-62.390	¹⁸¹ Tm	-34.800	¹⁵³ Lu	-40.870	¹⁷⁵ Hf	-54.760		
¹⁶² Tb	-65.410	¹⁸⁵ Dy	22.450 †	¹⁵⁵ Er	-62.090	¹⁸² Tm	-30.510	¹⁵⁴ Lu	-41.940	¹⁷⁶ Hf	-54.740		
¹⁶³ Tb	-64.580	¹⁸⁶ Dy	29.490	¹⁵⁶ Er	-63.840	¹⁸³ Tm	-27.300	¹⁵⁵ Lu	-44.300	¹⁷⁷ Hf	-53.020		
¹⁶⁴ Tb	-62.060	¹⁸⁷ Dy	38.240 †	¹⁵⁷ Er	-63.450	¹⁸⁴ Tm	-22.080	¹⁵⁶ Lu	-45.170	¹⁷⁸ Hf	-52.580		
¹⁶⁵ Tb	-60.720	¹⁸⁸ Dy	46.030 ‡	¹⁵⁸ Er	-65.060	¹⁸⁵ Tm	-18.470	¹⁵⁷ Lu	-47.390	¹⁷⁹ Hf	-50.580		
¹⁶⁶ Tb	-57.720	¹⁸⁹ Dy	55.810 †	¹⁵⁹ Er	-64.590	¹⁸⁶ Tm	-12.790	¹⁵⁸ Lu	-47.850	¹⁸⁰ Hf	-49.950		
¹⁶⁷ Tb	-55.760	¹⁹⁰ Dy	64.330 †	¹⁶⁰ Er	-66.000	¹⁸⁷ Tm	-8.690	¹⁵⁹ Lu	-49.920	¹⁸¹ Hf	-47.500		
¹⁶⁸ Tb	-52.320	¹³⁹ Ho	-18.780 †	¹⁶¹ Er	-65.310	¹⁸⁸ Tm	-2.590	¹⁶⁰ Lu	-50.210	¹⁸² Hf	-46.470		
¹⁶⁹ Tb	-49.700	¹⁴⁰ Ho	-23.020 †	¹⁶² Er	-66.360	¹⁸⁹ Tm	2.410	¹⁶¹ Lu	-52.280	¹⁸³ Hf	-43.470		
¹⁷⁰ Tb	-45.710	¹⁴¹ Ho	-28.830 †	¹⁶³ Er	-65.340	¹⁹⁰ Tm	8.840	¹⁶² Lu	-52.740	¹⁸⁴ Hf	-41.910		
¹⁷¹ Tb	-42.490	¹⁴² Ho	-32.710 †	¹⁶⁴ Er	-65.990	¹⁹¹ Tm	14.260	¹⁶³ Lu	-54.630	¹⁸⁵ Hf	-38.550		
¹⁷² Tb	-38.120	¹⁴³ Ho	-38.100 †	¹⁶⁵ Er	-64.640	¹⁹² Tm	21.250	¹⁶⁴ Lu	-54.750	¹⁸⁶ Hf	-36.700		
¹⁷³ Tb	-34.630	¹⁴⁴ Ho	-41.420 †	¹⁶⁶ Er	-64.960	¹⁹³ Tm	27.270	¹⁶⁵ Lu	-56.190	¹⁸⁷ Hf	-32.950		
¹⁷⁴ Tb	-29.320	¹⁴⁵ Ho	-46.300 †	¹⁶⁷ Er	-63.250	¹⁹⁴ Tm	34.630	¹⁶⁶ Lu	-56.130	¹⁸⁸ Hf	-30.780		
¹⁷⁵ Tb	-24.980	¹⁴⁶ Ho	-49.400 †	¹⁶⁸ Er	-63.160	¹⁹⁵ Tm	41.740	¹⁶⁷ Lu	-57.380	¹⁸⁹ Hf	-26.470		
¹⁷⁶ Tb	-19.140	¹⁴⁷ Ho	-54.260	¹⁶⁹ Er	-61.020	¹⁹⁶ Tm	52.420 †	¹⁶⁸ Lu	-57.060	¹⁹⁰ Hf	-24.010		
¹⁷⁷ Tb	-14.330	¹⁴⁸ Ho	-57.430	¹⁷⁰ Er	-60.310	¹⁹⁷ Tm	61.700 †	¹⁶⁹ Lu	-58.010	¹⁹¹ Hf	-19.550		
¹⁷⁸ Tb	-7.750	¹⁴⁹ Ho	-62.020	¹⁷¹ Er	-57.740	¹⁴⁷ Yb	-14.210 †	¹⁷⁰ Lu	-57.320	¹⁹² Hf	-16.570		
¹⁷⁹ Tb	-2.320	¹⁵⁰ Ho	-62.250	¹⁷² Er	-56.520	¹⁴⁸ Yb	-21.220 †	¹⁷¹ Lu	-57.850	¹⁹³ Hf	-11.830		
¹⁸⁰ Tb	4.960	¹⁵¹ Ho	-63.740	¹⁷³ Er	-53.700	¹⁴⁹ Yb	-26.250 †	¹⁷² Lu	-56.830	¹⁹⁴ Hf	-8.460		
¹⁸¹ Tb	10.970	¹⁵² Ho	-63.810	¹⁷⁴ Er	-51.830	¹⁵⁰ Yb	-33.820 ‡	¹⁷³ Lu	-57.020	¹⁹⁵ Hf	-3.160		
¹⁸² Tb	18.890	¹⁵³ Ho	-65.080	¹⁷⁵ Er	-48.510	¹⁵¹ Yb	-39.610	¹⁷⁴ Lu	-55.500	¹⁹⁶ Hf	0.730		
¹⁸³ Tb	25.820	¹⁵⁴ Ho	-64.810	¹⁷⁶ Er	-46.410	¹⁵² Yb	-47.780	¹⁷⁵ Lu	-55.000	¹⁹⁷ Hf	6.270		
¹⁸⁴ Tb	34.820 †	¹⁵⁵ Ho	-66.060	¹⁷⁷ Er	-42.380	¹⁵³ Yb	-48.370	¹⁷⁶ Lu	-53.230	¹⁹⁸ Hf	10.950		
¹⁸⁵ Tb	42.670 ‡	¹⁵⁶ Ho	-65.610	¹⁷⁸ Er	-39.660	¹⁵⁴ Yb	-50.830	¹⁷⁷ Lu	-52.260	¹⁹⁹ Hf	19.720 †		
¹⁸⁶ Tb	52.370 †	¹⁵⁷ Ho	-66.890	¹⁷⁹ Er	-35.080	¹⁵⁵ Yb	-51.270	¹⁷⁸ Lu	-50.180	²⁰⁰ Hf	26.750		
¹⁸⁷ Tb	61.030 †	¹⁵⁸ Ho	-66.370	¹⁸⁰ Er	-32.150	¹⁵⁶ Yb	-53.500	¹⁷⁹ Lu	-48.930	²⁰¹ Hf	35.480 †		
¹³⁶ Dy	-19.810 †	¹⁵⁹ Ho	-67.360	¹⁸¹ Er	-27.120	¹⁵⁷ Yb	-53.690	¹⁸⁰ Lu	-46.320	²⁰² Hf	42.410		
¹³⁷ Dy	-23.730 †	¹⁶⁰ Ho	-66.560	¹⁸² Er	-23.810	¹⁵⁸ Yb	-55.760	¹⁸¹ Lu	-44.670	²⁰³ Hf	50.940 †		
¹³⁸ Dy	-29.630 †	¹⁶¹ Ho	-67.080	¹⁸³ Er	-18.030	¹⁵⁹ Yb	-55.700	¹⁸² Lu	-41.710	²⁰⁴ Hf	57.610		
¹³⁹ Dy	-33.200 †	¹⁶² Ho	-66.100	¹⁸⁴ Er	-13.840	¹⁶⁰ Yb	-57.720	¹⁸³ Lu	-39.750	¹⁵² Ta	4.560 †		
¹⁴⁰ Dy	-38.920 ‡	¹⁶³ Ho	-66.300	¹⁸⁵ Er	-7.590	¹⁶¹ Yb	-57.720	¹⁸⁴ Lu	-35.960	¹⁵³ Ta	-6.430 †		
¹⁴¹ Dy	-42.060	¹⁶⁴ Ho	-64.840	¹⁸⁶ Er	-2.820	¹⁶² Yb	-59.700	¹⁸⁵ Lu	-33.720	¹⁵⁴ Ta	-16.540 †		
¹⁴² Dy	-47.350	¹⁶⁵ Ho	-64.640	¹⁸⁷ Er	3.870	¹⁶³ Yb	-59.440	¹⁸⁶ Lu	-29.470	¹⁵⁵ Ta	-28.730 †		
¹⁴³ Dy	-49.980	¹⁶⁶ Ho	-62.830	¹⁸⁸ Er	9.390	¹⁶⁴ Yb	-60.830	¹⁸⁷ Lu	-26.900	¹⁵⁶ Ta	-30.050		
¹⁴⁴ Dy	-54.670	¹⁶⁷ Ho	-62.190	¹⁸⁹ Er	16.770	¹⁶⁵ Yb	-60.310	¹⁸⁸ Lu	-22.270	¹⁵⁷ Ta	-32.760		
¹⁴⁵ Dy	-57.080	¹⁶⁸ Ho	-59.930	¹⁹⁰ Er	22.820	¹⁶⁶ Yb	-61.520	¹⁸⁹ Lu	-19.070	¹⁵⁸ Ta	-33.820		
¹⁴⁶ Dy	-61.440	¹⁶⁹ Ho	-58.730	¹⁹¹ Er	30.730	¹⁶⁷ Yb	-60.720	¹⁹⁰ Lu	-14.210	¹⁵⁹ Ta	-36.230		
¹⁴⁷ Dy	-63.810	¹⁷⁰ Ho	-56.000	¹⁹² Er	37.390	¹⁶⁸ Yb	-61.620	¹⁹¹ Lu	-10.550	¹⁶⁰ Ta	-36.980		
¹⁴⁸ Dy	-67.920	¹⁷¹ Ho	-54.140	¹⁹³ Er	45.760 †	¹⁶⁹ Yb	-60.510	¹⁹² Lu	-5.400	¹⁶¹ Ta	-39.390		
¹⁴⁹ Dy	-67.530	¹⁷² Ho	-51.050	¹⁹⁴ Er	53.460	¹⁷⁰ Yb	-60.960	¹⁹³ Lu	-1.290	¹⁶² Ta	-40.130		
¹⁵⁰ Dy	-69.040	¹⁷³ Ho	-48.860	¹⁴⁷ Tm	-29.650 †	¹⁷¹ Yb	-59.380	¹⁹⁴ Lu	4.320	¹⁶³ Ta	-42.520		
¹⁵¹ Dy	-68.510	¹⁷⁴ Ho	-45.210	¹⁴⁸ Tm	-34.140 †	¹⁷² Yb	-59.390	¹⁹⁵ Lu	9.030	¹⁶⁴ Ta	-43.210		
¹⁵² Dy	-69.860	¹⁷⁵ Ho	-42.500	¹⁴⁹ Tm	-40.360 †	¹⁷³ Yb	-57.640	¹⁹⁶ Lu	15.010	¹⁶⁵ Ta	-45.480		
¹⁵³ Dy	-69.010	¹⁷⁶ Ho	-38.280	¹⁵⁰ Tm	-45.360	¹⁷⁴ Yb	-56.910	¹⁹⁷ Lu	20.600	¹⁶⁶ Ta	-46.060		
¹⁵⁴ Dy	-70.260	¹⁷⁷ Ho	-34.880	¹⁵¹ Tm	-52.000	¹⁷⁵ Yb	-54.630	¹⁹⁸ Lu	29.710 †	¹⁶⁷ Ta	-47.950		
¹⁵⁵ Dy	-69.300	¹⁷⁸ Ho	-30.070	¹⁵² Tm	-52.740	¹⁷⁶ Yb	-53.590	¹⁹⁹ Lu	37.650 ‡	¹⁶⁸ Ta	-48.350		
¹⁵⁶ Dy	-70.500	¹⁷⁹ Ho	-26.350	¹⁵³ Tm	-54.690	¹⁷⁷ Yb	-50.950	²⁰⁰ Lu	46.610 †	¹⁶⁹ Ta	-50.080		
¹⁵⁷ Dy	-69.620	¹⁸⁰ Ho	-20.980	¹⁵⁴ Tm	-55.200	¹⁷⁸ Yb	-49.580	²⁰¹ Lu	54.440 ‡	¹⁷⁰ Ta	-50.190		
¹⁵⁸ Dy	-70.540	¹⁸¹ Ho	-16.870	¹⁵⁵ Tm	-56.980	¹⁷⁹ Yb	-46.330	¹⁵⁰ Hf	0.410 †	¹⁷¹ Ta	-51.580		
¹⁵⁹ Dy	-69.300	¹⁸² Ho	-10.930	¹⁵⁶ Tm	-57.150	¹⁸⁰ Yb	-44.490	¹⁵¹ Hf	-6.840 †	¹⁷² Ta	-51.480		
¹⁶⁰ Dy	-69.690	¹⁸³ Ho	-6.110	¹⁵⁷ Tm	-58.930	¹⁸¹ Yb	-40.880	¹⁵² Hf	-16.800 †	¹⁷³ Ta	-52.690		
¹⁶¹ Dy	-68.160	¹⁸⁴ Ho	0.800	¹⁵⁸ Tm	-58.860	¹⁸² Yb	-38.920	¹⁵³ Hf	-25.140	¹⁷⁴ Ta	-52.020		
¹⁶² Dy	-68.380	¹⁸⁵ Ho	6.200	¹⁵⁹ Tm	-60.510	¹⁸³ Yb	-34.670	¹⁵⁴ Hf	-36.030	¹⁷⁵ Ta	-52.610		
¹⁶³ Dy	-66.450	¹⁸⁶ Ho	13.640	¹⁶⁰ Tm	-60.430	¹⁸⁴ Yb	-31.960	¹⁵⁵ Hf	-36.980	¹⁷⁶ Ta	-51.760		
¹⁶⁴ Dy	-66.110	¹⁸⁷ Ho	19.830	¹⁶¹ Tm	-61.930	¹⁸⁵ Yb	-27.270	¹⁵⁶ Hf	-39.740	¹⁷⁷ Ta	-51.670		
¹⁶⁵ Dy	-63.750	¹⁸⁸ Ho	27.820	¹⁶² Tm	-61.740	¹⁸⁶ Yb	-24.150	¹⁵⁷ Hf	-40.580	¹⁷⁸ Ta	-50.560		
¹⁶⁶ Dy	-63.000	¹⁸⁹ Ho	34.910	¹⁶³ Tm	-62.740	¹⁸⁷ Yb	-19.080	¹⁵⁸ Hf	-43.050	¹⁷⁹ Ta	-50.180		
¹⁶⁷ Dy	-60.150	¹⁹⁰ Ho	43.540 †	¹⁶⁴ Tm	-62.140	¹⁸⁸ Yb	-15.500	¹⁵⁹ Hf	-43.480	¹⁸⁰ Ta	-48.770		
¹⁶⁸ Dy	-58.800	¹⁹¹ Ho	51.230 ‡	¹⁶⁵ Tm	-62.880	¹⁸⁹ Yb	-9.840	¹⁶⁰ Hf	-45.880	¹⁸¹ Ta	-48.270		
¹⁶⁹ Dy	-55.540	¹⁹² Ho	60.360 †	¹⁶⁶ Tm	-62.030	¹⁹⁰ Yb	-5.710	¹⁶¹ Hf	-46.200	¹⁸² Ta	-46.400		
¹⁷⁰ Dy	-53.490	¹⁹³ Ho	69.180 †	¹⁶⁷ Tm	-62.420	¹⁹¹ Yb	0.190	¹⁶² Hf	-48.710	¹⁸³ Ta	-45.300		
¹⁷¹ Dy	-49.720			¹⁶⁸ Tm	-61.240	¹⁹² Yb	4.780			¹⁸⁴ Ta	-42.670		

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁸⁵ Ta	-41.510	²⁰⁶ W	37.630	¹⁷¹ Os	-34.640	¹⁸⁹ Ir	-38.270	²⁰⁷ Pt	-2.810	¹⁷¹ Hg	2.740 †		
¹⁸⁶ Ta	-38.500	²⁰⁷ W	44.820	¹⁷² Os	-37.260	¹⁹⁰ Ir	-36.710	²⁰⁸ Pt	1.420	¹⁷² Hg	-1.120 ‡		
¹⁸⁷ Ta	-37.110	²⁰⁸ W	50.590	¹⁷³ Os	-38.010	¹⁹¹ Ir	-36.640	²⁰⁹ Pt	7.510	¹⁷³ Hg	-3.030 ‡		
¹⁸⁸ Ta	-33.710			¹⁷⁴ Os	-40.190	¹⁹² Ir	-34.810	²¹⁰ Pt	11.770	¹⁷⁴ Hg	-6.440 ‡		
¹⁸⁹ Ta	-31.810	¹⁵⁵ Re	13.420 †	¹⁷⁵ Os	-40.530	¹⁹³ Ir	-34.520	²¹¹ Pt	17.760	¹⁷⁵ Hg	-8.110		
¹⁹⁰ Ta	-28.190	¹⁵⁶ Re	0.020 †	¹⁷⁶ Os	-42.520	¹⁹⁴ Ir	-32.480	²¹² Pt	22.120	¹⁷⁶ Hg	-11.560		
¹⁹¹ Ta	-26.070	¹⁵⁷ Re	-15.720 †	¹⁷⁷ Os	-42.450	¹⁹⁵ Ir	-31.810	²¹³ Pt	27.770	¹⁷⁷ Hg	-13.030		
¹⁹² Ta	-22.240	¹⁵⁸ Re	-17.130 †	¹⁷⁸ Os	-43.950	¹⁹⁶ Ir	-29.510	²¹⁴ Pt	32.130	¹⁷⁸ Hg	-16.240		
¹⁹³ Ta	-19.600	¹⁵⁹ Re	-19.930 †	¹⁷⁹ Os	-43.600	¹⁹⁷ Ir	-28.390	²¹⁵ Pt	37.880	¹⁷⁹ Hg	-17.460		
¹⁹⁴ Ta	-15.550	¹⁶⁰ Re	-21.180 †	¹⁸⁰ Os	-44.680	¹⁹⁸ Ir	-25.980	²¹⁶ Pt	42.020	¹⁸⁰ Hg	-20.450		
¹⁹⁵ Ta	-12.430	¹⁶¹ Re	-23.860 †	¹⁸¹ Os	-44.140	¹⁹⁹ Ir	-24.490	²¹⁷ Pt	47.660	¹⁸¹ Hg	-21.470		
¹⁹⁶ Ta	-7.870	¹⁶² Re	-24.980	¹⁸² Os	-44.950	²⁰⁰ Ir	-21.690	²¹⁸ Pt	51.810	¹⁸² Hg	-24.120		
¹⁹⁷ Ta	-4.340	¹⁶³ Re	-27.630	¹⁸³ Os	-44.060	²⁰¹ Ir	-19.790	²¹⁹ Pt	57.260	¹⁸³ Hg	-24.760		
¹⁹⁸ Ta	0.370	¹⁶⁴ Re	-28.540	¹⁸⁴ Os	-44.310	²⁰² Ir	-16.840			¹⁸⁴ Hg	-26.590		
¹⁹⁹ Ta	4.780	¹⁶⁵ Re	-31.240	¹⁸⁵ Os	-42.990	²⁰³ Ir	-14.430	¹⁶⁴ Au	9.670 †	¹⁸⁵ Hg	-27.030		
²⁰⁰ Ta	12.650	¹⁶⁶ Re	-32.340	¹⁸⁶ Os	-42.850	²⁰⁴ Ir	-8.540	¹⁶⁵ Au	6.640 †	¹⁸⁶ Hg	-28.570		
²⁰¹ Ta	19.460	¹⁶⁷ Re	-34.980	¹⁸⁷ Os	-41.260	²⁰⁵ Ir	-3.870	¹⁶⁶ Au	5.130 †	¹⁸⁷ Hg	-28.900		
²⁰² Ta	27.300	¹⁶⁸ Re	-35.980	¹⁸⁸ Os	-41.080	²⁰⁶ Ir	2.080	¹⁶⁷ Au	1.940 †	¹⁸⁸ Hg	-30.310		
²⁰³ Ta	33.840	¹⁶⁹ Re	-38.290	¹⁸⁹ Os	-38.950	²⁰⁷ Ir	6.700	¹⁶⁸ Au	0.360 †	¹⁸⁹ Hg	-30.000		
²⁰⁴ Ta	41.780	¹⁷⁰ Re	-39.060	¹⁹⁰ Os	-38.670	²⁰⁸ Ir	12.880	¹⁶⁹ Au	-3.030 †	¹⁹⁰ Hg	-31.150		
²⁰⁵ Ta	48.090	¹⁷¹ Re	-41.190	¹⁹¹ Os	-36.340	²⁰⁹ Ir	17.690	¹⁷⁰ Au	-4.790 †	¹⁹¹ Hg	-30.690		
²⁰⁶ Ta	55.670	¹⁷² Re	-41.820	¹⁹² Os	-35.870	²¹⁰ Ir	23.830	¹⁷¹ Au	-8.170 †	¹⁹² Hg	-31.880		
²⁰⁷ Ta	61.850	¹⁷³ Re	-43.850	¹⁹³ Os	-33.310	²¹¹ Ir	28.810	¹⁷² Au	-9.970 †	¹⁹³ Hg	-31.130		
		¹⁷⁴ Re	-44.030	¹⁹⁴ Os	-32.560	²¹² Ir	34.620	¹⁷³ Au	-13.230 †	¹⁹⁴ Hg	-32.180		
¹⁵⁴ W	2.060 †	¹⁷⁵ Re	-45.590	¹⁹⁵ Os	-29.710	²¹³ Ir	39.530	¹⁷⁴ Au	-14.750 †	¹⁹⁵ Hg	-31.030		
¹⁵⁵ W	-9.380 ‡	¹⁷⁶ Re	-45.530	¹⁹⁶ Os	-28.430	²¹⁴ Ir	45.320	¹⁷⁵ Au	-17.770 †	¹⁹⁶ Hg	-31.790		
¹⁵⁶ W	-23.500	¹⁷⁷ Re	-46.560	¹⁹⁷ Os	-25.390	²¹⁵ Ir	49.930	¹⁷⁶ Au	-19.240	¹⁹⁷ Hg	-30.420		
¹⁵⁷ W	-24.740	¹⁷⁸ Re	-46.200	¹⁹⁸ Os	-23.850	²¹⁶ Ir	55.690	¹⁷⁷ Au	-21.980	¹⁹⁸ Hg	-30.960		
¹⁵⁸ W	-27.640	¹⁷⁹ Re	-46.730	¹⁹⁹ Os	-20.390			¹⁷⁸ Au	-23.190	¹⁹⁹ Hg	-29.350		
¹⁵⁹ W	-28.630	¹⁸⁰ Re	-46.110	²⁰⁰ Os	-18.470	¹⁶⁰ Pt	6.230 ‡	¹⁷⁹ Au	-25.630	²⁰⁰ Hg	-29.400		
¹⁶⁰ W	-31.330	¹⁸¹ Re	-46.390	²⁰¹ Os	-14.790	¹⁶¹ Pt	4.840 ‡	¹⁸⁰ Au	-26.580	²⁰¹ Hg	-27.540		
¹⁶¹ W	-32.060	¹⁸² Re	-45.640	²⁰² Os	-12.120	¹⁶² Pt	1.550 ‡	¹⁸¹ Au	-28.690	²⁰² Hg	-27.290		
¹⁶² W	-34.880	¹⁸³ Re	-45.580	²⁰³ Os	-5.670	¹⁶³ Pt	0.230 ‡	¹⁸² Au	-29.480	²⁰³ Hg	-25.300		
¹⁶³ W	-35.480	¹⁸⁴ Re	-43.940	²⁰⁴ Os	-0.680	¹⁶⁴ Pt	-2.870 ‡	¹⁸³ Au	-31.000	²⁰⁴ Hg	-24.680		
¹⁶⁴ W	-38.190	¹⁸⁵ Re	-43.520	²⁰⁵ Os	5.870	¹⁶⁵ Pt	-4.030 ‡	¹⁸⁴ Au	-31.130	²⁰⁵ Hg	-22.560		
¹⁶⁵ W	-38.890	¹⁸⁶ Re	-41.550	²⁰⁶ Os	10.870	¹⁶⁶ Pt	-7.300 ‡	¹⁸⁵ Au	-32.410	²⁰⁶ Hg	-21.300		
¹⁶⁶ W	-41.570	¹⁸⁷ Re	-41.110	²⁰⁷ Os	17.460	¹⁶⁷ Pt	-8.490	¹⁸⁶ Au	-32.380	²⁰⁷ Hg	-16.640		
¹⁶⁷ W	-42.130	¹⁸⁸ Re	-38.800	²⁰⁸ Os	22.360	¹⁶⁸ Pt	-11.920	¹⁸⁷ Au	-33.550	²⁰⁸ Hg	-13.290		
¹⁶⁸ W	-44.460	¹⁸⁹ Re	-37.930	²⁰⁹ Os	29.050	¹⁶⁹ Pt	-13.340	¹⁸⁸ Au	-33.090	²⁰⁹ Hg	-8.170		
¹⁶⁹ W	-44.860	¹⁹⁰ Re	-35.370	²¹⁰ Os	34.170	¹⁷⁰ Pt	-16.720	¹⁸⁹ Au	-33.700	²¹⁰ Hg	-4.560		
¹⁷⁰ W	-46.970	¹⁹¹ Re	-34.390	²¹¹ Os	40.600	¹⁷¹ Pt	-18.040	¹⁹⁰ Au	-33.050	²¹¹ Hg	0.840		
¹⁷¹ W	-47.100	¹⁹² Re	-31.610	²¹² Os	45.670	¹⁷² Pt	-21.200	¹⁹¹ Au	-33.780	²¹² Hg	4.340		
¹⁷² W	-49.010	¹⁹³ Re	-30.320	²¹³ Os	52.000	¹⁷³ Pt	-22.560	¹⁹² Au	-32.880	²¹³ Hg	9.540		
¹⁷³ W	-49.030	¹⁹⁴ Re	-27.370	²¹⁴ Os	56.630	¹⁷⁴ Pt	-25.440	¹⁹³ Au	-33.440	²¹⁴ Hg	13.170		
¹⁷⁴ W	-50.420	¹⁹⁵ Re	-25.500			¹⁷⁵ Pt	-26.480	¹⁹⁴ Au	-32.260	²¹⁵ Hg	18.210		
¹⁷⁵ W	-49.930	¹⁹⁶ Re	-22.260	¹⁵⁸ Ir	18.690 †	¹⁷⁶ Pt	-29.240	¹⁹⁵ Au	-32.510	²¹⁶ Hg	22.040		
¹⁷⁶ W	-50.970	¹⁹⁷ Re	-20.060	¹⁵⁹ Ir	-0.900 †	¹⁷⁷ Pt	-29.990	¹⁹⁶ Au	-31.040	²¹⁷ Hg	27.170		
¹⁷⁷ W	-50.130	¹⁹⁸ Re	-16.510	¹⁶⁰ Ir	-2.400 †	¹⁷⁸ Pt	-32.410	¹⁹⁷ Au	-31.010	²¹⁸ Hg	30.860		
¹⁷⁸ W	-50.630	¹⁹⁹ Re	-13.890	¹⁶¹ Ir	-5.370 †	¹⁷⁹ Pt	-32.820	¹⁹⁸ Au	-29.420	²¹⁹ Hg	36.160		
¹⁷⁹ W	-49.450	²⁰⁰ Re	-10.130	¹⁶² Ir	-6.910 †	¹⁸⁰ Pt	-34.870	¹⁹⁹ Au	-28.890	²²⁰ Hg	39.720		
¹⁸⁰ W	-49.650	²⁰¹ Re	-6.680	¹⁶³ Ir	-9.750 †	¹⁸¹ Pt	-35.130	²⁰⁰ Au	-27.100	²²¹ Hg	44.780		
¹⁸¹ W	-48.340	²⁰² Re	0.120	¹⁶⁴ Ir	-10.960 †	¹⁸² Pt	-36.790	²⁰¹ Au	-26.190	²²² Hg	48.650		
¹⁸² W	-48.400	²⁰³ Re	5.690	¹⁶⁵ Ir	-13.870 †	¹⁸³ Pt	-36.630	²⁰² Au	-24.040	²²³ Hg	53.860		
¹⁸³ W	-46.440	²⁰⁴ Re	12.570	¹⁶⁶ Ir	-15.130 †	¹⁸⁴ Pt	-37.600	²⁰³ Au	-23.020				
¹⁸⁴ W	-45.680	²⁰⁵ Re	18.170	¹⁶⁷ Ir	-18.160 †	¹⁸⁵ Pt	-37.310	²⁰⁴ Au	-20.720	¹⁷² Tl	12.640 †		
¹⁸⁵ W	-43.410	²⁰⁶ Re	25.150	¹⁶⁸ Ir	-19.620 †	¹⁸⁶ Pt	-38.140	²⁰⁵ Au	-18.980	¹⁷³ Tl	8.670 †		
¹⁸⁶ W	-42.580	²⁰⁷ Re	30.450	¹⁶⁹ Ir	-22.660 †	¹⁸⁷ Pt	-37.440	²⁰⁶ Au	-13.980	¹⁷⁴ Tl	6.610 †		
¹⁸⁷ W	-39.990	²⁰⁸ Re	37.240	¹⁷⁰ Ir	-23.970	¹⁸⁸ Pt	-37.900	²⁰⁷ Au	-10.250	¹⁷⁵ Tl	3.030 †		
¹⁸⁸ W	-38.920	²⁰⁹ Re	42.910	¹⁷¹ Ir	-26.650	¹⁸⁹ Pt	-36.700	²⁰⁸ Au	-5.060	¹⁷⁶ Tl	0.930 †		
¹⁸⁹ W	-35.750	²¹⁰ Re	49.490	¹⁷² Ir	-27.910	¹⁹⁰ Pt	-37.240	²⁰⁹ Au	-0.920	¹⁷⁷ Tl	-2.530 †		
¹⁹⁰ W	-34.490	²¹¹ Re	55.160	¹⁷³ Ir	-30.640	¹⁹¹ Pt	-35.880	²¹⁰ Au	4.640	¹⁷⁸ Tl	-4.470 †		
¹⁹¹ W	-31.180			¹⁷⁴ Ir	-31.530	¹⁹² Pt	-36.270	²¹¹ Au	8.740	¹⁷⁹ Tl	-7.710 †		
¹⁹² W	-29.640	¹⁵⁷ Os	8.060 †	¹⁷⁵ Ir	-33.870	¹⁹³ Pt	-34.610	²¹² Au	14.120	¹⁸⁰ Tl	-9.500 †		
¹⁹³ W	-26.100	¹⁵⁸ Os	-9.690	¹⁷⁶ Ir	-34.630	¹⁹⁴ Pt	-34.830	²¹³ Au	18.310	¹⁸¹ Tl	-12.570 †		
¹⁹⁴ W	-24.090	¹⁵⁹ Os	-10.970	¹⁷⁷ Ir	-36.600	¹⁹⁵ Pt	-32.830	²¹⁴ Au	23.400	¹⁸² Tl	-14.130 †		
¹⁹⁵ W	-20.220	¹⁶⁰ Os	-14.010	¹⁷⁸ Ir	-37.000	¹⁹⁶ Pt	-32.700	²¹⁵ Au	27.720	¹⁸³ Tl	-16.650 †		
¹⁹⁶ W	-17.780	¹⁶¹ Os	-15.210	¹⁷⁹ Ir	-38.500	¹⁹⁷ Pt	-30.530	²¹⁶ Au	32.990	¹⁸⁴ Tl	-17.600		
¹⁹⁷ W	-13.530	¹⁶² Os	-18.250	¹⁸⁰ Ir	-38.700	¹⁹⁸ Pt	-30.010	²¹⁷ Au	37.000	¹⁸⁵ Tl	-19.750		
¹⁹⁸ W	-10.760	¹⁶³ Os	-19.190	¹⁸¹ Ir	-39.840	¹⁹⁹ Pt	-27.610	²¹⁸ Au	42.330	¹⁸⁶ Tl	-22.470		
¹⁹⁹ W	-6.250	¹⁶⁴ Os	-22.140	¹⁸² Ir	-39.830	²⁰⁰ Pt	-26.740	²¹⁹ Au	46.460	¹⁸⁷ Tl	-22.370		
²⁰⁰ W	-2.670	¹⁶⁵ Os	-23.020	¹⁸³ Ir	-40.500	²⁰¹ Pt	-23.930	²²⁰ Au	51.360	¹⁸⁸ Tl	-22.940		
²⁰¹ W	5.000	¹⁶⁶ Os	-26.110	¹⁸⁴ Ir	-39.910	²⁰² Pt	-22.730	²²¹ Au	55.390	¹⁸⁹ Tl	-24.510		
²⁰² W	10.930	¹⁶⁷ Os	-27.160	¹⁸⁵ Ir	-40.470	²⁰³ Pt	-20.000			¹⁹⁰ Tl	-24.750		
²⁰³ W	18.400	¹⁶⁸ Os	-30.220	¹⁸⁶ Ir	-39.420	²⁰⁴ Pt	-18.050	¹⁶⁸ Hg	9.750 †	¹⁹¹ Tl	-26.100		
²⁰⁴ W	24.350	¹⁶⁹ Os	-31.200	¹⁸⁷ Ir	-39.640	²⁰⁵ Pt	-12.470	¹⁶⁹ Hg	8.220 †	¹⁹² Tl	-26.100		
²⁰⁵ W	31.940	¹⁷⁰ Os	-33.870	¹⁸⁸ Ir	-38.290	²⁰⁶ Pt	-8.390	¹⁷⁰ Hg	4.490 †	¹⁹³ Tl	-27.450		

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁹⁴ Tl	-27.200	²¹⁸ Pb	15.310	²¹² Po	-10.430	²⁰⁶ Rn	-8.830	²⁰¹ Ra	9.920	²³⁷ Ac	54.720
¹⁹⁵ Tl	-28.270	²¹⁹ Pb	20.050	²¹³ Po	-6.690	²⁰⁷ Rn	-8.540	²⁰² Ra	7.620	²³⁸ Ac	58.720
¹⁹⁶ Tl	-27.630	²²⁰ Pb	23.100	²¹⁴ Po	-4.500	²⁰⁸ Rn	-9.540	²⁰³ Ra	7.350	²³⁹ Ac	61.970
¹⁹⁷ Tl	-28.490	²²¹ Pb	27.930	²¹⁵ Po	-0.450	²⁰⁹ Rn	-8.900	²⁰⁴ Ra	5.240	²⁴⁰ Ac	66.450
¹⁹⁸ Tl	-27.670	²²² Pb	31.440	²¹⁶ Po	1.780	²¹⁰ Rn	-9.660	²⁰⁵ Ra	5.160	²⁴¹ Ac	69.940
¹⁹⁹ Tl	-28.180	²²³ Pb	36.250	²¹⁷ Po	5.710	²¹¹ Rn	-8.770	²⁰⁶ Ra	3.220	²⁴² Ac	74.950
²⁰⁰ Tl	-27.150	²²⁴ Pb	39.800	²¹⁸ Po	8.270	²¹² Rn	-8.760	²⁰⁷ Ra	3.120	²⁴³ Ac	79.000
²⁰¹ Tl	-27.140	²²⁵ Pb	44.930	²¹⁹ Po	12.200	²¹³ Rn	-5.840	²⁰⁸ Ra	1.580	²⁴⁴ Ac	84.250
²⁰² Tl	-25.910	²²⁶ Pb	48.820	²²⁰ Po	14.800	²¹⁴ Rn	-4.450	²⁰⁹ Ra	1.630	²⁴⁵ Ac	88.530
²⁰³ Tl	-25.800	²²⁷ Pb	54.120	²²¹ Po	18.930	²¹⁵ Rn	-1.320	²¹⁰ Ra	0.290	²⁰⁷ Th	17.200
²⁰⁴ Tl	-24.200	²²⁸ Pb	58.270	²²² Po	21.730	²¹⁶ Rn	0.300	²¹¹ Ra	0.790	²⁰⁸ Th	15.070
²⁰⁵ Tl	-23.740			²²³ Po	26.080	²¹⁷ Rn	3.650	²¹² Ra	-0.190	²⁰⁹ Th	14.790
²⁰⁶ Tl	-22.080	¹⁸⁹ Bi	-10.090	²²⁴ Po	28.960	²¹⁸ Rn	5.310	²¹³ Ra	0.440	²¹⁰ Th	12.970
²⁰⁷ Tl	-21.070	¹⁹⁰ Bi	-11.180	²²⁵ Po	33.360	²¹⁹ Rn	8.740	²¹⁴ Ra	0.210	²¹¹ Th	12.940
²⁰⁸ Tl	-16.770	¹⁹¹ Bi	-13.320	²²⁶ Po	36.500	²²⁰ Rn	10.510	²¹⁵ Ra	2.500	²¹² Th	11.420
²⁰⁹ Tl	-13.480	¹⁹² Bi	-14.050	²²⁷ Po	41.150	²²¹ Rn	13.790	²¹⁶ Ra	3.300	²¹³ Th	11.710
²¹⁰ Tl	-8.890	¹⁹³ Bi	-15.860	²²⁸ Po	44.550	²²² Rn	16.090	²¹⁷ Ra	5.710	²¹⁴ Th	10.540
²¹¹ Tl	-5.430	¹⁹⁴ Bi	-16.350	²²⁹ Po	49.520	²²³ Rn	19.690	²¹⁸ Ra	6.730	²¹⁵ Th	11.040
²¹² Tl	-0.630	¹⁹⁵ Bi	-18.060	²³⁰ Po	53.140	²²⁴ Rn	21.820	²¹⁹ Ra	9.550	²¹⁶ Th	10.710
²¹³ Tl	2.690	¹⁹⁶ Bi	-18.190	²³¹ Po	58.280	²²⁵ Rn	25.710	²²⁰ Ra	10.390	²¹⁷ Th	12.270
²¹⁴ Tl	7.330	¹⁹⁷ Bi	-19.740	²³² Po	62.180	²²⁶ Rn	28.140	²²¹ Ra	13.140	²¹⁸ Th	12.460
²¹⁵ Tl	10.910	¹⁹⁸ Bi	-19.630	²³³ Po	67.430	²²⁷ Rn	32.010	²²² Ra	14.570	²¹⁹ Th	14.330
²¹⁶ Tl	15.460	¹⁹⁹ Bi	-20.890			²²⁸ Rn	34.620	²²³ Ra	17.290	²²⁰ Th	14.510
²¹⁷ Tl	19.130	²⁰⁰ Bi	-20.510	¹⁹⁴ At	-2.480	²²⁹ Rn	38.910	²²⁴ Ra	18.880	²²¹ Th	16.630
²¹⁸ Tl	23.930	²⁰¹ Bi	-21.420	¹⁹⁵ At	-4.390	²³⁰ Rn	41.750	²²⁵ Ra	21.980	²²² Th	17.120
²¹⁹ Tl	27.570	²⁰² Bi	-20.840	¹⁹⁶ At	-5.040	²³¹ Rn	46.160	²²⁶ Ra	23.630	²²³ Th	19.280
²²⁰ Tl	32.290	²⁰³ Bi	-21.500	¹⁹⁷ At	-6.990	²³² Rn	49.470	²²⁷ Ra	26.960	²²⁴ Th	19.980
²²¹ Tl	35.990	²⁰⁴ Bi	-20.710	¹⁹⁸ At	-7.430	²³³ Rn	54.170	²²⁸ Ra	28.830	²²⁵ Th	22.180
²²² Tl	40.870	²⁰⁵ Bi	-21.040	¹⁹⁹ At	-9.180	²³⁴ Rn	57.630	²²⁹ Ra	32.300	²²⁶ Th	23.260
²²³ Tl	44.700	²⁰⁶ Bi	-19.960	²⁰⁰ At	-9.300	²³⁵ Rn	62.530	²³⁰ Ra	34.310	²²⁷ Th	25.780
²²⁴ Tl	49.640	²⁰⁷ Bi	-20.110	²⁰¹ At	-10.770	²³⁶ Rn	66.320	²³¹ Ra	38.010	²²⁸ Th	26.840
²²⁵ Tl	53.730	²⁰⁸ Bi	-18.910	²⁰² At	-10.680	²³⁷ Rn	71.510	²³² Ra	40.500	²²⁹ Th	29.740
²²⁶ Tl	58.850	²⁰⁹ Bi	-18.330	²⁰³ At	-12.090	²³⁸ Rn	75.460	²³³ Ra	44.440	²³⁰ Th	30.980
		²¹⁰ Bi	-14.560	²⁰⁴ At	-11.790			²³⁴ Ra	47.290	²³¹ Th	33.840
¹⁷⁶ Pb	11.590 †	²¹¹ Bi	-11.880	²⁰⁵ At	-12.760	¹⁹⁹ Fr	5.040	²³⁵ Ra	51.610	²³² Th	35.480
¹⁷⁷ Pb	9.470 †	²¹² Bi	-7.990	²⁰⁶ At	-12.350	²⁰⁰ Fr	4.440	²³⁶ Ra	54.670	²³³ Th	38.680
¹⁷⁸ Pb	5.530 †	²¹³ Bi	-5.270	²⁰⁷ At	-13.170	²⁰¹ Fr	2.570	²³⁷ Ra	59.060	²³⁴ Th	40.680
¹⁷⁹ Pb	3.540 †	²¹⁴ Bi	-1.160	²⁰⁸ At	-12.430	²⁰² Fr	2.250	²³⁸ Ra	62.390	²³⁵ Th	44.210
¹⁸⁰ Pb	-0.270 †	²¹⁵ Bi	1.560	²⁰⁹ At	-12.910	²⁰³ Fr	0.340	²³⁹ Ra	67.140	²³⁶ Th	46.640
¹⁸¹ Pb	-2.160 †	²¹⁶ Bi	5.670	²¹⁰ At	-12.120	²⁰⁴ Fr	0.240	²⁴⁰ Ra	70.750	²³⁷ Th	50.420
¹⁸² Pb	-5.780 ‡	²¹⁷ Bi	8.590	²¹¹ At	-11.750	²⁰⁵ Fr	-1.410	²⁴¹ Ra	76.020	²³⁸ Th	52.990
¹⁸³ Pb	-7.230	²¹⁸ Bi	12.630	²¹² At	-8.670	²⁰⁶ Fr	-1.430	²⁴² Ra	80.180	²³⁹ Th	56.910
¹⁸⁴ Pb	-10.080	²¹⁹ Bi	15.870	²¹³ At	-6.720	²⁰⁷ Fr	-2.820			²⁴⁰ Th	59.880
¹⁸⁵ Pb	-11.380	²²⁰ Bi	19.970	²¹⁴ At	-3.530	²⁰⁸ Fr	-2.690	²⁰⁴ Ac	14.460	²⁴¹ Th	64.240
¹⁸⁶ Pb	-13.810	²²¹ Bi	23.070	²¹⁵ At	-1.400	²⁰⁹ Fr	-3.780	²⁰⁵ Ac	12.380	²⁴² Th	67.450
¹⁸⁷ Pb	-14.910	²²² Bi	27.620	²¹⁶ At	2.140	²¹⁰ Fr	-3.410	²⁰⁶ Ac	12.030	²⁴³ Th	72.340
¹⁸⁸ Pb	-17.070	²²³ Bi	30.940	²¹⁷ At	4.190	²¹¹ Fr	-4.040	²⁰⁷ Ac	10.020	²⁴⁴ Th	76.060
¹⁸⁹ Pb	-17.810	²²⁴ Bi	35.330	²¹⁸ At	7.750	²¹² Fr	-3.510	²⁰⁸ Ac	9.780	²⁴⁵ Th	81.200
¹⁹⁰ Pb	-19.940	²²⁵ Bi	38.890	²¹⁹ At	10.190	²¹³ Fr	-3.420	²⁰⁹ Ac	8.190	²⁴⁶ Th	85.130
¹⁹¹ Pb	-20.390	²²⁶ Bi	43.620	²²⁰ At	13.460	²¹⁴ Fr	-1.060	²¹⁰ Ac	8.000	²⁴⁷ Th	90.540
¹⁹² Pb	-22.210	²²⁷ Bi	47.440	²²¹ At	16.070	²¹⁵ Fr	0.260	²¹¹ Ac	6.800		
¹⁹³ Pb	-22.390	²²⁸ Bi	52.320	²²² At	19.900	²¹⁶ Fr	2.880	²¹² Ac	6.970	²⁰⁹ Pa	22.270
¹⁹⁴ Pb	-24.230	²²⁹ Bi	56.570	²²³ At	22.490	²¹⁷ Fr	4.290	²¹³ Ac	6.100	²¹⁰ Pa	21.780
¹⁹⁵ Pb	-24.010	²³⁰ Bi	61.620	²²⁴ At	26.390	²¹⁸ Fr	7.250	²¹⁴ Ac	6.420	²¹¹ Pa	20.130
¹⁹⁶ Pb	-25.590			²²⁵ At	29.270	²¹⁹ Fr	8.780	²¹⁵ Ac	6.360	²¹² Pa	19.790
¹⁹⁷ Pb	-25.060	¹⁹¹ Po	-5.990	²²⁶ At	33.230	²²⁰ Fr	11.530	²¹⁶ Ac	8.130	²¹³ Pa	18.400
¹⁹⁸ Pb	-26.480	¹⁹² Po	-8.380	²²⁷ At	36.290	²²¹ Fr	13.300	²¹⁷ Ac	8.720	²¹⁴ Pa	18.410
¹⁹⁹ Pb	-25.640	¹⁹³ Po	-9.070	²²⁸ At	40.500	²²² Fr	16.250	²¹⁸ Ac	10.740	²¹⁵ Pa	17.430
²⁰⁰ Pb	-26.730	¹⁹⁴ Po	-11.170	²²⁹ At	43.980	²²³ Fr	18.320	²¹⁹ Ac	11.610	²¹⁶ Pa	17.670
²⁰¹ Pb	-25.630	¹⁹⁵ Po	-11.510	²³⁰ At	48.310	²²⁴ Fr	21.450	²²⁰ Ac	13.740	²¹⁷ Pa	17.360
²⁰² Pb	-26.240	¹⁹⁶ Po	-13.550	²³¹ At	52.030	²²⁵ Fr	23.560	²²¹ Ac	14.580	²¹⁸ Pa	18.520
²⁰³ Pb	-25.160	¹⁹⁷ Po	-13.620	²³² At	56.770	²²⁶ Fr	27.000	²²² Ac	16.980	²¹⁹ Pa	18.570
²⁰⁴ Pb	-25.420	¹⁹⁸ Po	-15.560	²³³ At	60.630	²²⁷ Fr	29.330	²²³ Ac	18.170	²²⁰ Pa	19.740
²⁰⁵ Pb	-23.970	¹⁹⁹ Po	-15.270	²³⁴ At	65.490	²²⁸ Fr	32.750	²²⁴ Ac	20.410	²²¹ Pa	19.900
²⁰⁶ Pb	-23.960	²⁰⁰ Po	-16.970	²³⁵ At	69.700	²²⁹ Fr	35.420	²²⁵ Ac	21.960	²²² Pa	21.680
²⁰⁷ Pb	-22.540	²⁰¹ Po	-16.390			²³⁰ Fr	39.050	²²⁶ Ac	24.600	²²³ Pa	21.930
²⁰⁸ Pb	-21.820	²⁰² Po	-17.800	¹⁹⁶ Rn	0.720	²³¹ Fr	41.960	²²⁷ Ac	26.130	²²⁴ Pa	23.590
²⁰⁹ Pb	-17.570	²⁰³ Po	-17.250	¹⁹⁷ Rn	0.180	²³² Fr	45.960	²²⁸ Ac	28.990	²²⁵ Pa	24.250
²¹⁰ Pb	-14.790	²⁰⁴ Po	-18.180	¹⁹⁸ Rn	-2.120	²³³ Fr	49.220	²²⁹ Ac	30.910	²²⁶ Pa	25.970
²¹¹ Pb	-10.340	²⁰⁵ Po	-17.440	¹⁹⁹ Rn	-2.340	²³⁴ Fr	53.520	²³⁰ Ac	33.710	²²⁷ Pa	26.930
²¹² Pb	-7.480	²⁰⁶ Po	-18.120	²⁰⁰ Rn	-4.470	²³⁵ Fr	57.000	²³¹ Ac	35.780	²²⁸ Pa	28.970
²¹³ Pb	-2.850	²⁰⁷ Po	-17.190	²⁰¹ Rn	-4.350	²³⁶ Fr	61.480	²³² Ac	39.060	²²⁹ Pa	30.060
²¹⁴ Pb	-0.080	²⁰⁸ Po	-17.550	²⁰² Rn	-6.290	²³⁷ Fr	65.190	²³³ Ac	41.480	²³⁰ Pa	32.290
²¹⁵ Pb	4.500	²⁰⁹ Po	-16.470	²⁰³ Rn	-6.180	²³⁸ Fr	70.020	²³⁴ Ac	45.000	²³¹ Pa	33.580
²¹⁶ Pb	7.590	²¹⁰ Po	-16.190	²⁰⁴ Rn	-7.830	²³⁹ Fr	73.890	²³⁵ Ac	47.870	²³² Pa	36.000
²¹⁷ Pb	11.970	²¹¹ Po	-12.530	²⁰⁵ Rn	-7.550	²⁴⁰ Fr	79.280	²³⁶ Ac	51.750		

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
²³³ Pa	37.570	²³⁴ Np	40.000	²⁴¹ Am	53.000	²⁵⁴ Bk	84.880	²⁴⁷ Fm	71.560	²⁵² Lr	88.940
²³⁴ Pa	40.340	²³⁵ Np	41.130	²⁴² Am	55.550			²⁴⁸ Fm	71.850	²⁵³ Lr	88.900
²³⁵ Pa	42.340	²³⁶ Np	43.450	²⁴³ Am	57.170	²²⁷ Cf	65.040 ‡	²⁴⁹ Fm	73.370	²⁵⁴ Lr	90.060
²³⁶ Pa	45.430	²³⁷ Np	44.880	²⁴⁴ Am	59.890	²²⁸ Cf	62.950 ‡	²⁵⁰ Fm	74.000	²⁵⁵ Lr	90.340
²³⁷ Pa	47.740	²³⁸ Np	47.450	²⁴⁵ Am	61.820	²²⁹ Cf	62.850	²⁵¹ Fm	75.960	²⁵⁶ Lr	92.110
²³⁸ Pa	51.130	²³⁹ Np	49.270	²⁴⁶ Am	64.910	²³⁰ Cf	60.790	²⁵² Fm	76.850	²⁵⁷ Lr	92.840
²³⁹ Pa	53.610	²⁴⁰ Np	52.260	²⁴⁷ Am	67.050	²³¹ Cf	60.690	²⁵³ Fm	79.390	²⁵⁸ Lr	94.820
²⁴⁰ Pa	57.250	²⁴¹ Np	54.320	²⁴⁸ Am	70.700	²³² Cf	59.190	²⁵⁴ Fm	80.770	²⁵⁹ Lr	95.830
²⁴¹ Pa	60.090	²⁴² Np	57.530	²⁴⁹ Am	73.330	²³³ Cf	59.140	²⁵⁵ Fm	83.690	²⁶⁰ Lr	98.130
²⁴² Pa	64.170	²⁴³ Np	59.950	²⁵⁰ Am	77.270	²³⁴ Cf	58.020	²⁵⁶ Fm	85.440		
²⁴³ Pa	67.260	²⁴⁴ Np	63.550	²⁵¹ Am	80.180	²³⁵ Cf	58.450	²⁵⁷ Fm	88.580		
²⁴⁴ Pa	71.810	²⁴⁵ Np	66.170	²⁵² Am	84.450	²³⁶ Cf	57.450				
²⁴⁵ Pa	75.400	²⁴⁶ Np	70.240			²³⁷ Cf	58.150	²³⁴ Md	85.050 †		
²⁴⁶ Pa	80.200	²⁴⁷ Np	73.370	²²² Cm	51.620 ‡	²³⁸ Cf	57.470	²³⁵ Md	83.000 †		
²⁴⁷ Pa	84.030	²⁴⁸ Np	77.770	²²³ Cm	51.300 ‡	²³⁹ Cf	58.250	²³⁶ Md	82.020 †		
²⁴⁸ Pa	89.160	²⁴⁹ Np	81.120	²²⁴ Cm	49.530	²⁴⁰ Cf	57.960	²³⁷ Md	80.290 †		
		²⁵⁰ Np	85.810	²²⁵ Cm	49.530	²⁴¹ Cf	59.180	²³⁸ Md	79.720 †		
²¹² U	25.600			²²⁶ Cm	48.070	²⁴² Cf	59.340	²³⁹ Md	78.070 †		
²¹³ U	25.410	²¹⁷ Pu	38.200	²²⁷ Cm	48.440	²⁴³ Cf	60.900	²⁴⁰ Md	77.920 †		
²¹⁴ U	23.750	²¹⁸ Pu	36.870	²²⁸ Cm	47.040	²⁴⁴ Cf	61.460	²⁴¹ Md	76.660 †		
²¹⁵ U	23.960	²¹⁹ Pu	37.050	²²⁹ Cm	47.590	²⁴⁵ Cf	63.350	²⁴² Md	76.670		
²¹⁶ U	22.720	²²⁰ Pu	36.120	²³⁰ Cm	46.500	²⁴⁶ Cf	64.080	²⁴³ Md	75.770		
²¹⁷ U	23.000	²²¹ Pu	36.410	²³¹ Cm	46.990	²⁴⁷ Cf	66.150	²⁴⁴ Md	76.160		
²¹⁸ U	22.520	²²² Pu	35.400	²³² Cm	46.410	²⁴⁸ Cf	67.270	²⁴⁵ Md	75.650		
²¹⁹ U	23.530	²²³ Pu	35.950	²³³ Cm	47.300	²⁴⁹ Cf	69.710	²⁴⁶ Md	76.300		
²²⁰ U	22.880	²²⁴ Pu	35.020	²³⁴ Cm	46.780	²⁵⁰ Cf	71.060	²⁴⁷ Md	76.190		
²²¹ U	24.040	²²⁵ Pu	36.000	²³⁵ Cm	48.060	²⁵¹ Cf	74.030	²⁴⁸ Md	77.260		
²²² U	23.860	²²⁶ Pu	35.230	²³⁶ Cm	47.920	²⁵² Cf	75.960	²⁴⁹ Md	77.310		
²²³ U	25.380	²²⁷ Pu	36.240	²³⁷ Cm	49.230	²⁵³ Cf	79.280	²⁵⁰ Md	78.570		
²²⁴ U	25.130	²²⁸ Pu	35.810	²³⁸ Cm	49.360	²⁵⁴ Cf	81.430	²⁵¹ Md	78.980		
²²⁵ U	26.750	²²⁹ Pu	36.950	²³⁹ Cm	51.040	²⁵⁵ Cf	85.140	²⁵² Md	80.690		
²²⁶ U	26.940	²³⁰ Pu	36.770	²⁴⁰ Cm	51.650			²⁵³ Md	81.390		
²²⁷ U	28.530	²³¹ Pu	38.200	²⁴¹ Cm	53.660	²²⁹ Es	72.140 †	²⁵⁴ Md	83.570		
²²⁸ U	29.010	²³² Pu	38.210	²⁴² Cm	54.730	²³⁰ Es	71.350 †	²⁵⁵ Md	84.900		
²²⁹ U	31.080	²³³ Pu	39.950	²⁴³ Cm	57.140	²³¹ Es	69.320 †	²⁵⁶ Md	87.460		
²³⁰ U	31.490	²³⁴ Pu	40.270	²⁴⁴ Cm	58.400	²³² Es	68.770 †	²⁵⁷ Md	88.980		
²³¹ U	33.760	²³⁵ Pu	42.160	²⁴⁵ Cm	60.970	²³³ Es	67.180 †	²⁵⁸ Md	91.770		
²³² U	34.620	²³⁶ Pu	42.830	²⁴⁶ Cm	62.530	²³⁴ Es	66.680 †				
²³³ U	36.950	²³⁷ Pu	45.030	²⁴⁷ Cm	65.500	²³⁵ Es	65.550 †	²³⁶ No	90.890 †		
²³⁴ U	38.080	²³⁸ Pu	46.060	²⁴⁸ Cm	67.330	²³⁶ Es	65.520	²³⁷ No	89.790 †		
²³⁵ U	40.850	²³⁹ Pu	48.520	²⁴⁹ Cm	70.770	²³⁷ Es	64.390	²³⁸ No	87.640 †		
²³⁶ U	42.410	²⁴⁰ Pu	50.040	²⁵⁰ Cm	73.150	²³⁸ Es	64.680	²³⁹ No	86.950 ‡		
²³⁷ U	45.380	²⁴¹ Pu	52.890	²⁵¹ Cm	76.880	²³⁹ Es	63.880	²⁴⁰ No	84.980 ‡		
²³⁸ U	47.300	²⁴² Pu	54.650	²⁵² Cm	79.560	²⁴⁰ Es	64.350	²⁴¹ No	84.680		
²³⁹ U	50.590	²⁴³ Pu	57.720	²⁵³ Cm	83.660	²⁴¹ Es	63.910	²⁴² No	83.120		
²⁴⁰ U	52.780	²⁴⁴ Pu	59.800			²⁴² Es	64.820	²⁴³ No	82.970		
²⁴¹ U	56.280	²⁴⁵ Pu	63.260	²²⁴ Bk	60.090 †	²⁴³ Es	64.830	²⁴⁴ No	81.700		
²⁴² U	58.840	²⁴⁶ Pu	65.510	²²⁵ Bk	58.270 †	²⁴⁴ Es	66.020	²⁴⁵ No	81.940		
²⁴³ U	62.790	²⁴⁷ Pu	69.470	²²⁶ Bk	57.780 †	²⁴⁵ Es	66.430	²⁴⁶ No	81.040		
²⁴⁴ U	65.530	²⁴⁸ Pu	72.310	²²⁷ Bk	56.190 †	²⁴⁶ Es	67.940	²⁴⁷ No	81.560		
²⁴⁵ U	69.960	²⁴⁹ Pu	76.490	²²⁸ Bk	56.060 †	²⁴⁷ Es	68.540	²⁴⁸ No	81.130		
²⁴⁶ U	73.200	²⁵⁰ Pu	79.600	²²⁹ Bk	54.690 †	²⁴⁸ Es	70.300	²⁴⁹ No	81.960		
²⁴⁷ U	77.890	²⁵¹ Pu	84.100	²³⁰ Bk	54.560	²⁴⁹ Es	71.190	²⁵⁰ No	81.750		
²⁴⁸ U	81.450			²³¹ Bk	53.500	²⁵⁰ Es	73.370	²⁵¹ No	82.780		
²⁴⁹ U	86.370	²¹⁹ Am	45.600 †	²³² Bk	53.550	²⁵¹ Es	74.500	²⁵² No	82.950		
		²²⁰ Am	45.280 †	²³³ Bk	52.870	²⁵² Es	77.230	²⁵³ No	84.470		
²¹⁴ Np	33.070 †	²²¹ Am	44.490 †	²³⁴ Bk	53.320	²⁵³ Es	78.970	²⁵⁴ No	84.800		
²¹⁵ Np	31.630 †	²²² Am	44.440 †	²³⁵ Bk	52.780	²⁵⁴ Es	81.940	²⁵⁵ No	86.930		
²¹⁶ Np	31.590 †	²²³ Am	43.160 †	²³⁶ Bk	53.600	²⁵⁵ Es	84.040	²⁵⁶ No	87.910		
²¹⁷ Np	30.410 †	²²⁴ Am	43.220	²³⁷ Bk	53.340	²⁵⁶ Es	87.410	²⁵⁷ No	90.230		
²¹⁸ Np	30.520 †	²²⁵ Am	42.240	²³⁸ Bk	54.230			²⁵⁸ No	91.400		
²¹⁹ Np	30.100 †	²²⁶ Am	42.740	²³⁹ Bk	54.250	²³¹ Fm	79.060 †	²⁵⁹ No	94.030		
²²⁰ Np	30.410	²²⁷ Am	41.830	²⁴⁰ Bk	55.620	²³² Fm	76.580 ‡				
²²¹ Np	29.750	²²⁸ Am	42.350	²⁴¹ Bk	56.080	²³³ Fm	75.930 ‡	²³⁸ Lr	99.330 †		
²²² Np	30.550	²²⁹ Am	41.950	²⁴² Bk	57.790	²³⁴ Fm	73.890 ‡	²³⁹ Lr	97.070 †		
²²³ Np	30.120	²³⁰ Am	42.410	²⁴³ Bk	58.720	²³⁵ Fm	73.380	²⁴⁰ Lr	96.060 †		
²²⁴ Np	31.150	²³¹ Am	42.270	²⁴⁴ Bk	60.760	²³⁶ Fm	71.780	²⁴¹ Lr	93.940 †		
²²⁵ Np	30.850	²³² Am	43.250	²⁴⁵ Bk	61.870	²³⁷ Fm	71.630	²⁴² Lr	93.330 †		
²²⁶ Np	32.000	²³³ Am	43.170	²⁴⁶ Bk	64.070	²³⁸ Fm	70.090	²⁴³ Lr	91.610 †		
²²⁷ Np	32.050	²³⁴ Am	44.460	²⁴⁷ Bk	65.500	²³⁹ Fm	70.250	²⁴⁴ Lr	91.100 †		
²²⁸ Np	33.160	²³⁵ Am	44.780	²⁴⁸ Bk	68.170	²⁴⁰ Fm	69.150	²⁴⁵ Lr	89.670 †		
²²⁹ Np	33.670	²³⁶ Am	46.210	²⁴⁹ Bk	69.770	²⁴¹ Fm	69.460	²⁴⁶ Lr	89.520 †		
²³⁰ Np	35.060	²³⁷ Am	46.760	²⁵⁰ Bk	72.960	²⁴² Fm	68.720	²⁴⁷ Lr	88.490 †		
²³¹ Np	35.510	²³⁸ Am	48.550	²⁵¹ Bk	75.120	²⁴³ Fm	69.480	²⁴⁸ Lr	88.690		
²³² Np	37.340	²³⁹ Am	49.470	²⁵² Bk	78.630	²⁴⁴ Fm	69.120	²⁴⁹ Lr	88.020		
²³³ Np	38.110	²⁴⁰ Am	51.630	²⁵³ Bk	81.130	²⁴⁵ Fm	70.150	²⁵⁰ Lr	88.590		
						²⁴⁶ Fm	70.180	²⁵¹ Lr	88.150		