

J. Janecke and P.J. Masson 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
⁶ He	17.590	¹¹ N	25.430 †	²⁵ Ne	-1.840	⁴⁸ Mg	130.570 †	²⁵ P	19.800 †	³¹ Cl	-6.910
⁷ He	26.370 †	¹² N	17.610	²⁶ Ne	0.350	⁵⁰ Mg	154.560 †	²⁶ P	11.140 †	³² Cl	-13.540
⁸ He	31.170	¹³ N	5.230	²⁷ Ne	6.700			²⁷ P	-0.550	³³ Cl	-21.060
⁹ He	41.270 †	¹⁵ N	0.170	²⁸ Ne	10.410	²⁰ Al	41.630 †	²⁸ P	-7.360	³⁵ Cl	-28.940
¹⁰ He	49.350 †	¹⁶ N	5.680	²⁹ Ne	18.400	²¹ Al	26.180 †	²⁹ P	-16.840	³⁶ Cl	-29.410
¹² He	74.050 †	¹⁷ N	7.860	³⁰ Ne	23.460	²² Al	17.890	³¹ P	-24.510	³⁷ Cl	-31.690
¹⁴ He	96.610 †	¹⁸ N	13.080	³¹ Ne	33.780 †	²³ Al	6.640	³² P	-24.520	³⁸ Cl	-29.710
		¹⁹ N	15.860	³² Ne	40.620 ‡	²⁴ Al	-0.010	³³ P	-26.170	³⁹ Cl	-29.820
⁷ Li	14.670	²⁰ N	20.990	³³ Ne	51.040 †	²⁵ Al	-9.040	³⁴ P	-24.450	⁴⁰ Cl	-27.620
⁸ Li	21.140	²¹ N	23.740	³⁴ Ne	57.980 ‡	²⁷ Al	-17.110	³⁵ P	-24.690	⁴¹ Cl	-27.440
⁹ Li	25.190	²² N	29.970	³⁵ Ne	68.330 †	²⁸ Al	-17.110	³⁶ P	-20.410	⁴² Cl	-24.590
¹⁰ Li	33.050	²³ N	35.670	³⁶ Ne	75.940 ‡	²⁹ Al	-18.090	³⁷ P	-18.530	⁴³ Cl	-23.340
¹¹ Li	40.720	²⁴ N	44.970 †	³⁷ Ne	86.350 †	³⁰ Al	-15.740	³⁸ P	-14.230	⁴⁴ Cl	-20.310
¹² Li	52.550 †	²⁵ N	52.860 ‡	³⁸ Ne	93.610 ‡	³¹ Al	-15.170	³⁹ P	-12.090	⁴⁵ Cl	-19.160
¹³ Li	60.990 †	²⁷ N	73.070 †	⁴⁰ Ne	114.700 †	³² Al	-11.290	⁴⁰ P	-7.560	⁴⁶ Cl	-14.520
¹⁴ Li	71.310 †	²⁹ N	97.500 †	⁴² Ne	137.690 †	³³ Al	-9.140	⁴¹ P	-4.520	⁴⁷ Cl	-11.010
¹⁵ Li	80.340 †	³¹ N	121.610 †	⁴⁴ Ne	161.880 †	³⁴ Al	-2.660	⁴² P	0.430	⁴⁸ Cl	-4.880
¹⁷ Li	101.710 †					³⁵ Al	1.260	⁴³ P	3.630	⁴⁹ Cl	-0.050
		¹² O	33.070 †	¹⁸ Na	25.380 †	³⁶ Al	7.860	⁴⁴ P	10.020	⁵⁰ Cl	7.650
⁶ Be	18.740 †	¹³ O	23.620	¹⁹ Na	12.920 †	³⁷ Al	11.990	⁴⁵ P	15.320	⁵¹ Cl	13.670
⁷ Be	15.530	¹⁴ O	7.960	²⁰ Na	6.890	³⁸ Al	18.610	⁴⁶ P	22.820	⁵² Cl	22.430 †
⁸ Be	5.180	¹⁵ O	2.920	²¹ Na	-2.340	³⁹ Al	23.610	⁴⁷ P	29.000	⁵³ Cl	29.080
⁹ Be	10.920	¹⁶ O	-4.760	²³ Na	-9.470	⁴⁰ Al	30.250	⁴⁸ P	37.850 †	⁵⁴ Cl	38.740 †
¹⁰ Be	12.720	¹⁷ O	-0.820	²⁴ Na	-8.350	⁴¹ Al	35.230	⁴⁹ P	44.890	⁵⁵ Cl	46.050 ‡
¹¹ Be	20.160	¹⁸ O	-0.760	²⁵ Na	-9.420	⁴² Al	43.550 †	⁵⁰ P	54.930 †	⁵⁶ Cl	56.020 †
¹² Be	25.050	¹⁹ O	3.370	²⁶ Na	-6.950	⁴³ Al	50.900	⁵¹ P	63.300 †	⁵⁷ Cl	63.930 †
¹³ Be	35.240 †	²⁰ O	3.650	²⁷ Na	-5.700	⁴⁴ Al	60.140 †	⁵³ P	83.270 †	⁵⁸ Cl	74.070 †
¹⁴ Be	40.400	²¹ O	8.290	²⁸ Na	-0.870	⁴⁵ Al	68.120 ‡	⁵⁵ P	103.770 †	⁵⁹ Cl	81.980 ‡
¹⁵ Be	50.780 †	²² O	9.270	²⁹ Na	2.120	⁴⁶ Al	78.340 †	⁵⁷ P	125.070 †	⁶⁰ Cl	92.660 †
¹⁶ Be	58.350 ‡	²³ O	15.240	³⁰ Na	8.360	⁴⁷ Al	86.730 †	⁵⁹ P	146.530 †	⁶¹ Cl	100.930 †
¹⁷ Be	69.200 †	²⁴ O	19.450	³¹ Na	12.740	⁴⁹ Al	107.300 †	⁶¹ P	168.630 †	⁶² Cl	111.560 †
¹⁸ Be	76.030 ‡	²⁵ O	28.450 †	³² Na	21.370 †	⁵¹ Al	130.280 †	⁶³ P	191.040 †	⁶³ Cl	120.090 †
¹⁹ Be	87.030 †	²⁶ O	34.630	³³ Na	27.690	⁵³ Al	153.780 †	⁶⁵ P	213.710 †	⁶⁴ Cl	130.510 †
²⁰ Be	95.240 †	²⁷ O	44.860 †	³⁴ Na	36.480 †	⁵⁵ Al	177.690 †			⁶⁵ Cl	139.280 †
²² Be	118.000 †	²⁸ O	52.380 ‡	³⁵ Na	42.650			²⁶ S	27.390 †	⁶⁶ Cl	150.250 †
		³⁰ O	74.340 †	³⁶ Na	51.580 †	²² Si	31.970 ‡	²⁷ S	17.790	⁶⁷ Cl	159.370 †
⁷ B	28.590 †	³² O	96.080 †	³⁷ Na	58.560	²³ Si	23.430	²⁸ S	4.580		
⁸ B	23.070	³⁴ O	118.610 †	³⁸ Na	67.300 †	²⁴ Si	10.680	²⁹ S	-2.940	³⁰ Ar	21.470 ‡
⁹ B	11.990			³⁹ Na	74.240	²⁵ Si	3.730	³⁰ S	-14.170	³¹ Ar	11.520
¹¹ B	8.760	¹⁴ F	33.290 †	⁴⁰ Na	84.230 †	²⁶ Si	-7.020	³¹ S	-19.110	³² Ar	-2.070
¹² B	13.410	¹⁵ F	17.690 †	⁴¹ Na	93.370 †	²⁷ Si	-12.300	³² S	-26.100	³³ Ar	-9.230
¹³ B	16.670	¹⁶ F	11.190 †	⁴³ Na	114.570 †	²⁸ Si	-21.070	³³ S	-26.640	³⁴ Ar	-18.370
¹⁴ B	23.580	¹⁷ F	1.940	⁴⁵ Na	136.720 †	²⁹ Si	-21.780	³⁴ S	-29.910	³⁵ Ar	-22.980
¹⁵ B	28.810	¹⁹ F	-1.520	⁴⁷ Na	160.020 †	³⁰ Si	-24.510	³⁵ S	-28.970	³⁶ Ar	-29.830
¹⁶ B	37.720 †	²⁰ F	0.100			³¹ Si	-22.830	³⁶ S	-30.620	³⁷ Ar	-30.930
¹⁷ B	43.710	²¹ F	-0.110	¹⁸ Mg	43.510 †	³² Si	-23.950	³⁷ S	-26.960	³⁸ Ar	-34.890
¹⁸ B	52.440 †	²² F	2.760	¹⁹ Mg	32.220 ‡	³³ Si	-20.610	³⁸ S	-26.770	³⁹ Ar	-33.220
¹⁹ B	58.180	²³ F	3.490	²⁰ Mg	17.260	³⁴ Si	-20.080	³⁹ S	-22.770	⁴⁰ Ar	-35.120
²⁰ B	66.670 †	²⁴ F	7.970	²¹ Mg	10.740	³⁵ Si	-14.380	⁴⁰ S	-22.420	⁴¹ Ar	-33.090
²¹ B	74.400 ‡	²⁵ F	11.880	²² Mg	-0.260	³⁶ Si	-11.870	⁴¹ S	-18.070	⁴² Ar	-34.410
²² B	85.450 †	²⁶ F	19.160	²³ Mg	-5.410	³⁷ Si	-5.890	⁴² S	-16.530	⁴³ Ar	-31.850
²³ B	95.130 †	²⁷ F	24.400	²⁴ Mg	-14.150	³⁸ Si	-3.450	⁴³ S	-11.860	⁴⁴ Ar	-32.240
		²⁸ F	33.100 †	²⁵ Mg	-13.320	³⁹ Si	2.870	⁴⁴ S	-10.310	⁴⁵ Ar	-29.620
⁸ C	35.370 †	²⁹ F	39.910	²⁶ Mg	-16.110	⁴⁰ Si	6.080	⁴⁵ S	-4.320	⁴⁶ Ar	-29.800
⁹ C	29.100	³⁰ F	50.910 †	²⁷ Mg	-14.580	⁴¹ Si	12.540	⁴⁶ S	-0.360	⁴⁷ Ar	-25.620
¹⁰ C	15.770	³¹ F	59.440 †	²⁸ Mg	-14.850	⁴² Si	16.020	⁴⁷ S	6.680	⁴⁸ Ar	-23.030
¹¹ C	10.740	³² F	70.390 †	²⁹ Mg	-10.740	⁴³ Si	24.060	⁴⁸ S	11.950	⁴⁹ Ar	-17.330
¹² C	-0.010	³³ F	78.960 †	³⁰ Mg	-9.500	⁴⁴ Si	29.760	⁴⁹ S	20.360 †	⁵⁰ Ar	-13.210
¹³ C	3.010	³⁵ F	99.100 †	³¹ Mg	-3.930	⁴⁵ Si	38.600 †	⁵⁰ S	26.690	⁵¹ Ar	-5.820
¹⁴ C	2.990	³⁶ F	110.140 †	³² Mg	-1.250	⁴⁶ Si	45.240	⁵¹ S	36.430 †	⁵² Ar	-0.780
¹⁵ C	9.960	³⁷ F	119.070 †	³³ Mg	6.850 †	⁴⁷ Si	55.000 †	⁵² S	43.820 ‡	⁵³ Ar	7.240
¹⁶ C	13.720			³⁴ Mg	11.540	⁴⁸ Si	62.470 ‡	⁵³ S	54.390 †	⁵⁴ Ar	12.980
¹⁷ C	21.060	¹⁴ Ne	54.420 †	³⁵ Mg	19.570	⁴⁹ Si	73.230 †	⁵⁴ S	62.140 ‡	⁵⁵ Ar	22.200 †
¹⁸ C	24.930	¹⁵ Ne	41.760 †	³⁶ Mg	24.320	⁵⁰ Si	81.910 †	⁵⁵ S	73.000 †	⁵⁶ Ar	28.620
¹⁹ C	32.570	¹⁶ Ne	24.690 ‡	³⁷ Mg	32.620 †	⁵¹ Si	103.600 †	⁵⁶ S	81.300 †	⁵⁷ Ar	38.210 †
²⁰ C	35.810	¹⁷ Ne	16.610	³⁸ Mg	37.930	⁵² Si	125.450 †	⁵⁸ S	100.800 ‡	⁵⁸ Ar	44.700
²¹ C	43.810	¹⁸ Ne	5.240	³⁹ Mg	46.350 †	⁵⁴ Si	148.020 †	⁶⁰ S	121.140 †	⁵⁹ Ar	54.800 †
²² C	49.770	¹⁹ Ne	1.720	⁴⁰ Mg	51.510	⁵⁶ Si	170.930 †	⁶² S	141.730 †	⁶⁰ Ar	61.630 ‡
²³ C	60.560 †	²⁰ Ne	-7.020	⁴¹ Mg	61.330 †	⁶⁰ Si	194.420 †	⁶⁴ S	162.410 †	⁶¹ Ar	72.000 †
²⁴ C	68.750 †	²¹ Ne	-5.890	⁴² Mg	68.960 ‡	⁶² Si	218.270 †	⁶⁶ S	183.840 †	⁶² Ar	79.070 ‡
²⁶ C	91.620 †	²² Ne	-7.870	⁴³ Mg	79.860 †	⁶⁴ Si	242.420 †			⁶³ Ar	89.470 †
		²³ Ne	-5.250	⁴⁴ Mg	88.240 †			²⁹ Cl	14.270 †	⁶⁴ Ar	96.500 ‡
¹⁰ N	39.180	²⁴ Ne	-6.020	⁴⁶ Mg	108.640 †	²⁴ P	32.850 †	³⁰ Cl	4.990 †		

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
⁶⁵ Ar	106.930 †	⁶⁵ Ca	51.290 †	⁶⁰ Ti	-21.040	⁴⁷ Cr	-34.540	⁷² Mn	-9.690	⁹⁴ Fe	146.320 †
⁶⁶ Ar	114.450 ‡	⁶⁶ Ca	57.070	⁶¹ Ti	-14.300	⁴⁸ Cr	-42.840	⁷³ Mn	-5.570	⁹⁵ Fe	157.200 †
⁶⁷ Ar	125.330 †	⁶⁷ Ca	66.170 †	⁶² Ti	-10.430	⁴⁹ Cr	-45.310	⁷⁴ Mn	0.930	⁹⁶ Fe	165.290 †
⁶⁸ Ar	133.690 †	⁶⁸ Ca	72.840	⁶³ Ti	-3.160	⁵⁰ Cr	-50.220	⁷⁵ Mn	5.600	⁹⁷ Fe	176.340 †
⁷⁰ Ar	157.480 †	⁶⁹ Ca	82.640 †	⁶⁴ Ti	0.430	⁵¹ Cr	-51.510	⁷⁶ Mn	14.000 †	⁹⁸ Fe	184.850 †
³² K	21.550 †	⁷⁰ Ca	89.750 ‡	⁶⁵ Ti	7.890	⁵² Cr	-55.480	⁷⁷ Mn	21.470	¹⁰⁰ Fe	204.440 †
³³ K	7.420 †	⁷² Ca	111.440 †	⁶⁶ Ti	11.980	⁵³ Cr	-55.300	⁷⁸ Mn	30.340 †	¹⁰² Fe	223.920 †
³⁴ K	-1.360 †	⁷⁴ Ca	133.490 †	⁶⁷ Ti	19.550	⁵⁴ Cr	-56.790	⁷⁹ Mn	38.230 †	¹⁰³ Fe	234.970 †
³⁵ K	-11.280	⁷⁶ Ca	156.330 †	⁶⁸ Ti	24.490	⁵⁵ Cr	-55.190	⁸⁰ Mn	47.490 †	¹⁰⁴ Fe	243.480 †
³⁶ K	-17.300	³⁷ Sc	3.750 †	⁶⁹ Ti	32.510	⁵⁶ Cr	-55.340	⁸¹ Mn	55.690 †	¹⁰⁵ Fe	254.490 †
³⁷ K	-24.780	³⁸ Sc	-4.580 †	⁷⁰ Ti	37.930	⁵⁷ Cr	-52.290	⁸² Mn	65.870 †	¹⁰⁶ Fe	263.210 †
³⁹ K	-33.340	³⁹ Sc	-14.050 †	⁷¹ Ti	46.770 †	⁵⁸ Cr	-52.030	⁸³ Mn	74.860 †	¹⁰⁷ Fe	274.270 †
⁴⁰ K	-33.460	⁴⁰ Sc	-20.440	⁷² Ti	52.740	⁵⁹ Cr	-48.090	⁸⁴ Mn	85.400 †	¹⁰⁸ Fe	283.250 †
⁴¹ K	-35.530	⁴¹ Sc	-28.510	⁷³ Ti	63.290 †	⁶⁰ Cr	-46.600	⁸⁵ Mn	94.080 †	⁴⁸ Co	0.970 †
⁴² K	-35.000	⁴² Sc	-32.100	⁷⁴ Ti	71.930 †	⁶¹ Cr	-41.510	⁸⁶ Mn	104.260 †	⁴⁹ Co	-10.200 †
⁴³ K	-36.610	⁴³ Sc	-36.250	⁷⁵ Ti	82.750 †	⁶² Cr	-39.510	⁸⁷ Mn	112.820 †	⁵⁰ Co	-17.700
⁴⁴ K	-35.690	⁴⁴ Sc	-37.820	⁷⁶ Ti	91.760 †	⁶³ Cr	-34.210	⁸⁸ Mn	123.290 †	⁵¹ Co	-27.470
⁴⁵ K	-36.490	⁴⁵ Sc	-41.010	⁷⁸ Ti	112.550 †	⁶⁴ Cr	-32.070	⁸⁹ Mn	131.720 †	⁵² Co	-34.260
⁴⁶ K	-35.200	⁴⁶ Sc	-41.840	⁸⁰ Ti	134.950 †	⁶⁵ Cr	-26.280	⁹⁰ Mn	142.550 †	⁵³ Co	-42.660
⁴⁷ K	-35.850	⁴⁷ Sc	-44.430	⁸² Ti	157.570 †	⁶⁶ Cr	-23.930	⁹¹ Mn	151.380 †	⁵⁴ Co	-48.320
⁴⁸ K	-32.580	⁴⁸ Sc	-44.520	⁸⁴ Ti	180.000 †	⁶⁷ Cr	-17.820	⁹³ Mn	171.370 †	⁵⁵ Co	-53.990
⁴⁹ K	-30.420	⁴⁹ Sc	-46.520	⁸⁶ Ti	202.130 †	⁶⁸ Cr	-14.570	⁹⁵ Mn	191.450 †	⁵⁶ Co	-56.110
⁵⁰ K	-25.430	⁵⁰ Sc	-44.380	⁸⁸ Ti	224.370 †	⁶⁹ Cr	-8.080	⁹⁷ Mn	211.760 †	⁵⁷ Co	-59.320
⁵¹ K	-21.620	⁵¹ Sc	-43.250	⁴⁰ V	11.510 †	⁷⁰ Cr	-4.390	⁹⁹ Mn	232.590 †	⁵⁸ Co	-59.850
⁵² K	-15.210	⁵² Sc	-39.550	⁴¹ V	0.080 †	⁷¹ Cr	2.670	¹⁰¹ Mn	252.930 †	⁵⁹ Co	-62.210
⁵³ K	-10.910	⁵³ Sc	-37.460	⁴² V	-7.980 †	⁷² Cr	6.950	¹⁰³ Mn	273.190 †	⁶⁰ Co	-61.700
⁵⁴ K	-3.800	⁵⁴ Sc	-32.690	⁴³ V	-17.860 †	⁷³ Cr	14.520	¹⁰⁵ Mn	293.530 †	⁶¹ Co	-62.870
⁵⁵ K	1.500	⁵⁵ Sc	-29.750	⁴⁴ V	-23.820	⁷⁴ Cr	19.260	⁴⁶ Fe	0.480	⁶² Co	-61.520
⁵⁶ K	9.830 †	⁵⁶ Sc	-23.970	⁴⁵ V	-31.940	⁷⁵ Cr	28.660 †	⁴⁷ Fe	-7.240	⁶³ Co	-61.780
⁵⁷ K	15.860	⁵⁷ Sc	-19.950	⁴⁶ V	-36.850	⁷⁶ Cr	36.230 ‡	⁴⁸ Fe	-17.980	⁶⁴ Co	-59.610
⁵⁸ K	24.030 †	⁵⁸ Sc	-13.420	⁴⁷ V	-41.990	⁷⁷ Cr	45.950 †	⁴⁹ Fe	-24.790	⁶⁵ Co	-59.330
⁵⁹ K	30.490	⁵⁹ Sc	-8.840	⁴⁸ V	-44.470	⁷⁸ Cr	54.010 ‡	⁵⁰ Fe	-34.480	⁶⁶ Co	-56.770
⁶⁰ K	39.510 †	⁶⁰ Sc	-1.780	⁴⁹ V	-47.980	⁷⁹ Cr	64.180 †	⁵¹ Fe	-40.200	⁶⁷ Co	-55.960
⁶¹ K	46.030	⁶¹ Sc	3.280	⁵⁰ V	-49.190	⁸⁰ Cr	72.700 †	⁵² Fe	-48.390	⁶⁸ Co	-52.270
⁶² K	55.200 †	⁶² Sc	10.800	⁵¹ V	-52.200	⁸¹ Cr	83.610 †	⁵³ Fe	-50.960	⁶⁹ Co	-51.080
⁶³ K	62.040	⁶³ Sc	15.880	⁵² V	-51.360	⁸² Cr	92.810 †	⁵⁴ Fe	-56.230	⁷⁰ Co	-46.990
⁶⁴ K	70.930 †	⁶⁴ Sc	23.310	⁵³ V	-51.950	⁸⁴ Cr	113.280 †	⁵⁵ Fe	-57.450	⁷¹ Co	-45.010
⁶⁵ K	77.980	⁶⁵ Sc	28.670	⁵⁴ V	-49.890	⁸⁶ Cr	133.180 †	⁵⁶ Fe	-60.560	⁷² Co	-40.600
⁶⁶ K	87.160 †	⁶⁶ Sc	36.320	⁵⁵ V	-49.150	⁸⁸ Cr	153.200 †	⁵⁷ Fe	-60.180	⁷³ Co	-38.200
⁶⁷ K	94.590 ‡	⁶⁷ Sc	42.030	⁵⁶ V	-45.720	⁹⁰ Cr	173.540 †	⁵⁸ Fe	-62.170	⁷⁴ Co	-33.490
⁶⁸ K	104.710 †	⁶⁸ Sc	50.360 †	⁵⁷ V	-44.050	⁹² Cr	194.580 †	⁵⁹ Fe	-60.580	⁷⁵ Co	-30.510
⁶⁹ K	112.760 ‡	⁶⁹ Sc	56.710	⁵⁸ V	-40.080	⁹⁴ Cr	215.620 †	⁶⁰ Fe	-61.440	⁷⁶ Co	-25.090
⁷¹ K	135.580 †	⁷⁰ Sc	65.580 †	⁵⁹ V	-37.500	⁹⁶ Cr	236.870 †	⁶¹ Fe	-58.890	⁷⁷ Co	-21.520
³⁴ Ca	14.480 ‡	⁷¹ Sc	72.670	⁶⁰ V	-32.090	⁹⁸ Cr	258.450 †	⁶² Fe	-58.910	⁷⁸ Co	-14.060
³⁵ Ca	4.930	⁷² Sc	83.370 †	⁶¹ V	-28.910	¹⁰⁰ Cr	279.900 †	⁶³ Fe	-55.250	⁷⁹ Co	-7.610
³⁶ Ca	-6.400	⁷³ Sc	93.090 †	⁶² V	-23.360	¹⁰² Cr	301.020 †	⁶⁴ Fe	-54.990	⁸⁰ Co	0.180
³⁷ Ca	-13.050	⁷⁴ Sc	103.980 †	⁶³ V	-19.730	¹⁰⁴ Cr	322.140 †	⁶⁵ Fe	-51.160	⁸¹ Co	6.830
³⁸ Ca	-22.210	⁷⁵ Sc	113.990 †	⁶⁴ V	-13.950	⁴⁴ Mn	6.500 †	⁶⁶ Fe	-50.270	⁸² Co	15.040 †
³⁹ Ca	-26.810	⁷⁷ Sc	135.730 †	⁶⁵ V	-10.350	⁴⁵ Mn	-5.410 †	⁶⁷ Fe	-45.820	⁸³ Co	22.300
⁴⁰ Ca	-34.710	⁸¹ Sc	182.880 †	⁶⁶ V	-4.160	⁴⁶ Mn	-12.670	⁶⁸ Fe	-44.320	⁸⁴ Co	31.260 †
⁴¹ Ca	-35.000	⁸³ Sc	206.520 †	⁶⁷ V	-0.140	⁴⁷ Mn	-22.650	⁶⁹ Fe	-39.290	⁸⁵ Co	39.010 ‡
⁴² Ca	-38.550	⁸⁵ Sc	229.950 †	⁶⁸ V	6.670	⁴⁸ Mn	-29.300	⁷⁰ Fe	-37.290	⁸⁶ Co	48.270 †
⁴³ Ca	-38.350	³⁸ Ti	10.810 ‡	⁶⁹ V	11.300	⁴⁹ Mn	-37.590	⁷¹ Fe	-31.760	⁸⁷ Co	55.080 ‡
⁴⁴ Ca	-41.590	³⁹ Ti	2.180 ‡	⁷⁰ V	18.380	⁵⁰ Mn	-43.300	⁷² Fe	-29.200	⁸⁸ Co	65.010 †
⁴⁵ Ca	-41.070	⁴⁰ Ti	-9.080	⁷¹ V	23.770	⁵¹ Mn	-48.220	⁷³ Fe	-23.420	⁸⁹ Co	72.450 ‡
⁴⁶ Ca	-43.200	⁴¹ Ti	-15.640	⁷² V	31.500	⁵² Mn	-50.580	⁷⁴ Fe	-20.370	⁹⁰ Co	82.140 †
⁴⁷ Ca	-42.370	⁴² Ti	-25.190	⁷³ V	37.310	⁵³ Mn	-54.750	⁷⁵ Fe	-13.940	⁹¹ Co	89.890 ‡
⁴⁸ Ca	-43.940	⁴³ Ti	-29.380	⁷⁴ V	46.790 †	⁵⁴ Mn	-55.570	⁷⁶ Fe	-10.270	⁹² Co	99.840 †
⁴⁹ Ca	-41.100	⁴⁴ Ti	-37.490	⁷⁵ V	55.360 †	⁵⁵ Mn	-57.620	⁷⁷ Fe	-1.970 †	⁹³ Co	107.610 ‡
⁵⁰ Ca	-39.650	⁴⁵ Ti	-39.070	⁷⁶ V	65.170 †	⁵⁶ Mn	-56.910	⁷⁸ Fe	4.650	⁹⁴ Co	117.780 †
⁵¹ Ca	-34.980	⁴⁶ Ti	-44.130	⁷⁷ V	74.080 †	⁵⁷ Mn	-57.440	⁷⁹ Fe	13.350 †	⁹⁵ Co	125.670 ‡
⁵² Ca	-32.140	⁴⁷ Ti	-44.950	⁷⁸ V	84.430 †	⁵⁸ Mn	-55.810	⁸⁰ Fe	20.330	⁹⁶ Co	135.770 †
⁵³ Ca	-26.470	⁴⁸ Ti	-48.300	⁷⁹ V	93.860 †	⁵⁹ Mn	-55.590	⁸¹ Fe	29.260 †	⁹⁷ Co	143.690 ‡
⁵⁴ Ca	-23.070	⁴⁹ Ti	-48.820	⁸¹ V	115.020 †	⁶⁰ Mn	-52.730	⁸² Fe	36.730 ‡	⁹⁸ Co	154.160 †
⁵⁵ Ca	-16.410	⁵⁰ Ti	-51.530	⁸³ V	136.700 †	⁶¹ Mn	-51.550	⁸³ Fe	46.710 †	⁹⁹ Co	162.510 †
⁵⁶ Ca	-12.000	⁵¹ Ti	-49.710	⁸⁵ V	157.890 †	⁶² Mn	-47.650	⁸⁴ Fe	54.680 ‡	¹⁰⁰ Co	172.740 †
⁵⁷ Ca	-4.060	⁵² Ti	-49.550	⁸⁷ V	178.860 †	⁶³ Mn	-45.900	⁸⁵ Fe	64.990 †	¹⁰¹ Co	180.990 †
⁵⁸ Ca	0.560	⁵³ Ti	-46.590	⁸⁹ V	199.980 †	⁶⁴ Mn	-42.080	⁸⁶ Fe	72.620 ‡	¹⁰² Co	191.260 †
⁵⁹ Ca	8.700 †	⁵⁴ Ti	-45.410	⁹¹ V	221.900 †	⁶⁵ Mn	-39.930	⁸⁷ Fe	82.690 †	¹⁰³ Co	199.600 †
⁶⁰ Ca	14.070	⁵⁵ Ti	-41.090	⁴² Cr	6.210 ‡	⁶⁶ Mn	-35.400	⁸⁸ Fe	90.410 ‡	¹⁰⁴ Co	209.990 †
⁶¹ Ca	22.780 †	⁵⁶ Ti	-39.030	⁴³ Cr	-2.140	⁶⁷ Mn	-33.140	⁸⁹ Fe	100.610 †	¹⁰⁵ Co	218.390 †
⁶² Ca	28.100	⁵⁷ Ti	-33.640	⁴⁴ Cr	-13.650	⁶⁸ Mn	-27.790	⁹⁰ Fe	108.530 ‡	¹⁰⁶ Co	228.900 †
⁶³ Ca	37.030 †	⁵⁸ Ti	-31.030	⁴⁵ Cr	-19.560	⁶⁹ Mn	-24.850	⁹¹ Fe	119.180 †	¹⁰⁷ Co	237.550 †
⁶⁴ Ca	42.370	⁵⁹ Ti	-24.540	⁴⁶ Cr	-29.550	⁷⁰ Mn	-19.300	⁹² Fe	127.310 †	¹⁰⁸ Co	247.820 †
						⁷¹ Mn	-15.630	⁹³ Fe	138.090 †	¹⁰⁹ Co	256.940 †

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
⁵⁰ Ni	-4.210	⁶⁵ Cu	-67.150	⁸¹ Zn	-45.780	⁹⁶ Ga	32.320	¹¹² Ge	124.010	⁶⁸ Se	-54.280		
⁵¹ Ni	-12.010	⁶⁶ Cu	-66.230	⁸² Zn	-41.300	⁹⁷ Ga	38.190	¹¹³ Ge	132.910 †	⁶⁹ Se	-56.420		
⁵² Ni	-22.740	⁶⁷ Cu	-67.300	⁸³ Zn	-34.760	⁹⁸ Ga	46.490 †	¹¹⁴ Ge	139.930	⁷⁰ Se	-61.940		
⁵³ Ni	-29.730	⁶⁸ Cu	-65.580	⁸⁴ Zn	-30.050	⁹⁹ Ga	52.700	¹¹⁶ Ge	160.320 †	⁷¹ Se	-63.200		
⁵⁴ Ni	-39.230	⁶⁹ Cu	-65.840	⁸⁵ Zn	-23.300	¹⁰⁰ Ga	60.810 †	¹¹⁸ Ge	181.220 †	⁷² Se	-67.770		
⁵⁵ Ni	-45.290	⁷⁰ Cu	-63.410	⁸⁶ Zn	-18.330	¹⁰¹ Ga	66.880	¹²⁰ Ge	202.590 †	⁷³ Se	-68.330		
⁵⁶ Ni	-53.870	⁷¹ Cu	-63.190	⁸⁷ Zn	-10.760	¹⁰² Ga	75.240 †	⁶⁰ As	-6.860 †	⁷⁴ Se	-72.050		
⁵⁷ Ni	-56.100	⁷² Cu	-60.230	⁸⁸ Zn	-5.020	¹⁰³ Ga	81.610	⁶¹ As	-18.060 †	⁷⁵ Se	-72.190		
⁵⁸ Ni	-60.210	⁷³ Cu	-59.520	⁸⁹ Zn	3.000	¹⁰⁴ Ga	90.280 †	⁶² As	-25.390 †	⁷⁶ Se	-75.270		
⁵⁹ Ni	-61.130	⁷⁴ Cu	-56.330	⁹⁰ Zn	8.900	¹⁰⁵ Ga	96.890	⁶³ As	-33.860 †	⁷⁷ Se	-74.590		
⁶⁰ Ni	-64.510	⁷⁵ Cu	-55.090	⁹¹ Zn	17.170 †	¹⁰⁶ Ga	105.860 †	⁶⁴ As	-39.750 †	⁷⁸ Se	-76.980		
⁶¹ Ni	-64.200	⁷⁶ Cu	-51.450	⁹² Zn	23.220	¹⁰⁷ Ga	112.850	⁶⁵ As	-46.810 †	⁷⁹ Se	-75.980		
⁶² Ni	-66.640	⁷⁷ Cu	-49.570	⁹³ Zn	31.680 †	¹⁰⁸ Ga	121.780 †	⁶⁶ As	-51.410	⁸⁰ Se	-77.760		
⁶³ Ni	-65.530	⁷⁸ Cu	-45.090	⁹⁴ Zn	37.760	¹⁰⁹ Ga	128.950	⁶⁷ As	-56.540	⁸¹ Se	-76.480		
⁶⁴ Ni	-67.280	⁷⁹ Cu	-42.540	⁹⁵ Zn	46.390 †	¹¹⁰ Ga	138.050 †	⁶⁸ As	-58.830	⁸² Se	-77.590		
⁶⁵ Ni	-65.090	⁸⁰ Cu	-36.170	⁹⁶ Zn	52.440	¹¹¹ Ga	145.300 ‡	⁶⁹ As	-63.030	⁸³ Se	-75.450		
⁶⁶ Ni	-66.080	⁸¹ Cu	-30.960	⁹⁷ Zn	61.310 †	¹¹² Ga	154.290 †	⁷⁰ As	-64.410	⁸⁴ Se	-76.080		
⁶⁷ Ni	-63.590	⁸² Cu	-24.220	⁹⁸ Zn	67.690	¹¹³ Ga	161.900 ‡	⁷¹ As	-67.820	⁸⁵ Se	-72.210		
⁶⁸ Ni	-63.550	⁸³ Cu	-18.500	⁹⁹ Zn	76.880 †	¹¹⁵ Ga	183.080 †	⁷² As	-68.380	⁸⁶ Se	-70.230		
⁶⁹ Ni	-60.170	⁸⁴ Cu	-11.510	¹⁰⁰ Zn	82.970	¹¹⁷ Ga	204.620 †	⁷³ As	-70.940	⁸⁷ Se	-66.110		
⁷⁰ Ni	-59.930	⁸⁵ Cu	-5.500	¹⁰¹ Zn	92.170 †	¹¹⁹ Ga	226.770 †	⁷⁴ As	-70.880	⁸⁸ Se	-63.640		
⁷¹ Ni	-55.860	⁸⁶ Cu	2.190	¹⁰² Zn	98.580	⁵⁸ Ge	-8.690 †	⁷⁵ As	-73.070	⁸⁹ Se	-59.160		
⁷² Ni	-55.000	⁸⁷ Cu	8.770	¹⁰³ Zn	107.910 †	⁵⁹ Ge	-17.030 ‡	⁷⁶ As	-72.420	⁹⁰ Se	-55.930		
⁷³ Ni	-50.730	⁸⁸ Cu	17.070 †	¹⁰⁴ Zn	114.630	⁶⁰ Ge	-28.030	⁷⁷ As	-73.960	⁹¹ Se	-50.160		
⁷⁴ Ni	-49.410	⁸⁹ Cu	23.470	¹⁰⁵ Zn	124.100 †	⁶¹ Ge	-34.230	⁷⁸ As	-72.790	⁹² Se	-46.080		
⁷⁵ Ni	-44.770	⁹⁰ Cu	31.910 †	¹⁰⁶ Zn	131.160 ‡	⁶² Ge	-42.480	⁷⁹ As	-73.660	⁹³ Se	-39.790		
⁷⁶ Ni	-42.800	⁹¹ Cu	38.680	¹⁰⁷ Zn	140.870 †	⁶³ Ge	-47.290	⁸⁰ As	-72.050	⁹⁴ Se	-35.750		
⁷⁷ Ni	-37.470	⁹² Cu	47.490 †	¹⁰⁸ Zn	147.920 ‡	⁶⁴ Ge	-54.360	⁸¹ As	-72.430	⁹⁵ Se	-29.500		
⁷⁸ Ni	-34.750	⁹³ Cu	54.180	¹⁰⁹ Zn	157.700 †	⁶⁵ Ge	-56.470	⁸² As	-70.090	⁹⁶ Se	-25.520		
⁷⁹ Ni	-27.470	⁹⁴ Cu	63.160 †	¹¹⁰ Zn	165.010 ‡	⁶⁶ Ge	-61.560	⁸³ As	-69.710	⁹⁷ Se	-18.960		
⁸⁰ Ni	-21.930	⁹⁵ Cu	69.970	¹¹¹ Zn	174.670 †	⁶⁷ Ge	-62.650	⁸⁴ As	-65.610	⁹⁸ Se	-14.750		
⁸¹ Ni	-14.470	⁹⁶ Cu	79.020 †	¹¹² Zn	182.370 ‡	⁶⁸ Ge	-66.990	⁸⁵ As	-62.570	⁹⁹ Se	-7.800		
⁸² Ni	-8.540	⁹⁷ Cu	85.970	¹¹⁴ Zn	204.250 †	⁶⁹ Ge	-67.050	⁸⁶ As	-58.340	¹⁰⁰ Se	-3.750		
⁸³ Ni	-0.540	⁹⁸ Cu	95.330 †	¹¹⁶ Zn	226.470 †	⁷⁰ Ge	-70.580	⁸⁷ As	-55.030	¹⁰¹ Se	3.270		
⁸⁴ Ni	5.710	⁹⁹ Cu	102.510 ‡	¹¹⁸ Zn	249.350 †	⁷¹ Ge	-69.980	⁸⁸ As	-50.280	¹⁰² Se	7.540		
⁸⁵ Ni	14.440 †	¹⁰⁰ Cu	111.730 †	⁵⁶ Ga	-4.850 †	⁷² Ge	-72.430	⁸⁹ As	-46.540	¹⁰³ Se	14.760		
⁸⁶ Ni	21.140	¹⁰¹ Cu	118.970 ‡	⁵⁷ Ga	-16.140 †	⁷³ Ge	-71.290	⁹⁰ As	-40.590	¹⁰⁴ Se	19.290		
⁸⁷ Ni	30.280 †	¹⁰² Cu	128.340 †	⁵⁸ Ga	-24.110 †	⁷⁴ Ge	-73.410	⁹¹ As	-35.810	¹⁰⁵ Se	26.850		
⁸⁸ Ni	36.960	¹⁰³ Cu	135.720 ‡	⁵⁹ Ga	-34.090 †	⁷⁵ Ge	-71.760	⁹² As	-29.170	¹⁰⁶ Se	31.950		
⁸⁹ Ni	45.910 †	¹⁰⁴ Cu	145.290 †	⁶⁰ Ga	-40.020	⁷⁶ Ge	-73.200	⁹³ As	-24.510	¹⁰⁷ Se	39.940		
⁹⁰ Ni	52.840	¹⁰⁵ Cu	152.860 ‡	⁶¹ Ga	-47.140	⁷⁷ Ge	-71.180	⁹⁴ As	-17.910	¹⁰⁸ Se	45.190		
⁹¹ Ni	62.360 †	¹⁰⁶ Cu	162.640 †	⁶² Ga	-51.740	⁷⁸ Ge	-71.880	⁹⁵ As	-13.170	¹⁰⁹ Se	53.430 †		
⁹² Ni	69.410 ‡	¹⁰⁷ Cu	170.470 ‡	⁶³ Ga	-56.730	⁷⁹ Ge	-69.360	⁹⁶ As	-6.440	¹¹⁰ Se	59.080		
⁹³ Ni	79.000 †	¹⁰⁸ Cu	180.130 †	⁶⁴ Ga	-58.850	⁸⁰ Ge	-69.420	⁹⁷ As	-1.650	¹¹¹ Se	67.400 †		
⁹⁴ Ni	86.160 ‡	¹⁰⁹ Cu	188.120 ‡	⁶⁵ Ga	-62.700	⁸¹ Ge	-66.350	⁹⁸ As	5.470	¹¹² Se	73.160		
⁹⁵ Ni	95.980 †	¹¹⁰ Cu	197.830 †	⁶⁶ Ga	-63.740	⁸² Ge	-65.760	⁹⁹ As	10.600	¹¹³ Se	81.440 †		
⁹⁶ Ni	103.100 ‡	¹¹¹ Cu	206.200 †	⁶⁷ Ga	-66.880	⁸³ Ge	-60.650	¹⁰⁰ As	17.650	¹¹⁴ Se	87.340		
⁹⁷ Ni	113.030 †	¹¹³ Cu	228.770 †	⁶⁸ Ga	-67.090	⁸⁴ Ge	-57.380	¹⁰¹ As	22.750	¹¹⁵ Se	95.530 †		
⁹⁸ Ni	120.380 ‡	⁵⁴ Zn	-6.230 †	⁶⁹ Ga	-69.300	⁸⁵ Ge	-52.090	¹⁰² As	30.000	¹¹⁶ Se	101.760		
⁹⁹ Ni	130.680 †	⁵⁵ Zn	-14.780 ‡	⁷⁰ Ga	-68.800	⁸⁶ Ge	-48.670	¹⁰³ As	35.200	¹¹⁷ Se	112.200 †		
¹⁰⁰ Ni	137.950 ‡	⁵⁶ Zn	-25.740	⁷¹ Ga	-70.030	⁸⁷ Ge	-43.070	¹⁰⁴ As	42.860	¹¹⁸ Se	120.830 †		
¹⁰¹ Ni	148.150 †	⁵⁷ Zn	-32.800	⁷² Ga	-68.740	⁸⁸ Ge	-39.070	¹⁰⁵ As	48.460	¹¹⁹ Se	131.400 †		
¹⁰² Ni	155.570 ‡	⁵⁸ Zn	-42.390	⁷³ Ga	-69.780	⁸⁹ Ge	-32.610	¹⁰⁶ As	56.530	¹²⁰ Se	140.230 †		
¹⁰³ Ni	165.810 †	⁵⁹ Zn	-47.300	⁷⁴ Ga	-68.060	⁹⁰ Ge	-27.650	¹⁰⁷ As	62.570	¹²¹ Se	151.100 †		
¹⁰⁴ Ni	173.480 ‡	⁶⁰ Zn	-54.160	⁷⁵ Ga	-68.500	⁹¹ Ge	-20.310	¹⁰⁸ As	70.670 †	¹²² Se	159.980 †		
¹⁰⁵ Ni	183.760 †	⁶¹ Zn	-56.360	⁷⁶ Ga	-66.380	⁹² Ge	-15.290	¹⁰⁹ As	77.010	¹²⁴ Se	180.080 †		
¹⁰⁶ Ni	191.660 ‡	⁶² Zn	-61.140	⁷⁷ Ga	-66.230	⁹³ Ge	-8.080	¹¹⁰ As	85.380 †	¹²⁶ Se	200.550 †		
¹⁰⁷ Ni	202.100 †	⁶³ Zn	-62.180	⁷⁸ Ga	-63.540	⁹⁴ Ge	-2.990	¹¹¹ As	91.810	¹²⁸ Se	221.780 †		
¹⁰⁸ Ni	209.970 ‡	⁶⁴ Zn	-66.030	⁷⁹ Ga	-62.690	⁹⁵ Ge	4.510	¹¹² As	100.180 †	¹³⁰ Se	244.070 †		
¹⁰⁹ Ni	220.370 †	⁶⁵ Zn	-65.840	⁸⁰ Ga	-59.290	⁹⁶ Ge	9.470	¹¹³ As	106.680	¹³² Se	267.370 †		
¹¹⁰ Ni	228.790 †	⁶⁶ Zn	-68.940	⁸¹ Ga	-57.980	⁹⁷ Ge	17.160	¹¹⁴ As	114.980 †	⁶⁵ Br	-17.560 †		
¹¹² Ni	252.120 †	⁶⁷ Zn	-68.030	⁸² Ga	-52.660	⁹⁸ Ge	22.450	¹¹⁵ As	121.890	⁶⁶ Br	-24.680 †		
⁵² Cu	-2.440 †	⁶⁸ Zn	-69.860	⁸³ Ga	-48.380	⁹⁹ Ge	30.590 †	¹¹⁶ As	132.330 †	⁶⁷ Br	-33.030 †		
⁵³ Cu	-13.830 †	⁶⁹ Zn	-68.450	⁸⁴ Ga	-42.860	¹⁰⁰ Ge	35.720	¹¹⁷ As	141.600 †	⁶⁸ Br	-38.870 †		
⁵⁴ Cu	-21.820 †	⁷⁰ Zn	-69.660	⁸⁵ Ga	-38.380	¹⁰¹ Ge	43.800 †	¹¹⁸ As	152.250 †	⁶⁹ Br	-46.330 †		
⁵⁵ Cu	-31.720 †	⁷¹ Zn	-67.240	⁸⁶ Ga	-32.680	¹⁰² Ge	49.030	¹¹⁹ As	161.770 †	⁷⁰ Br	-51.140		
⁵⁶ Cu	-38.680	⁷² Zn	-68.140	⁸⁷ Ga	-27.820	¹⁰³ Ge	57.370 †	¹²⁰ As	172.740 †	⁷¹ Br	-56.530		
⁵⁷ Cu	-47.370	⁷³ Zn	-65.330	⁸⁸ Ga	-21.100	¹⁰⁴ Ge	63.070	¹²¹ As	182.370 †	⁷² Br	-58.950		
⁵⁸ Cu	-51.890	⁷⁴ Zn	-65.700	⁸⁹ Ga	-15.630	¹⁰⁵ Ge	71.630 †	⁶² Se	-10.630 †	⁷³ Br	-63.510		
⁵⁹ Cu	-56.390	⁷⁵ Zn	-62.590	⁹⁰ Ga	-8.110	¹⁰⁶ Ge	77.750	⁶³ Se	-18.310 ‡	⁷⁴ Br	-65.230		
⁶⁰ Cu	-58.330	⁷⁶ Zn	-62.340	⁹¹ Ga	-2.390	¹⁰⁷ Ge	86.630 †	⁶⁴ Se	-27.840 ‡	⁷⁵ Br	-69.110		
⁶¹ Cu	-61.980	⁷⁷ Zn	-58.800	⁹² Ga	5.170	¹⁰⁸ Ge	92.850	⁶⁵ Se	-33.730	⁷⁶ Br	-70.290		
⁶² Cu	-62.800	⁷⁸ Zn	-57.770	⁹³ Ga	10.880	¹⁰⁹ Ge	101.900 †	⁶⁶ Se	-42.030	⁷⁷ Br	-73.190		
⁶³ Cu	-65.590	⁷⁹ Zn	-53.470	⁹⁴ Ga	18.720	¹¹⁰ Ge	108.390	⁶⁷ Se	-46.670	⁷⁸ Br	-73.550		
⁶⁴ Cu	-65.390	⁸⁰ Zn	-51.820	⁹⁵ Ga	24.450	¹¹¹ Ge	117.430 †			⁷⁹ Br	-76.060		

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
⁸⁰ Br	-75.980	⁸⁸ Kr	-76.680	¹⁰¹ Rb	-43.090	¹¹¹ Sr	-11.720	¹²³ Y	39.980	¹³² Zr	89.450 ‡
⁸¹ Br	-78.080	⁹⁰ Kr	-74.990	¹⁰² Rb	-38.080	¹¹² Sr	-7.750	¹²⁴ Y	48.370 †	¹³³ Zr	99.220 †
⁸² Br	-77.530	⁹¹ Kr	-71.190	¹⁰³ Rb	-34.920	¹¹³ Sr	-1.010	¹²⁵ Y	55.640	¹³⁴ Zr	107.540 †
⁸³ Br	-78.840	⁹² Kr	-68.850	¹⁰⁴ Rb	-29.430	¹¹⁴ Sr	3.230	¹²⁶ Y	64.480 †	¹³⁵ Zr	117.760 †
⁸⁴ Br	-77.710	⁹³ Kr	-64.130	¹⁰⁵ Rb	-25.970	¹¹⁵ Sr	10.080	¹²⁷ Y	71.980 ‡	¹³⁶ Zr	126.640 †
⁸⁵ Br	-78.580	⁹⁴ Kr	-61.020	¹⁰⁶ Rb	-20.030	¹¹⁶ Sr	14.370	¹²⁸ Y	81.340 †	¹³⁷ Zr	137.320 †
⁸⁶ Br	-75.760	⁹⁵ Kr	-55.690	¹⁰⁷ Rb	-16.170	¹¹⁷ Sr	21.270	¹²⁹ Y	89.010 ‡	¹³⁸ Zr	146.600 †
⁸⁷ Br	-73.890	⁹⁶ Kr	-52.760	¹⁰⁸ Rb	-9.970	¹¹⁸ Sr	25.740	¹³⁰ Y	98.530 †	¹⁴⁰ Zr	168.110 †
⁸⁸ Br	-70.610	⁹⁷ Kr	-47.450	¹⁰⁹ Rb	-5.600	¹¹⁹ Sr	32.520	¹³¹ Y	106.650 †	¹⁴² Zr	190.220 †
⁸⁹ Br	-68.410	⁹⁸ Kr	-44.230	¹¹⁰ Rb	1.050	¹²⁰ Sr	37.340	¹³² Y	116.420 †	¹⁴⁴ Zr	213.290 †
⁹⁰ Br	-64.440	⁹⁹ Kr	-38.410	¹¹¹ Rb	5.690	¹²¹ Sr	46.270 †	¹³³ Y	125.150 †	⁷⁶ Nb	-5.150 †
⁹¹ Br	-61.390	¹⁰⁰ Kr	-35.450	¹¹² Rb	12.520	¹²² Sr	53.280	¹³⁴ Y	135.590 †	⁷⁸ Nb	-22.640 †
⁹² Br	-56.320	¹⁰¹ Kr	-29.600	¹¹³ Rb	17.350	¹²³ Sr	62.230 †	¹³⁵ Y	144.740 †	⁷⁹ Nb	-32.010 †
⁹³ Br	-52.600	¹⁰² Kr	-26.420	¹¹⁴ Rb	24.320	¹²⁴ Sr	69.580 ‡	¹³⁶ Y	155.660 †	⁸⁰ Nb	-38.670 †
⁹⁴ Br	-46.920	¹⁰³ Kr	-20.260	¹¹⁵ Rb	29.280	¹²⁵ Sr	78.980 †	¹³⁷ Y	165.510 †	⁸¹ Nb	-46.930 †
⁹⁵ Br	-43.220	¹⁰⁴ Kr	-16.690	¹¹⁶ Rb	36.180	¹²⁶ Sr	86.580 ‡	¹³⁸ Y	187.610 †	⁸² Nb	-52.840
⁹⁶ Br	-37.740	¹⁰⁵ Kr	-10.250	¹¹⁷ Rb	41.290	¹²⁷ Sr	96.400 †	¹⁴¹ Y	210.530 †	⁸³ Nb	-58.490
⁹⁷ Br	-33.940	¹⁰⁶ Kr	-6.320	¹¹⁸ Rb	48.170	¹²⁸ Sr	104.180 ‡	⁷⁴ Zr	-8.220 †	⁸⁴ Nb	-61.700
⁹⁸ Br	-27.960	¹⁰⁷ Kr	0.660	¹¹⁹ Rb	53.660	¹²⁹ Sr	114.100 †	⁷⁵ Zr	-15.370 †	⁸⁵ Nb	-66.790
⁹⁹ Br	-23.910	¹⁰⁸ Kr	4.910	¹²⁰ Rb	62.690 †	¹³⁰ Sr	122.350 †	⁷⁶ Zr	-25.730 ‡	⁸⁶ Nb	-69.360
¹⁰⁰ Br	-18.040	¹⁰⁹ Kr	12.240	¹²¹ Rb	70.450 ‡	¹³¹ Sr	132.610 †	⁷⁷ Zr	-32.050	⁸⁷ Nb	-74.110
¹⁰¹ Br	-14.020	¹¹⁰ Kr	16.940	¹²² Rb	79.480 †	¹³² Sr	141.340 †	⁷⁸ Zr	-41.430	⁸⁸ Nb	-76.360
¹⁰² Br	-7.830	¹¹¹ Kr	24.430	¹²³ Rb	87.390 ‡	¹³³ Sr	152.200 †	⁷⁹ Zr	-47.220	⁸⁹ Nb	-80.650
¹⁰³ Br	-3.590	¹¹² Kr	29.360	¹²⁴ Rb	96.870 †	¹³⁴ Sr	161.570 †	⁸⁰ Zr	-55.490	⁹⁰ Nb	-82.660
¹⁰⁴ Br	2.950	¹¹³ Kr	36.920	¹²⁵ Rb	105.030 †	¹³⁵ Sr	182.840 †	⁸¹ Zr	-58.330	⁹¹ Nb	-86.650
¹⁰⁵ Br	7.380	¹¹⁴ Kr	42.000	¹²⁶ Rb	114.950 †	¹³⁸ Sr	205.530 †	⁸² Zr	-64.080	⁹² Nb	-86.370
¹⁰⁶ Br	14.440	¹¹⁵ Kr	49.570	¹²⁷ Rb	123.190 †	⁷⁴ Y	-22.670 †	⁸³ Zr	-66.200	⁹³ Nb	-87.300
¹⁰⁷ Br	19.470	¹¹⁶ Kr	54.680	¹²⁸ Rb	133.220 †	⁷⁵ Y	-31.980 †	⁸⁴ Zr	-71.590	⁹⁴ Nb	-86.280
¹⁰⁸ Br	26.670	¹¹⁷ Kr	62.190	¹²⁹ Rb	141.870 †	⁷⁶ Y	-38.490 †	⁸⁵ Zr	-73.120	⁹⁵ Nb	-86.840
¹⁰⁹ Br	32.060	¹¹⁸ Kr	67.790	¹³⁰ Rb	152.270 †	⁷⁷ Y	-46.870 †	⁸⁶ Zr	-77.760	⁹⁶ Nb	-85.830
¹¹⁰ Br	39.610	¹¹⁹ Kr	77.500 †	¹³¹ Rb	161.490 †	⁷⁸ Y	-52.670	⁸⁷ Zr	-79.270	⁹⁷ Nb	-85.740
¹¹¹ Br	45.200	¹²⁰ Kr	85.350 ‡	¹³² Rb	172.350 †	⁷⁹ Y	-58.400	⁸⁸ Zr	-83.630	⁹⁸ Nb	-83.500
¹¹² Br	52.850	¹²¹ Kr	95.140 †	¹³³ Rb	182.130 †	⁸⁰ Y	-61.250	⁸⁹ Zr	-84.900	⁹⁹ Nb	-82.420
¹¹³ Br	58.520	¹²² Kr	103.120 ‡	¹³⁵ Rb	203.880 †	⁸¹ Y	-65.990	⁹⁰ Zr	-88.820	¹⁰⁰ Nb	-79.860
¹¹⁴ Br	66.210	¹²³ Kr	113.160 †	⁷⁰ Sr	-9.400 ‡	⁸² Y	-68.200	⁹¹ Zr	-87.860	¹⁰¹ Nb	-78.950
¹¹⁵ Br	72.000	¹²⁴ Kr	121.400 †	⁷¹ Sr	-16.300 †	⁸³ Y	-72.510	⁹² Zr	-88.510	¹⁰² Nb	-76.330
¹¹⁶ Br	79.510	¹²⁵ Kr	131.880 †	⁷² Sr	-26.120 ‡	⁸⁴ Y	-74.340	⁹³ Zr	-87.250	¹⁰³ Nb	-75.240
¹¹⁷ Br	85.740	¹²⁶ Kr	140.220 †	⁷³ Sr	-31.950	⁸⁵ Y	-77.940	⁹⁴ Zr	-87.400	¹⁰⁴ Nb	-72.070
¹¹⁸ Br	95.540 †	¹²⁷ Kr	150.710 †	⁷⁴ Sr	-41.110	⁸⁶ Y	-79.340	⁹⁵ Zr	-85.630	¹⁰⁵ Nb	-70.770
¹¹⁹ Br	104.080 †	¹²⁸ Kr	159.470 †	⁷⁵ Sr	-46.570	⁸⁷ Y	-82.960	⁹⁶ Zr	-85.360	¹⁰⁶ Nb	-67.060
¹²⁰ Br	113.960 †	¹²⁹ Kr	170.260 †	⁷⁶ Sr	-55.140	⁸⁸ Y	-84.290	⁹⁷ Zr	-82.550	¹⁰⁷ Nb	-65.260
¹²¹ Br	122.700 †	¹³⁰ Kr	179.620 †	⁷⁷ Sr	-57.870	⁸⁹ Y	-87.560	⁹⁸ Zr	-81.300	¹⁰⁸ Nb	-61.230
¹²² Br	132.820 †	¹³² Kr	200.760 †	⁷⁸ Sr	-63.610	⁹⁰ Y	-86.480	⁹⁹ Zr	-77.660	¹⁰⁹ Nb	-58.990
¹²³ Br	141.610 †	¹³⁴ Kr	223.150 †	⁷⁹ Sr	-65.590	⁹¹ Y	-86.400	¹⁰⁰ Zr	-76.720	¹¹⁰ Nb	-54.470
¹²⁴ Br	152.180 †	⁷⁰ Rb	-23.630 †	⁸⁰ Sr	-70.350	⁹² Y	-84.790	¹⁰¹ Zr	-73.260	¹¹¹ Nb	-52.010
¹²⁵ Br	161.080 †	⁷¹ Rb	-32.290 †	⁸¹ Sr	-71.550	⁹³ Y	-84.330	¹⁰² Zr	-72.150	¹¹² Nb	-47.090
¹²⁶ Br	171.670 †	⁷² Rb	-38.130 †	⁸² Sr	-75.950	⁹⁴ Y	-82.210	¹⁰³ Zr	-68.300	¹¹³ Nb	-44.220
¹²⁷ Br	180.880 †	⁷³ Rb	-46.120 †	⁸³ Sr	-76.690	⁹⁵ Y	-81.170	¹⁰⁴ Zr	-66.900	¹¹⁴ Nb	-38.980
¹²⁸ Br	191.790 †	⁷⁴ Rb	-51.430	⁸⁴ Sr	-80.590	⁹⁶ Y	-78.190	¹⁰⁵ Zr	-62.690	¹¹⁵ Nb	-35.800
¹²⁹ Br	201.550 †	⁷⁵ Rb	-57.310	⁸⁵ Sr	-80.960	⁹⁷ Y	-76.360	¹⁰⁶ Zr	-60.820	¹¹⁶ Nb	-30.450
¹³¹ Br	223.310 †	⁷⁶ Rb	-60.230	⁸⁶ Sr	-84.460	⁹⁸ Y	-72.550	¹⁰⁷ Zr	-56.000	¹¹⁷ Nb	-27.000
¹³³ Br	246.120 †	⁷⁷ Rb	-64.970	⁸⁷ Sr	-84.980	⁹⁹ Y	-70.530	¹⁰⁸ Zr	-53.900	¹¹⁸ Nb	-21.460
⁶⁶ Kr	-10.360 ‡	⁷⁸ Rb	-66.960	⁸⁸ Sr	-87.850	¹⁰⁰ Y	-67.050	¹⁰⁹ Zr	-48.680	¹¹⁹ Nb	-17.900
⁶⁷ Kr	-17.520 ‡	⁷⁹ Rb	-70.850	⁸⁹ Sr	-86.260	¹⁰¹ Y	-65.100	¹¹⁰ Zr	-46.170	¹²⁰ Nb	-12.420
⁶⁸ Kr	-27.070 ‡	⁸⁰ Rb	-72.070	⁹⁰ Sr	-86.010	¹⁰² Y	-61.230	¹¹¹ Zr	-40.580	¹²¹ Nb	-8.820
⁶⁹ Kr	-32.770	⁸¹ Rb	-75.460	⁹¹ Sr	-83.680	¹⁰³ Y	-59.150	¹¹² Zr	-37.620	¹²² Nb	-3.560
⁷⁰ Kr	-41.550	⁸² Rb	-76.290	⁹² Sr	-82.870	¹⁰⁴ Y	-54.840	¹¹³ Zr	-31.790	¹²³ Nb	0.320
⁷¹ Kr	-46.230	⁸³ Rb	-79.110	⁹³ Sr	-80.140	¹⁰⁵ Y	-52.460	¹¹⁴ Zr	-28.490	¹²⁴ Nb	7.860
⁷² Kr	-54.230	⁸⁴ Rb	-79.710	⁹⁴ Sr	-78.760	¹⁰⁶ Y	-47.580	¹¹⁵ Zr	-22.470	¹²⁵ Nb	14.150
⁷³ Kr	-56.640	⁸⁵ Rb	-82.270	⁹⁵ Sr	-75.000	¹⁰⁷ Y	-44.690	¹¹⁶ Zr	-19.010	¹²⁶ Nb	21.910
⁷⁴ Kr	-62.370	⁸⁶ Rb	-82.420	⁹⁶ Sr	-73.010	¹⁰⁸ Y	-39.600	¹¹⁷ Zr	-12.840	¹²⁷ Nb	28.510
⁷⁵ Kr	-64.240	⁸⁷ Rb	-84.450	⁹⁷ Sr	-68.620	¹⁰⁹ Y	-36.400	¹¹⁸ Zr	-9.190	¹²⁸ Nb	36.800 †
⁷⁶ Kr	-69.170	⁸⁸ Rb	-82.590	⁹⁸ Sr	-66.440	¹¹⁰ Y	-30.760	¹¹⁹ Zr	-3.020	¹²⁹ Nb	43.720
⁷⁷ Kr	-70.160	⁸⁹ Rb	-81.840	⁹⁹ Sr	-61.870	¹¹¹ Y	-27.130	¹²⁰ Zr	0.670	¹³⁰ Nb	52.580 †
⁷⁸ Kr	-74.060	⁹⁰ Rb	-79.340	¹⁰⁰ Sr	-59.890	¹¹² Y	-21.210	¹²¹ Zr	6.680	¹³¹ Nb	59.720
⁷⁹ Kr	-74.410	⁹¹ Rb	-77.820	¹⁰¹ Sr	-55.180	¹¹³ Y	-17.320	¹²² Zr	10.640	¹³² Nb	68.610 †
⁸⁰ Kr	-77.820	⁹² Rb	-74.730	¹⁰² Sr	-53.080	¹¹⁴ Y	-11.180	¹²³ Zr	18.750 †	¹³³ Nb	76.240 ‡
⁸¹ Kr	-77.640	⁹³ Rb	-72.730	¹⁰³ Sr	-48.100	¹¹⁵ Y	-7.050	¹²⁴ Zr	25.110	¹³⁴ Nb	85.590 †
⁸² Kr	-80.430	⁹⁴ Rb	-68.640	¹⁰⁴ Sr	-45.620	¹¹⁶ Y	-0.880	¹²⁵ Zr	33.430 †	¹³⁵ Nb	93.680 †
⁸³ Kr	-80.070	⁹⁵ Rb	-65.870	¹⁰⁵ Sr	-40.230	¹¹⁷ Y	3.410	¹²⁶ Zr	40.140	¹³⁶ Nb	103.640 †
⁸⁴ Kr	-82.400	⁹⁶ Rb	-61.310	¹⁰⁶ Sr	-37.270	¹¹⁸ Y	9.670	¹²⁷ Zr	48.870 †	¹³⁷ Nb	112.290 †
⁸⁵ Kr	-81.510	⁹⁷ Rb	-58.550	¹⁰⁷ Sr	-31.400	¹¹⁹ Y	14.050	¹²⁸ Zr	55.920	¹³⁸ Nb	122.400 †
⁸⁶ Kr	-83.420	⁹⁸ Rb	-53.820	¹⁰⁸ Sr	-28.330	¹²⁰ Y	20.150	¹²⁹ Zr	65.170 †	¹³⁹ Nb	131.660 †
⁸⁷ Kr	-80.710	⁹⁹ Rb	-50.760	¹⁰⁹ Sr	-22.000	¹²¹ Y	24.870	¹³⁰ Zr	72.440 ‡	¹⁴⁰ Nb	142.550 †
⁸⁸ Kr	-79.690	¹⁰⁰ Rb	-46.030	¹¹⁰ Sr	-18.310	¹²² Y	33.050 †	¹³¹ Zr	81.820 †	¹⁴¹ Nb	152.330 †

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁴³ Nb	173.770 †	⁸⁴ Tc	-38.240 †	⁹⁰ Ru	-65.500	⁹⁷ Rh	-82.540	¹⁰¹ Pd	-85.410	¹⁰⁷ Ag	-88.440
¹⁴⁵ Nb	196.200 †	⁸⁵ Tc	-46.800 †	⁹¹ Ru	-68.490	⁹⁸ Rh	-83.220	¹⁰² Pd	-87.870	¹⁰⁸ Ag	-87.610
⁷⁸ Mo	-7.600 †	⁸⁶ Tc	-52.880	⁹² Ru	-74.270	⁹⁹ Rh	-85.520	¹⁰³ Pd	-87.470	¹⁰⁹ Ag	-88.750
⁷⁹ Mo	-14.910 †	⁸⁷ Tc	-59.120	⁹³ Ru	-77.190	¹⁰⁰ Rh	-85.600	¹⁰⁴ Pd	-89.440	¹¹⁰ Ag	-87.550
⁸⁰ Mo	-25.150 ‡	⁸⁸ Tc	-62.540	⁹⁴ Ru	-82.700	¹⁰¹ Rh	-87.350	¹⁰⁵ Pd	-88.390	¹¹¹ Ag	-88.230
⁸¹ Mo	-31.790 ‡	⁸⁹ Tc	-67.970	⁹⁵ Ru	-83.510	¹⁰² Rh	-86.800	¹⁰⁶ Pd	-89.950	¹¹² Ag	-86.660
⁸² Mo	-41.060	⁹⁰ Tc	-70.890	⁹⁶ Ru	-85.970	¹⁰³ Rh	-88.090	¹⁰⁷ Pd	-88.470	¹¹³ Ag	-87.010
⁸³ Mo	-46.870	⁹¹ Tc	-75.980	⁹⁷ Ru	-86.150	¹⁰⁴ Rh	-86.970	¹⁰⁸ Pd	-89.520	¹¹⁴ Ag	-84.940
⁸⁴ Mo	-55.740	⁹² Tc	-78.740	⁹⁸ Ru	-88.170	¹⁰⁵ Rh	-87.810	¹⁰⁹ Pd	-87.670	¹¹⁵ Ag	-84.920
⁸⁵ Mo	-58.640	⁹³ Tc	-83.570	⁹⁹ Ru	-87.570	¹⁰⁶ Rh	-86.490	¹¹⁰ Pd	-88.290	¹¹⁶ Ag	-82.590
⁸⁶ Mo	-64.780	⁹⁴ Tc	-84.140	¹⁰⁰ Ru	-89.200	¹⁰⁷ Rh	-86.750	¹¹¹ Pd	-86.060	¹¹⁷ Ag	-82.270
⁸⁷ Mo	-67.460	⁹⁵ Tc	-86.000	¹⁰¹ Ru	-87.950	¹⁰⁸ Rh	-85.040	¹¹² Pd	-86.320	¹¹⁸ Ag	-79.460
⁸⁸ Mo	-72.950	⁹⁶ Tc	-85.820	¹⁰² Ru	-88.960	¹⁰⁹ Rh	-84.970	¹¹³ Pd	-83.660	¹¹⁹ Ag	-78.710
⁸⁹ Mo	-75.140	⁹⁷ Tc	-87.340	¹⁰³ Ru	-87.290	¹¹⁰ Rh	-82.680	¹¹⁴ Pd	-83.520	¹²⁰ Ag	-75.670
⁹⁰ Mo	-80.160	⁹⁸ Tc	-86.460	¹⁰⁴ Ru	-87.910	¹¹¹ Rh	-82.270	¹¹⁵ Pd	-80.510	¹²¹ Ag	-74.680
⁹¹ Mo	-82.240	⁹⁹ Tc	-87.410	¹⁰⁵ Ru	-86.090	¹¹² Rh	-79.520	¹¹⁶ Pd	-80.200	¹²² Ag	-71.590
⁹² Mo	-86.900	¹⁰⁰ Tc	-86.230	¹⁰⁶ Ru	-86.280	¹¹³ Rh	-78.790	¹¹⁷ Pd	-76.750	¹²³ Ag	-70.480
⁹³ Mo	-86.790	¹⁰¹ Tc	-86.250	¹⁰⁷ Ru	-83.790	¹¹⁴ Rh	-75.670	¹¹⁸ Pd	-75.900	¹²⁴ Ag	-72.210
⁹⁴ Mo	-88.410	¹⁰² Tc	-84.550	¹⁰⁸ Ru	-83.850	¹¹⁵ Rh	-74.670	¹¹⁹ Pd	-72.180	¹²⁵ Ag	-65.900
⁹⁵ Mo	-87.620	¹⁰³ Tc	-84.510	¹⁰⁹ Ru	-80.870	¹¹⁶ Rh	-71.230	¹²⁰ Pd	-71.100	¹²⁶ Ag	-62.540
⁹⁶ Mo	-88.790	¹⁰⁴ Tc	-82.580	¹¹⁰ Ru	-80.410	¹¹⁷ Rh	-69.750	¹²¹ Pd	-67.260	¹²⁷ Ag	-61.070
⁹⁷ Mo	-87.650	¹⁰⁵ Tc	-82.270	¹¹¹ Ru	-76.990	¹¹⁸ Rh	-65.930	¹²² Pd	-66.060	¹²⁸ Ag	-57.650
⁹⁸ Mo	-88.130	¹⁰⁶ Tc	-79.700	¹¹² Ru	-76.170	¹¹⁹ Rh	-64.160	¹²³ Pd	-62.230	¹²⁹ Ag	-55.640
⁹⁹ Mo	-86.060	¹⁰⁷ Tc	-78.980	¹¹³ Ru	-72.450	¹²⁰ Rh	-60.230	¹²⁴ Pd	-60.840	¹³⁰ Ag	-49.800
¹⁰⁰ Mo	-86.060	¹⁰⁸ Tc	-76.130	¹¹⁴ Ru	-71.340	¹²¹ Rh	-58.280	¹²⁵ Pd	-56.930	¹³¹ Ag	-45.280
¹⁰¹ Mo	-83.530	¹⁰⁹ Tc	-74.980	¹¹⁵ Ru	-67.220	¹²² Rh	-54.370	¹²⁶ Pd	-55.350	¹³² Ag	-39.220
¹⁰² Mo	-83.450	¹¹⁰ Tc	-71.510	¹¹⁶ Ru	-65.740	¹²³ Rh	-52.420	¹²⁷ Pd	-51.480	¹³³ Ag	-34.200
¹⁰³ Mo	-80.860	¹¹¹ Tc	-70.020	¹¹⁷ Ru	-61.290	¹²⁴ Rh	-48.420	¹²⁸ Pd	-49.350	¹³⁴ Ag	-27.470
¹⁰⁴ Mo	-80.440	¹¹² Tc	-66.210	¹¹⁸ Ru	-59.420	¹²⁵ Rh	-46.300	¹²⁹ Pd	-43.120	¹³⁵ Ag	-22.210
¹⁰⁵ Mo	-77.370	¹¹³ Tc	-64.510	¹¹⁹ Ru	-54.800	¹²⁶ Rh	-42.320	¹³⁰ Pd	-38.460	¹³⁶ Ag	-14.880
¹⁰⁶ Mo	-76.580	¹¹⁴ Tc	-60.270	¹²⁰ Ru	-52.760	¹²⁷ Rh	-39.730	¹³¹ Pd	-31.910	¹³⁷ Ag	-9.370
¹⁰⁷ Mo	-72.950	¹¹⁵ Tc	-58.110	¹²¹ Ru	-48.100	¹²⁸ Rh	-33.390	¹³² Pd	-26.900	¹³⁸ Ag	-2.180
¹⁰⁸ Mo	-71.920	¹¹⁶ Tc	-53.660	¹²² Ru	-46.070	¹²⁹ Rh	-28.330	¹³³ Pd	-19.750	¹³⁹ Ag	3.710
¹⁰⁹ Mo	-67.760	¹¹⁷ Tc	-51.160	¹²³ Ru	-41.520	¹³⁰ Rh	-21.640	¹³⁴ Pd	-14.260	¹⁴⁰ Ag	11.180
¹¹⁰ Mo	-66.220	¹¹⁸ Tc	-46.450	¹²⁴ Ru	-39.310	¹³¹ Rh	-16.140	¹³⁵ Pd	-6.670	¹⁴¹ Ag	17.350
¹¹¹ Mo	-61.740	¹¹⁹ Tc	-43.720	¹²⁵ Ru	-34.770	¹³² Rh	-9.000	¹³⁶ Pd	-0.920	¹⁴² Ag	25.100
¹¹² Mo	-59.950	¹²⁰ Tc	-38.970	¹²⁶ Ru	-32.080	¹³³ Rh	-3.090	¹³⁷ Pd	6.830	¹⁴³ Ag	31.640
¹¹³ Mo	-55.120	¹²¹ Tc	-36.190	¹²⁷ Ru	-25.280	¹³⁴ Rh	4.720	¹³⁸ Pd	12.750	¹⁴⁴ Ag	39.650
¹¹⁴ Mo	-52.850	¹²² Tc	-31.550	¹²⁸ Ru	-20.110	¹³⁵ Rh	10.730	¹³⁹ Pd	20.790	¹⁴⁵ Ag	46.760
¹¹⁵ Mo	-47.720	¹²³ Tc	-28.780	¹²⁹ Ru	-13.030	¹³⁶ Rh	18.720	¹⁴⁰ Pd	27.220	¹⁴⁶ Ag	55.610 †
¹¹⁶ Mo	-45.220	¹²⁴ Tc	-24.170	¹³⁰ Ru	-7.390	¹³⁷ Rh	25.210	¹⁴¹ Pd	35.510 †	¹⁴⁷ Ag	63.340 ‡
¹¹⁷ Mo	-39.870	¹²⁵ Tc	-20.920	¹³¹ Ru	0.250	¹³⁸ Rh	33.280	¹⁴² Pd	42.190	¹⁴⁸ Ag	72.880 †
¹¹⁸ Mo	-37.050	¹²⁶ Tc	-14.020	¹³² Ru	6.150	¹³⁹ Rh	40.280	¹⁴³ Pd	50.770 †	¹⁴⁹ Ag	80.820 †
¹¹⁹ Mo	-31.610	¹²⁷ Tc	-8.390	¹³³ Ru	14.380 †	¹⁴⁰ Rh	48.840 †	¹⁴⁴ Pd	57.950	¹⁵⁰ Ag	90.330 †
¹²⁰ Mo	-28.740	¹²⁸ Tc	-1.190	¹³⁴ Ru	20.610	¹⁴¹ Rh	56.050	¹⁴⁵ Pd	67.250 †	¹⁵¹ Ag	98.960 †
¹²¹ Mo	-23.350	¹²⁹ Tc	4.840	¹³⁵ Ru	28.870 †	¹⁴² Rh	64.770 †	¹⁴⁶ Pd	75.270 ‡	¹⁵² Ag	108.810 †
¹²² Mo	-20.500	¹³⁰ Tc	12.620	¹³⁶ Ru	35.590	¹⁴³ Rh	72.520 ‡	¹⁴⁷ Pd	84.860 †	¹⁵³ Ag	117.810 †
¹²³ Mo	-15.330	¹³¹ Tc	19.010	¹³⁷ Ru	44.230 †	¹⁴⁴ Rh	81.890 †	¹⁴⁸ Pd	93.360 †	¹⁵⁴ Ag	127.840 †
¹²⁴ Mo	-12.000	¹³² Tc	27.240 †	¹³⁸ Ru	51.250	¹⁴⁵ Rh	90.360 †	¹⁴⁹ Pd	103.490 †	¹⁵⁵ Ag	137.100 †
¹²⁵ Mo	-4.540	¹³³ Tc	33.890	¹³⁹ Ru	60.380 †	¹⁴⁶ Rh	100.240 †	¹⁵⁰ Pd	112.400 †	¹⁵⁶ Ag	147.640 †
¹²⁶ Mo	1.190	¹³⁴ Tc	42.360 †	¹⁴⁰ Ru	67.860 ‡	¹⁴⁷ Rh	109.180 †	¹⁵¹ Pd	122.830 †	¹⁵⁷ Ag	157.340 †
¹²⁷ Mo	8.840	¹³⁵ Tc	49.350	¹⁴¹ Ru	77.120 †	¹⁴⁸ Rh	119.480 †	¹⁵² Pd	132.030 †	¹⁵⁸ Ag	178.490 †
¹²⁸ Mo	15.000	¹³⁶ Tc	58.220 †	¹⁴² Ru	84.990 ‡	¹⁴⁹ Rh	129.010 †	¹⁵³ Pd	142.590 †	¹⁶¹ Ag	200.140 †
¹²⁹ Mo	23.160 †	¹³⁷ Tc	65.820 ‡	¹⁴³ Ru	94.940 †	¹⁵⁰ Rh	139.710 †	¹⁵⁴ Pd	151.850 †	¹⁶³ Ag	222.430 †
¹³⁰ Mo	29.690	¹³⁸ Tc	74.970 †	¹⁴⁴ Ru	103.480 †	¹⁵¹ Rh	149.500 †	¹⁵⁵ Pd	172.800 †	¹⁶⁵ Ag	245.360 †
¹³¹ Mo	38.410 †	¹³⁹ Tc	83.020 ‡	¹⁴⁵ Ru	113.820 †	¹⁵² Rh	160.250 †	¹⁵⁶ Pd	194.530 †	⁹⁰ Cd	-5.850 †
¹³² Mo	45.060	¹⁴⁰ Tc	92.540 †	¹⁴⁶ Ru	123.050 †	¹⁵³ Rh	170.040 †	¹⁶⁰ Pd	216.800 †	⁹¹ Cd	-13.510 †
¹³³ Mo	53.960 †	¹⁴¹ Tc	100.960 †	¹⁴⁷ Ru	133.790 †	¹⁵⁵ Rh	191.570 †	¹⁶² Pd	239.820 †	⁹² Cd	-23.860 ‡
¹³⁴ Mo	61.160	¹⁴² Tc	111.040 †	¹⁴⁸ Ru	143.480 †	¹⁵⁷ Rh	213.830 †	⁹⁰ Ag	-21.340 †	⁹³ Cd	-30.820 ‡
¹³⁵ Mo	70.300 †	¹⁴³ Tc	120.150 †	¹⁵⁰ Ru	164.860 †	¹⁵⁹ Rh	236.760 †	⁹¹ Ag	-31.000 †	⁹⁴ Cd	-40.350 ‡
¹³⁶ Mo	78.130 ‡	¹⁴⁴ Tc	130.550 †	¹⁵² Ru	186.200 †	⁸⁶ Pd	-6.060 †	⁹² Ag	-37.800 †	⁹⁵ Cd	-46.580
¹³⁷ Mo	87.850 †	¹⁴⁵ Tc	140.240 †	¹⁵⁴ Ru	208.260 †	⁸⁷ Pd	-13.810 †	⁹³ Ag	-46.650 †	⁹⁶ Cd	-55.230
¹³⁸ Mo	95.930 †	¹⁴⁶ Tc	151.270 †	¹⁵⁶ Ru	231.230 †	⁸⁸ Pd	-24.270 ‡	⁹⁴ Ag	-52.640	⁹⁷ Cd	-60.400 †
¹³⁹ Mo	106.010 †	¹⁴⁷ Tc	161.410 †	¹⁵⁸ Ru	254.730 †	⁸⁹ Pd	-31.130 ‡	⁹⁵ Ag	-59.500	⁹⁸ Cd	-67.250
¹⁴⁰ Mo	114.700 †	¹⁴⁹ Tc	183.580 †	⁸⁶ Rh	-21.560 †	⁹⁰ Pd	-40.720 ‡	⁹⁶ Ag	-63.950	⁹⁹ Cd	-69.800
¹⁴¹ Mo	125.320 †	¹⁵¹ Tc	205.770 †	⁸⁷ Rh	-31.280 †	⁹¹ Pd	-46.840	⁹⁷ Ag	-70.660	¹⁰⁰ Cd	-74.080
¹⁴² Mo	134.570 †	¹⁵³ Tc	228.550 †	⁸⁸ Rh	-38.200 †	⁹² Pd	-55.520	⁹⁸ Ag	-72.940	¹⁰¹ Cd	-75.840
¹⁴³ Mo	145.540 †	⁸² Ru	-6.850 †	⁸⁹ Rh	-47.060 †	⁹³ Pd	-59.360	⁹⁹ Ag	-76.530	¹⁰² Cd	-79.640
¹⁴⁴ Mo	155.300 †	⁸³ Ru	-14.410 †	⁹⁰ Rh	-53.110	⁹⁴ Pd	-65.980	¹⁰⁰ Ag	-78.170	¹⁰³ Cd	-80.690
¹⁴⁶ Mo	177.210 †	⁸⁴ Ru	-24.670 ‡	⁹¹ Rh	-59.340	⁹⁵ Pd	-69.830	¹⁰¹ Ag	-81.270	¹⁰⁴ Cd	-83.970
¹⁴⁸ Mo	199.980 †	⁸⁵ Ru	-31.270 ‡	⁹² Rh	-63.010	⁹⁶ Pd	-76.180	¹⁰² Ag	-82.170	¹⁰⁵ Cd	-84.330
¹⁵⁰ Mo	223.070 †	⁸⁶ Ru	-40.880 ‡	⁹³ Rh	-68.950	⁹⁷ Pd	-77.960	¹⁰³ Ag	-84.780	¹⁰⁶ Cd	-87.150
⁸² Tc	-22.160 †	⁸⁷ Ru	-47.060	⁹⁴ Rh	-72.550	⁹⁸ Pd	-81.270	¹⁰⁴ Ag	-85.050	¹⁰⁷ Cd	-86.930
⁸³ Tc	-31.340 †	⁸⁸ Ru	-55.980	⁹⁵ Rh	-78.310	⁹⁹ Pd	-82.230	¹⁰⁵ Ag	-87.100	¹⁰⁸ Cd	-89.240
		⁸⁹ Ru	-59.340	⁹⁶ Rh	-79.730	¹⁰⁰ Pd	-85.210	¹⁰⁶ Ag	-86.830	¹⁰⁹ Cd	-88.490

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹¹⁰ Cd	-90.390	¹¹² In	-87.970	¹¹² Sn	-88.710	¹¹⁸ Sb	-88.070	¹²³ Te	-89.060	¹²⁷ I	-89.060
¹¹¹ Cd	-89.210	¹¹³ In	-89.410	¹¹³ Sn	-88.350	¹¹⁹ Sb	-89.510	¹²⁴ Te	-90.470	¹²⁸ I	-87.810
¹¹² Cd	-90.590	¹¹⁴ In	-88.600	¹¹⁴ Sn	-90.530	¹²⁰ Sb	-88.490	¹²⁵ Te	-89.000	¹²⁹ I	-88.560
¹¹³ Cd	-89.090	¹¹⁵ In	-89.580	¹¹⁵ Sn	-89.890	¹²¹ Sb	-89.680	¹²⁶ Te	-90.040	¹³⁰ I	-87.000
¹¹⁴ Cd	-90.030	¹¹⁶ In	-88.300	¹¹⁶ Sn	-91.460	¹²² Sb	-88.490	¹²⁷ Te	-88.330	¹³¹ I	-87.450
¹¹⁵ Cd	-88.080	¹¹⁷ In	-88.960	¹¹⁷ Sn	-90.230	¹²³ Sb	-89.350	¹²⁸ Te	-88.970	¹³² I	-85.790
¹¹⁶ Cd	-88.730	¹¹⁸ In	-87.260	¹¹⁸ Sn	-91.670	¹²⁴ Sb	-87.800	¹²⁹ Te	-87.010	¹³³ I	-85.910
¹¹⁷ Cd	-86.400	¹¹⁹ In	-87.680	¹¹⁹ Sn	-90.070	¹²⁵ Sb	-88.280	¹³⁰ Te	-87.330	¹³⁴ I	-84.050
¹¹⁸ Cd	-86.720	¹²⁰ In	-85.650	¹²⁰ Sn	-91.170	¹²⁶ Sb	-86.470	¹³¹ Te	-85.180	¹³⁵ I	-83.690
¹¹⁹ Cd	-84.000	¹²¹ In	-85.670	¹²¹ Sn	-89.230	¹²⁷ Sb	-86.650	¹³² Te	-85.300	¹³⁶ I	-79.380
¹²⁰ Cd	-83.930	¹²² In	-83.480	¹²² Sn	-90.000	¹²⁸ Sb	-84.580	¹³³ Te	-83.020	¹³⁷ I	-76.490
¹²¹ Cd	-80.990	¹²³ In	-83.320	¹²³ Sn	-87.900	¹²⁹ Sb	-84.500	¹³⁴ Te	-82.440	¹³⁸ I	-72.130
¹²² Cd	-80.750	¹²⁴ In	-80.870	¹²⁴ Sn	-88.300	¹³⁰ Sb	-82.210	¹³⁵ Te	-77.870	¹³⁹ I	-68.850
¹²³ Cd	-77.740	¹²⁵ In	-80.400	¹²⁵ Sn	-85.930	¹³¹ Sb	-81.840	¹³⁶ Te	-74.740	¹⁴⁰ I	-64.000
¹²⁴ Cd	-77.190	¹²⁶ In	-77.760	¹²⁶ Sn	-86.010	¹³² Sb	-79.570	¹³⁷ Te	-69.820	¹⁴¹ I	-60.670
¹²⁵ Cd	-74.000	¹²⁷ In	-77.120	¹²⁷ Sn	-83.480	¹³³ Sb	-78.570	¹³⁸ Te	-66.510	¹⁴² I	-55.550
¹²⁶ Cd	-73.250	¹²⁸ In	-74.320	¹²⁸ Sn	-83.290	¹³⁴ Sb	-73.780	¹³⁹ Te	-61.090	¹⁴³ I	-52.140
¹²⁷ Cd	-69.990	¹²⁹ In	-73.420	¹²⁹ Sn	-80.600	¹³⁵ Sb	-70.380	¹⁴⁰ Te	-57.490	¹⁴⁴ I	-47.060
¹²⁸ Cd	-68.980	¹³⁰ In	-70.510	¹³⁰ Sn	-80.100	¹³⁶ Sb	-65.220	¹⁴¹ Te	-51.830	¹⁴⁵ I	-43.310
¹²⁹ Cd	-65.680	¹³¹ In	-69.030	¹³¹ Sn	-77.330	¹³⁷ Sb	-61.350	¹⁴² Te	-48.290	¹⁴⁶ I	-37.870
¹³⁰ Cd	-64.050	¹³² In	-63.820	¹³² Sn	-76.340	¹³⁸ Sb	-55.910	¹⁴³ Te	-42.630	¹⁴⁷ I	-33.770
¹³¹ Cd	-58.350	¹³³ In	-59.780	¹³³ Sn	-71.120	¹³⁹ Sb	-51.740	¹⁴⁴ Te	-38.820	¹⁴⁸ I	-27.980
¹³² Cd	-54.320	¹³⁴ In	-54.140	¹³⁴ Sn	-67.510	¹⁴⁰ Sb	-45.800	¹⁴⁵ Te	-32.930	¹⁴⁹ I	-23.430
¹³³ Cd	-48.260	¹³⁵ In	-49.760	¹³⁵ Sn	-62.080	¹⁴¹ Sb	-41.720	¹⁴⁶ Te	-28.530	¹⁵⁰ I	-17.460
¹³⁴ Cd	-43.660	¹³⁶ In	-43.520	¹³⁶ Sn	-57.970	¹⁴² Sb	-35.940	¹⁴⁷ Te	-22.300	¹⁵¹ I	-12.600
¹³⁵ Cd	-37.160	¹³⁷ In	-38.750	¹³⁷ Sn	-51.960	¹⁴³ Sb	-31.550	¹⁴⁸ Te	-17.590	¹⁵² I	-6.120
¹³⁶ Cd	-32.150	¹³⁸ In	-32.230	¹³⁸ Sn	-47.770	¹⁴⁴ Sb	-25.590	¹⁴⁹ Te	-10.990	¹⁵³ I	-0.680
¹³⁷ Cd	-25.060	¹³⁹ In	-27.310	¹³⁹ Sn	-41.270	¹⁴⁵ Sb	-20.740	¹⁵⁰ Te	-5.860	¹⁵⁴ I	6.090
¹³⁸ Cd	-20.120	¹⁴⁰ In	-20.720	¹⁴⁰ Sn	-36.920	¹⁴⁶ Sb	-14.220	¹⁵¹ Te	1.200	¹⁵⁵ I	12.220
¹³⁹ Cd	-12.960	¹⁴¹ In	-15.660	¹⁴¹ Sn	-30.590	¹⁴⁷ Sb	-9.060	¹⁵² Te	6.840	¹⁵⁶ I	19.570
¹⁴⁰ Cd	-7.630	¹⁴² In	-9.000	¹⁴² Sn	-26.080	¹⁴⁸ Sb	-2.310	¹⁵³ Te	14.140	¹⁵⁷ I	26.170
¹⁴¹ Cd	-0.430	¹⁴³ In	-3.500	¹⁴³ Sn	-19.540	¹⁴⁹ Sb	3.450	¹⁵⁴ Te	20.280	¹⁵⁸ I	34.190
¹⁴² Cd	5.190	¹⁴⁴ In	3.540	¹⁴⁴ Sn	-14.620	¹⁵⁰ Sb	10.780	¹⁵⁵ Te	28.190	¹⁵⁹ I	41.370
¹⁴³ Cd	12.810	¹⁴⁵ In	9.450	¹⁴⁵ Sn	-7.650	¹⁵¹ Sb	17.010	¹⁵⁶ Te	34.940	¹⁶⁰ I	49.630 †
¹⁴⁴ Cd	18.790	¹⁴⁶ In	16.930	¹⁴⁶ Sn	-2.190	¹⁵² Sb	24.510	¹⁵⁷ Te	43.340 †	¹⁶¹ I	56.990
¹⁴⁵ Cd	26.730	¹⁴⁷ In	23.290	¹⁴⁷ Sn	5.000	¹⁵³ Sb	31.170	¹⁵⁸ Te	50.710	¹⁶² I	65.630 †
¹⁴⁶ Cd	33.380	¹⁴⁸ In	31.410 †	¹⁴⁸ Sn	10.920	¹⁵⁴ Sb	39.100	¹⁵⁹ Te	59.450 †	¹⁶³ I	73.410 ‡
¹⁴⁷ Cd	41.940 †	¹⁴⁹ In	38.530	¹⁴⁹ Sn	18.870	¹⁵⁵ Sb	46.410	¹⁶⁰ Te	66.940 ‡	¹⁶⁴ I	82.530 †
¹⁴⁸ Cd	49.220	¹⁵⁰ In	46.890 †	¹⁵⁰ Sn	25.370	¹⁵⁶ Sb	54.950 †	¹⁶¹ Te	76.150 †	¹⁶⁵ I	90.470 ‡
¹⁴⁹ Cd	58.210 †	¹⁵¹ In	54.340	¹⁵¹ Sn	33.460 †	¹⁵⁷ Sb	62.710 ‡	¹⁶² Te	84.100 ‡	¹⁶⁶ I	99.740 †
¹⁵⁰ Cd	65.920 ‡	¹⁵² In	62.990 †	¹⁵² Sn	40.310	¹⁵⁸ Sb	71.630 †	¹⁶³ Te	93.650 ‡	¹⁶⁷ I	107.760 ‡
¹⁵¹ Cd	75.160 †	¹⁵³ In	70.840 ‡	¹⁵³ Sn	48.770 †	¹⁵⁹ Sb	79.610 ‡	¹⁶⁴ Te	101.940 †	¹⁶⁸ I	117.490 †
¹⁵² Cd	83.210 ‡	¹⁵⁴ In	79.960 †	¹⁵⁴ Sn	56.090	¹⁶⁰ Sb	88.950 †	¹⁶⁵ Te	111.710 †	¹⁶⁹ I	125.760 †
¹⁵³ Cd	92.850 †	¹⁵⁵ In	88.420 †	¹⁵⁵ Sn	65.200 †	¹⁶¹ Sb	97.460 †	¹⁶⁶ Te	119.930 †	¹⁷⁰ I	135.700 †
¹⁵⁴ Cd	101.330 †	¹⁵⁶ In	97.880 †	¹⁵⁶ Sn	73.100 ‡	¹⁶² Sb	107.190 †	¹⁶⁷ Te	130.160 †	¹⁷¹ I	144.320 †
¹⁵⁵ Cd	111.350 †	¹⁵⁷ In	106.420 †	¹⁵⁷ Sn	82.410 †	¹⁶³ Sb	115.900 †	¹⁶⁸ Te	138.580 †	¹⁷² I	154.450 †
¹⁵⁶ Cd	120.040 †	¹⁵⁸ In	116.430 †	¹⁵⁸ Sn	90.570 †	¹⁶⁴ Sb	126.020 †	¹⁶⁹ Te	149.080 †	¹⁷³ I	163.500 †
¹⁵⁷ Cd	130.440 †	¹⁵⁹ In	125.560 †	¹⁵⁹ Sn	100.390 †	¹⁶⁵ Sb	134.750 †	¹⁷⁰ Te	157.900 †	¹⁷⁴ I	174.060 †
¹⁵⁸ Cd	139.750 †	¹⁶⁰ In	135.980 †	¹⁶⁰ Sn	109.040 †	¹⁶⁶ Sb	145.180 †	¹⁷¹ Te	168.580 †	¹⁷⁵ I	183.380 †
¹⁵⁹ Cd	150.650 †	¹⁶¹ In	145.430 †	¹⁶¹ Sn	119.330 †	¹⁶⁷ Sb	154.100 †	¹⁷² Te	177.780 †	¹⁷⁶ I	194.140 †
¹⁶⁰ Cd	160.240 †	¹⁶² In	156.150 †	¹⁶² Sn	128.220 †	¹⁶⁸ Sb	164.740 †	¹⁷³ Te	188.800 †	¹⁷⁷ I	203.880 †
¹⁶² Cd	181.190 †	¹⁶³ In	165.650 †	¹⁶³ Sn	138.760 †	¹⁶⁹ Sb	174.120 †	¹⁷⁴ Te	198.320 †	¹⁷⁸ I	214.930 †
¹⁶⁴ Cd	202.880 †	¹⁶⁵ In	186.570 †	¹⁶⁴ Sn	147.830 †	¹⁷⁰ Sb	185.000 †	¹⁷⁶ Te	219.410 †	¹⁷⁹ I	225.670 †
¹⁶⁶ Cd	224.960 †	¹⁶⁷ In	207.940 †	¹⁶⁵ Sn	158.770 †	¹⁷¹ Sb	194.760 †	¹⁷⁸ Te	241.770 †	¹⁰⁸ Xe	-42.870 ‡
¹⁶⁸ Cd	247.700 †	¹⁶⁹ In	230.030 †	¹⁶⁶ Sn	167.900 †	¹⁷³ Sb	215.920 †	¹⁰⁶ I	-43.880 †	¹⁰⁹ Xe	-46.280
¹⁷⁰ Cd	271.080 †	¹⁷¹ In	252.650 †	¹⁶⁸ Sn	188.560 †	¹⁷⁵ Sb	237.610 †	¹⁰⁷ I	-49.410 †	¹¹⁰ Xe	-52.010
⁹³ In	-13.650 †	¹⁷³ In	275.630 †	¹⁷⁰ Sn	209.960 †	¹⁰⁴ Te	-49.330 ‡	¹⁰⁸ I	-52.740 †	¹¹¹ Xe	-54.800
⁹⁴ In	-21.290 †	⁹⁴ Sn	-5.820 †	¹⁷² Sn	231.820 †	¹⁰⁵ Te	-52.700 †	¹⁰⁹ I	-57.710 †	¹¹² Xe	-60.030
⁹⁵ In	-31.070 †	⁹⁵ Sn	-13.710 †	¹⁷⁴ Sn	254.180 †	¹⁰⁶ Te	-58.180	¹¹⁰ I	-60.430	¹¹³ Xe	-62.240
⁹⁶ In	-37.900 †	⁹⁶ Sn	-24.080 ‡	¹⁰² Sb	-50.610 †	¹⁰⁷ Te	-60.810	¹¹¹ I	-64.910	¹¹⁴ Xe	-67.010
⁹⁷ In	-46.910 †	⁹⁷ Sn	-31.270 ‡	¹⁰³ Sb	-55.860 †	¹⁰⁸ Te	-65.690	¹¹² I	-67.060	¹¹⁵ Xe	-68.810
⁹⁸ In	-52.920	⁹⁸ Sn	-40.780	¹⁰⁴ Sb	-59.150 †	¹⁰⁹ Te	-67.650	¹¹³ I	-71.090	¹¹⁶ Xe	-73.010
⁹⁹ In	-60.410	⁹⁹ Sn	-47.070	¹⁰⁵ Sb	-63.860 †	¹¹⁰ Te	-72.070	¹¹⁴ I	-72.720	¹¹⁷ Xe	-74.210
¹⁰⁰ In	-63.650	¹⁰⁰ Sn	-55.820	¹⁰⁶ Sb	-66.430	¹¹¹ Te	-73.460	¹¹⁵ I	-76.400	¹¹⁸ Xe	-77.900
¹⁰¹ In	-68.050	¹⁰¹ Sn	-59.180	¹⁰⁷ Sb	-70.620	¹¹² Te	-77.430	¹¹⁶ I	-77.470	¹¹⁹ Xe	-78.720
¹⁰² In	-70.510	¹⁰² Sn	-64.270	¹⁰⁸ Sb	-72.500	¹¹³ Te	-78.320	¹¹⁷ I	-80.470	¹²⁰ Xe	-81.860
¹⁰³ In	-74.460	¹⁰³ Sn	-66.890	¹⁰⁹ Sb	-76.150	¹¹⁴ Te	-81.840	¹¹⁸ I	-81.170	¹²¹ Xe	-82.390
¹⁰⁴ In	-76.190	¹⁰⁴ Sn	-71.510	¹¹⁰ Sb	-77.480	¹¹⁵ Te	-82.380	¹¹⁹ I	-83.680	¹²² Xe	-85.270
¹⁰⁵ In	-79.550	¹⁰⁵ Sn	-73.320	¹¹¹ Sb	-80.690	¹¹⁶ Te	-85.250	¹²⁰ I	-83.890	¹²³ Xe	-85.210
¹⁰⁶ In	-80.670	¹⁰⁶ Sn	-77.450	¹¹² Sb	-81.520	¹¹⁷ Te	-85.270	¹²¹ I	-86.280	¹²⁴ Xe	-87.650
¹⁰⁷ In	-83.550	¹⁰⁷ Sn	-78.630	¹¹³ Sb	-84.300	¹¹⁸ Te	-87.660	¹²² I	-86.060	¹²⁵ Xe	-87.170
¹⁰⁸ In	-84.030	¹⁰⁸ Sn	-82.200	¹¹⁴ Sb	-84.680	¹¹⁹ Te	-87.240	¹²³ I	-87.900	¹²⁶ Xe	-89.210
¹⁰⁹ In	-86.420	¹⁰⁹ Sn	-82.770	¹¹⁵ Sb	-87.030	¹²⁰ Te	-89.300	¹²⁴ I	-87.410	¹²⁷ Xe	-88.260
¹¹⁰ In	-86.430	¹¹⁰ Sn	-85.920	¹¹⁶ Sb	-86.910	¹²¹ Te	-88.580	¹²⁵ I	-88.820	¹²⁸ Xe	-89.790
¹¹¹ In	-88.390	¹¹¹ Sn	-85.990	¹¹⁷ Sb	-88.610	¹²² Te	-90.270	¹²⁶ I	-87.920	¹²⁹ Xe	-88.650

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹³⁰ Xe	-89.810	¹³⁴ Cs	-86.890	¹³⁹ Ba	-85.020	¹⁴⁵ La	-72.910	¹⁵² Ce	-59.410	¹⁵⁵ Pr	-55.810		
¹³¹ Xe	-88.380	¹³⁵ Cs	-87.650	¹⁴⁰ Ba	-83.280	¹⁴⁶ La	-69.020	¹⁵³ Ce	-55.460	¹⁵⁶ Pr	-52.000		
¹³² Xe	-89.330	¹³⁶ Cs	-86.270	¹⁴¹ Ba	-79.790	¹⁴⁷ La	-67.000	¹⁵⁴ Ce	-53.110	¹⁵⁷ Pr	-49.160		
¹³³ Xe	-87.660	¹³⁷ Cs	-86.420	¹⁴² Ba	-77.880	¹⁴⁸ La	-63.180	¹⁵⁵ Ce	-48.740	¹⁵⁸ Pr	-44.520		
¹³⁴ Xe	-88.200	¹³⁸ Cs	-82.910	¹⁴³ Ba	-73.980	¹⁴⁹ La	-60.780	¹⁵⁶ Ce	-45.760	¹⁵⁹ Pr	-40.900		
¹³⁵ Xe	-86.560	¹³⁹ Cs	-80.610	¹⁴⁴ Ba	-71.880	¹⁵⁰ La	-56.860	¹⁵⁷ Ce	-40.730	¹⁶⁰ Pr	-35.900		
¹³⁶ Xe	-86.460	¹⁴⁰ Cs	-76.850	¹⁴⁵ Ba	-67.540	¹⁵¹ La	-54.250	¹⁵⁸ Ce	-36.920	¹⁶¹ Pr	-31.670		
¹³⁷ Xe	-82.390	¹⁴¹ Cs	-74.400	¹⁴⁶ Ba	-65.220	¹⁵² La	-50.110	¹⁵⁹ Ce	-31.440	¹⁶² Pr	-26.210		
¹³⁸ Xe	-80.070	¹⁴² Cs	-70.370	¹⁴⁷ Ba	-60.960	¹⁵³ La	-47.240	¹⁶⁰ Ce	-27.080	¹⁶³ Pr	-21.530		
¹³⁹ Xe	-75.740	¹⁴³ Cs	-67.700	¹⁴⁸ Ba	-58.400	¹⁵⁴ La	-42.850	¹⁶¹ Ce	-21.060	¹⁶⁴ Pr	-15.490		
¹⁴⁰ Xe	-73.020	¹⁴⁴ Cs	-63.280	¹⁴⁹ Ba	-53.860	¹⁵⁵ La	-39.310	¹⁶² Ce	-16.210	¹⁶⁵ Pr	-10.420		
¹⁴¹ Xe	-68.440	¹⁴⁵ Cs	-60.520	¹⁵⁰ Ba	-50.980	¹⁵⁶ La	-34.140	¹⁶³ Ce	-9.730	¹⁶⁶ Pr	-4.310		
¹⁴² Xe	-65.650	¹⁴⁶ Cs	-55.960	¹⁵¹ Ba	-46.250	¹⁵⁷ La	-29.940	¹⁶⁴ Ce	-4.330	¹⁶⁷ Pr	0.830		
¹⁴³ Xe	-60.660	¹⁴⁷ Cs	-52.960	¹⁵² Ba	-43.180	¹⁵⁸ La	-24.270	¹⁶⁵ Ce	2.290	¹⁶⁸ Pr	7.310		
¹⁴⁴ Xe	-57.820	¹⁴⁸ Cs	-48.260	¹⁵³ Ba	-38.270	¹⁵⁹ La	-19.430	¹⁶⁶ Ce	7.630	¹⁶⁹ Pr	12.960		
¹⁴⁵ Xe	-52.810	¹⁴⁹ Cs	-44.750	¹⁵⁴ Ba	-34.710	¹⁶⁰ La	-13.280	¹⁶⁷ Ce	14.620	¹⁷⁰ Pr	19.830		
¹⁴⁶ Xe	-49.510	¹⁵⁰ Cs	-39.750	¹⁵⁵ Ba	-28.970	¹⁶¹ La	-7.860	¹⁶⁸ Ce	20.420	¹⁷¹ Pr	25.660		
¹⁴⁷ Xe	-44.370	¹⁵¹ Cs	-36.090	¹⁵⁶ Ba	-24.630	¹⁶² La	-1.210	¹⁶⁹ Ce	27.840	¹⁷² Pr	32.760		
¹⁴⁸ Xe	-40.710	¹⁵² Cs	-30.980	¹⁵⁷ Ba	-18.580	¹⁶³ La	4.620	¹⁷⁰ Ce	33.870	¹⁷³ Pr	38.680		
¹⁴⁹ Xe	-35.080	¹⁵³ Cs	-26.910	¹⁵⁸ Ba	-13.550	¹⁶⁴ La	11.580	¹⁷¹ Ce	41.530	¹⁷⁴ Pr	46.330		
¹⁵⁰ Xe	-31.150	¹⁵⁴ Cs	-21.150	¹⁵⁹ Ba	-6.920	¹⁶⁵ La	17.430	¹⁷² Ce	47.590	¹⁷⁵ Pr	52.480		
¹⁵¹ Xe	-25.460	¹⁵⁵ Cs	-16.250	¹⁶⁰ Ba	-1.370	¹⁶⁶ La	24.630	¹⁷³ Ce	55.710 †	¹⁷⁶ Pr	60.430		
¹⁵² Xe	-21.180	¹⁵⁶ Cs	-10.050	¹⁶¹ Ba	5.840	¹⁶⁷ La	30.920	¹⁷⁴ Ce	62.060	¹⁷⁷ Pr	67.100		
¹⁵³ Xe	-14.900	¹⁵⁷ Cs	-4.640	¹⁶² Ba	11.850	¹⁶⁸ La	38.490	¹⁷⁵ Ce	70.430 †	¹⁷⁸ Pr	75.320 †		
¹⁵⁴ Xe	-9.990	¹⁵⁸ Cs	2.190	¹⁶³ Ba	19.240	¹⁶⁹ La	45.070	¹⁷⁶ Ce	77.260	¹⁷⁹ Pr	82.560		
¹⁵⁵ Xe	-3.220	¹⁵⁹ Cs	8.210	¹⁶⁴ Ba	25.430	¹⁷⁰ La	52.940	¹⁷⁷ Ce	86.000 †	¹⁸⁰ Pr	91.190 †		
¹⁵⁶ Xe	2.340	¹⁶⁰ Cs	15.560	¹⁶⁵ Ba	33.130	¹⁷¹ La	59.550	¹⁷⁸ Ce	93.290	¹⁸¹ Pr	98.680		
¹⁵⁷ Xe	9.540	¹⁶¹ Cs	22.130	¹⁶⁶ Ba	39.630	¹⁷² La	67.820 †	¹⁷⁹ Ce	102.490 †	¹⁸² Pr	107.640 †		
¹⁵⁸ Xe	15.760	¹⁶² Cs	29.690	¹⁶⁷ Ba	47.700	¹⁷³ La	74.640	¹⁸⁰ Ce	110.090 ‡	¹⁸³ Pr	115.550 ‡		
¹⁵⁹ Xe	23.580	¹⁶³ Cs	36.310	¹⁶⁸ Ba	54.430	¹⁷⁴ La	83.200 †	¹⁸¹ Ce	119.430 †	¹⁸⁴ Pr	124.900 †		
¹⁶⁰ Xe	30.290	¹⁶⁴ Cs	44.350	¹⁶⁹ Ba	62.850 †	¹⁷⁵ La	90.450	¹⁸² Ce	127.550 †	¹⁸⁵ Pr	133.750 †		
¹⁶¹ Xe	38.410 †	¹⁶⁵ Cs	51.360	¹⁷⁰ Ba	69.670	¹⁷⁶ La	99.350 †	¹⁸³ Ce	137.280 †	¹⁸⁷ Pr	156.460 †		
¹⁶² Xe	45.210	¹⁶⁶ Cs	59.640 †	¹⁷¹ Ba	78.490 †	¹⁷⁷ La	107.160 ‡	¹⁸⁴ Ce	146.380 †	¹⁸⁹ Pr	179.560 †		
¹⁶³ Xe	53.680 †	¹⁶⁷ Cs	66.870	¹⁷² Ba	85.450	¹⁷⁸ La	116.420 †	¹⁸⁶ Ce	169.750 †	¹⁹¹ Pr	202.350 †		
¹⁶⁴ Xe	61.030	¹⁶⁸ Cs	75.430 †	¹⁷³ Ba	94.490 †	¹⁷⁹ La	124.590 †	¹⁹⁰ Ce	217.020 †	¹⁹³ Pr	225.340 †		
¹⁶⁵ Xe	69.810 †	¹⁶⁹ Cs	82.800	¹⁷⁴ Ba	101.940 ‡	¹⁸⁰ La	134.040 †	¹⁹² Ce	240.770 †	¹⁹⁷ Pr	271.530 †		
¹⁶⁶ Xe	77.250 ‡	¹⁷⁰ Cs	91.330 †	¹⁷⁵ Ba	111.250 †	¹⁸¹ La	142.530 †	¹⁹⁶ Ce	288.280 †	¹⁹⁹ Pr	294.580 †		
¹⁶⁷ Xe	86.310 †	¹⁷¹ Cs	99.350 ‡	¹⁷⁶ Ba	119.220 ‡	¹⁸² La	152.470 †	¹⁹⁸ Ce	312.080 †				
¹⁶⁸ Xe	93.830 ‡	¹⁷² Cs	108.530 †	¹⁷⁷ Ba	129.000 †	¹⁸³ La	161.950 †			¹²⁰ Nd	-24.720 ‡		
¹⁶⁹ Xe	103.410 †	¹⁷³ Cs	116.440 ‡	¹⁷⁸ Ba	137.230 †			¹¹⁶ Ce	-30.460 ‡	¹¹⁹ Pr	-31.500 †		
¹⁷⁰ Xe	111.130 ‡	¹⁷⁴ Cs	125.960 †	¹⁷⁹ Ba	147.250 †			¹¹⁷ Ce	-34.220 ‡	¹²⁰ Pr	-35.390 †		
¹⁷¹ Xe	120.870 †	¹⁷⁵ Cs	134.340 †	¹⁸⁰ Ba	155.850 †			¹¹⁸ Ce	-40.500	¹²¹ Pr	-41.490 †		
¹⁷² Xe	128.930 ‡	¹⁷⁶ Cs	144.290 †	¹⁸¹ Ba	166.150 †			¹¹⁹ Ce	-43.770	¹²² Pr	-44.940 †		
¹⁷³ Xe	138.910 †	¹⁷⁷ Cs	153.030 †	¹⁸² Ba	175.850 †			¹²⁰ Ce	-49.540	¹²³ Pr	-50.360 †		
¹⁷⁴ Xe	147.490 †	¹⁷⁸ Cs	163.110 †			¹¹⁴ La	-30.940 †	¹²¹ Ce	-52.500	¹²⁴ Pr	-53.380		
¹⁷⁵ Xe	157.850 †	¹⁷⁹ Cs	172.280 †			¹¹⁵ La	-37.150 †	¹²² Ce	-57.750	¹²⁵ Pr	-58.100		
¹⁷⁶ Xe	166.760 †	¹⁸⁰ Cs	182.700 †			¹¹⁶ La	-40.780 †	¹²³ Ce	-60.180	¹²⁶ Pr	-60.520		
¹⁷⁷ Xe	177.350 †	¹⁸¹ Cs	192.760 †			¹¹⁷ La	-46.370 †	¹²⁴ Ce	-64.900	¹²⁷ Pr	-64.730		
¹⁷⁸ Xe	186.580 †			¹¹² Ba	-36.470 ‡	¹¹⁸ La	-49.510 †	¹²⁵ Ce	-66.690	¹²⁸ Pr	-66.460		
¹⁷⁹ Xe	197.570 †			¹¹³ Ba	-40.070 ‡	¹¹⁹ La	-54.660 †	¹²⁶ Ce	-70.960	¹²⁹ Pr	-70.070		
¹⁸⁰ Xe	207.750 †			¹¹⁴ Ba	-46.110	¹²⁰ La	-57.290	¹²⁷ Ce	-72.070	¹³⁰ Pr	-71.310		
				¹¹⁵ Ba	-49.220	¹²¹ La	-62.060	¹²⁸ Ce	-75.700	¹³¹ Pr	-74.530		
¹¹⁰ Cs	-37.310 †			¹¹⁶ Ba	-54.680	¹²² La	-64.320	¹²⁹ Ce	-76.380	¹³² Pr	-75.360		
¹¹¹ Cs	-43.110 †			¹¹⁷ Ba	-57.130	¹²³ La	-68.440	¹³⁰ Ce	-79.520	¹³³ Pr	-77.930		
¹¹² Cs	-46.650 †			¹¹⁸ Ba	-62.160	¹²⁴ La	-70.230	¹³¹ Ce	-79.800	¹³⁴ Pr	-78.540		
¹¹³ Cs	-51.940 †			¹¹⁹ Ba	-64.160	¹²⁵ La	-73.870	¹³² Ce	-82.570	¹³⁵ Pr	-80.900		
¹¹⁴ Cs	-54.890 †			¹²⁰ Ba	-68.600	¹²⁶ La	-75.040	¹³³ Ce	-82.360	¹³⁶ Pr	-81.320		
¹¹⁵ Cs	-59.830			¹²¹ Ba	-70.380	¹²⁷ La	-78.050	¹³⁴ Ce	-84.740	¹³⁷ Pr	-83.190		
¹¹⁶ Cs	-62.150			¹²² Ba	-74.330	¹²⁸ La	-78.760	¹³⁵ Ce	-84.680	¹³⁸ Pr	-83.150		
¹¹⁷ Cs	-66.480			¹²³ Ba	-75.520	¹²⁹ La	-81.330	¹³⁶ Ce	-86.530	¹³⁹ Pr	-84.870		
¹¹⁸ Cs	-68.370			¹²⁴ Ba	-79.160	¹³⁰ La	-81.540	¹³⁷ Ce	-85.990	¹⁴⁰ Pr	-84.810		
¹¹⁹ Cs	-72.180			¹²⁵ Ba	-79.700	¹³¹ La	-83.770	¹³⁸ Ce	-87.560	¹⁴¹ Pr	-85.890		
¹²⁰ Cs	-73.630			¹²⁶ Ba	-82.780	¹³² La	-83.750	¹³⁹ Ce	-86.810	¹⁴² Pr	-83.830		
¹²¹ Cs	-77.090			¹²⁷ Ba	-82.860	¹³³ La	-85.300	¹⁴⁰ Ce	-88.120	¹⁴³ Pr	-83.030		
¹²² Cs	-78.120			¹²⁸ Ba	-85.460	¹³⁴ La	-85.260	¹⁴¹ Ce	-85.470	¹⁴⁴ Pr	-80.780		
¹²³ Cs	-81.160			¹²⁹ Ba	-85.110	¹³⁵ La	-86.630	¹⁴² Ce	-84.550	¹⁴⁵ Pr	-79.650		
¹²⁴ Cs	-81.700			¹³⁰ Ba	-87.260	¹³⁶ La	-86.070	¹⁴³ Ce	-81.730	¹⁴⁶ Pr	-76.840		
¹²⁵ Cs	-84.140			¹³¹ Ba	-86.690	¹³⁷ La	-87.210	¹⁴⁴ Ce	-80.520	¹⁴⁷ Pr	-75.560		
¹²⁶ Cs	-84.290			¹³² Ba	-88.440	¹³⁸ La	-86.640	¹⁴⁵ Ce	-77.260	¹⁴⁸ Pr	-72.400		
¹²⁷ Cs	-86.270			¹³³ Ba	-87.570	¹³⁹ La	-87.380	¹⁴⁶ Ce	-75.690	¹⁴⁹ Pr	-70.980		
¹²⁸ Cs	-85.940			¹³⁴ Ba	-88.930	¹⁴⁰ La	-84.470	¹⁴⁷ Ce	-72.090	¹⁵⁰ Pr	-67.950		
¹²⁹ Cs	-87.520			¹³⁵ Ba	-87.900	¹⁴¹ La	-83.000	¹⁴⁸ Ce	-70.510	¹⁵¹ Pr	-66.440		
¹³⁰ Cs	-86.890			¹³⁶ Ba	-88.920	¹⁴² La	-80.050	¹⁴⁹ Ce	-66.840	¹⁵² Pr	-63.390		
¹³¹ Cs	-88.130			¹³⁷ Ba	-87.780	¹⁴³ La	-78.270	¹⁵⁰ Ce	-65.070	¹⁵³ Pr	-61.560		
¹³² Cs	-87.200			¹³⁸ Ba	-88.500	¹⁴⁴ La	-74.940	¹⁵¹ Ce	-61.430	¹⁵⁴ Pr	-58.140		
¹³³ Cs	-88.140									¹⁵⁵ Nd	-57.010		

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁵⁸ Nd	-54.560	¹⁵⁴ Pm	-68.130	¹⁵² Sm	-74.750	¹⁴⁹ Eu	-76.450	¹³⁷ Gd	-51.270	²¹³ Gd	301.040 †
¹⁵⁹ Nd	-50.110	¹⁵⁵ Pm	-66.850	¹⁵³ Sm	-72.770	¹⁵⁰ Eu	-74.850	¹³⁸ Gd	-55.650	²¹⁴ Gd	310.780 †
¹⁶⁰ Nd	-46.960	¹⁵⁶ Pm	-64.000	¹⁵⁴ Sm	-72.580	¹⁵¹ Eu	-74.770	¹³⁹ Gd	-57.390	²¹⁵ Gd	321.840 †
¹⁶¹ Nd	-42.100	¹⁵⁷ Pm	-62.370	¹⁵⁵ Sm	-70.250	¹⁵² Eu	-72.980	¹⁴⁰ Gd	-61.540	²¹⁶ Gd	331.560 †
¹⁶² Nd	-38.430	¹⁵⁸ Pm	-59.090	¹⁵⁶ Sm	-69.530	¹⁵³ Eu	-73.380	¹⁴¹ Gd	-63.120	²¹⁸ Gd	352.700 †
¹⁶³ Nd	-33.150	¹⁵⁹ Pm	-56.840	¹⁵⁷ Sm	-66.830	¹⁵⁴ Eu	-71.920	¹⁴² Gd	-66.890		
¹⁶⁴ Nd	-28.900	¹⁶⁰ Pm	-52.860	¹⁵⁸ Sm	-65.590	¹⁵⁵ Eu	-71.740	¹⁴³ Gd	-68.280	¹³⁰ Tb	-7.880 †
¹⁶⁵ Nd	-23.190	¹⁶¹ Pm	-49.850	¹⁵⁹ Sm	-62.500	¹⁵⁶ Eu	-69.980	¹⁴⁴ Gd	-71.850	¹³¹ Tb	-14.400 †
¹⁶⁶ Nd	-18.640	¹⁶² Pm	-45.550	¹⁶⁰ Sm	-60.720	¹⁵⁷ Eu	-69.410	¹⁴⁵ Gd	-73.040	¹³² Tb	-18.530 †
¹⁶⁷ Nd	-12.730	¹⁶³ Pm	-42.060	¹⁶¹ Sm	-56.880	¹⁵⁸ Eu	-67.090	¹⁴⁶ Gd	-76.080	¹³³ Tb	-24.330 †
¹⁶⁸ Nd	-8.090	¹⁶⁴ Pm	-37.200	¹⁶² Sm	-54.430	¹⁵⁹ Eu	-66.040	¹⁴⁷ Gd	-75.290	¹³⁴ Tb	-27.850 †
¹⁶⁹ Nd	-1.750	¹⁶⁵ Pm	-33.290	¹⁶³ Sm	-50.300	¹⁶⁰ Eu	-63.430	¹⁴⁸ Gd	-76.240	¹³⁵ Tb	-33.250 †
¹⁷⁰ Nd	3.340	¹⁶⁶ Pm	-28.100	¹⁶⁴ Sm	-47.240	¹⁶¹ Eu	-61.780	¹⁴⁹ Gd	-75.040	¹³⁶ Tb	-36.200 †
¹⁷¹ Nd	10.010	¹⁶⁷ Pm	-23.740	¹⁶⁵ Sm	-42.730	¹⁶² Eu	-58.500	¹⁵⁰ Gd	-75.750	¹³⁷ Tb	-41.070 †
¹⁷² Nd	15.280	¹⁶⁸ Pm	-18.340	¹⁶⁶ Sm	-39.320	¹⁶³ Eu	-56.230	¹⁵¹ Gd	-74.090	¹³⁸ Tb	-43.510 †
¹⁷³ Nd	22.240	¹⁶⁹ Pm	-13.850	¹⁶⁷ Sm	-34.330	¹⁶⁴ Eu	-52.530	¹⁵² Gd	-74.750	¹³⁹ Tb	-48.040 †
¹⁷⁴ Nd	27.680	¹⁷⁰ Pm	-8.060	¹⁶⁸ Sm	-30.480	¹⁶⁵ Eu	-49.810	¹⁵³ Gd	-72.890	¹⁴⁰ Tb	-50.430
¹⁷⁵ Nd	35.140	¹⁷¹ Pm	-3.170	¹⁶⁹ Sm	-25.220	¹⁶⁶ Eu	-45.800	¹⁵⁴ Gd	-73.810	¹⁴¹ Tb	-54.420
¹⁷⁶ Nd	40.870	¹⁷² Pm	2.940	¹⁷⁰ Sm	-21.280	¹⁶⁷ Eu	-42.600	¹⁵⁵ Gd	-72.120	¹⁴² Tb	-56.770
¹⁷⁷ Nd	48.670	¹⁷³ Pm	8.070	¹⁷¹ Sm	-15.700	¹⁶⁸ Eu	-38.110	¹⁵⁶ Gd	-72.500	¹⁴³ Tb	-60.560
¹⁷⁸ Nd	54.820	¹⁷⁴ Pm	14.560	¹⁷² Sm	-11.360	¹⁶⁹ Eu	-34.410	¹⁵⁷ Gd	-70.890	¹⁴⁴ Tb	-62.530
¹⁷⁹ Nd	62.980 †	¹⁷⁵ Pm	19.800	¹⁷³ Sm	-5.400	¹⁷⁰ Eu	-29.700	¹⁵⁸ Gd	-70.690	¹⁴⁵ Tb	-66.140
¹⁸⁰ Nd	69.650	¹⁷⁶ Pm	26.850	¹⁷⁴ Sm	-0.740	¹⁷¹ Eu	-25.970	¹⁵⁹ Gd	-68.570	¹⁴⁶ Tb	-67.890
¹⁸¹ Nd	78.160 †	¹⁷⁷ Pm	32.420	¹⁷⁵ Sm	5.550	¹⁷² Eu	-20.940	¹⁶⁰ Gd	-67.990	¹⁴⁷ Tb	-71.000
¹⁸² Nd	85.280	¹⁷⁸ Pm	39.690	¹⁷⁶ Sm	10.380	¹⁷³ Eu	-16.750	¹⁶¹ Gd	-65.520	¹⁴⁸ Tb	-70.720
¹⁸³ Nd	94.040 †	¹⁷⁹ Pm	45.790	¹⁷⁷ Sm	17.260	¹⁷⁴ Eu	-11.250	¹⁶² Gd	-64.440	¹⁴⁹ Tb	-71.680
¹⁸⁴ Nd	101.570 †	¹⁸⁰ Pm	53.380	¹⁷⁸ Sm	22.310	¹⁷⁵ Eu	-6.790	¹⁶³ Gd	-61.330	¹⁵⁰ Tb	-71.100
¹⁸⁵ Nd	110.660 †	¹⁸¹ Pm	59.930	¹⁷⁹ Sm	29.530	¹⁷⁶ Eu	-0.920	¹⁶⁴ Gd	-59.490	¹⁵¹ Tb	-71.750
¹⁸⁶ Nd	119.060 †	¹⁸² Pm	68.080 †	¹⁸⁰ Sm	35.060	¹⁷⁷ Eu	3.750	¹⁶⁵ Gd	-56.120	¹⁵² Tb	-70.820
¹⁸⁸ Nd	141.210 †	¹⁸³ Pm	74.990	¹⁸¹ Sm	42.530	¹⁷⁸ Eu	10.110	¹⁶⁶ Gd	-53.910	¹⁵³ Tb	-71.420
¹⁹⁰ Nd	163.390 †	¹⁸⁴ Pm	83.360 †	¹⁸² Sm	48.720	¹⁷⁹ Eu	15.110	¹⁶⁷ Gd	-50.110	¹⁵⁴ Tb	-70.180
¹⁹² Nd	185.520 †	¹⁸⁵ Pm	90.640	¹⁸³ Sm	56.660	¹⁸⁰ Eu	21.750	¹⁶⁸ Gd	-47.410	¹⁵⁵ Tb	-71.170
¹⁹⁴ Nd	207.780 †	¹⁸⁶ Pm	99.290 †	¹⁸⁴ Sm	63.180	¹⁸¹ Eu	27.170	¹⁶⁹ Gd	-43.070	¹⁵⁶ Tb	-69.940
¹⁹⁶ Nd	230.220 †	¹⁸⁷ Pm	107.470 †	¹⁸⁵ Sm	71.310 †	¹⁸² Eu	34.270	¹⁷⁰ Gd	-39.920	¹⁵⁷ Tb	-70.660
¹⁹⁸ Nd	252.530 †	¹⁸⁹ Pm	129.130 †	¹⁸⁶ Sm	78.140	¹⁸³ Eu	40.250	¹⁷¹ Gd	-35.420	¹⁵⁸ Tb	-69.560
²⁰⁰ Nd	274.930 †	¹⁹¹ Pm	150.420 †	¹⁸⁷ Sm	86.570 †	¹⁸⁴ Eu	47.810	¹⁷² Gd	-32.240	¹⁵⁹ Tb	-69.560
²⁰² Nd	297.810 †	¹⁹³ Pm	171.790 †	¹⁸⁸ Sm	94.400 †	¹⁸⁵ Eu	54.080	¹⁷³ Gd	-27.350	¹⁶⁰ Tb	-67.910
²⁰⁴ Nd	320.920 †	¹⁹⁵ Pm	193.480 †	¹⁹⁰ Sm	115.150 †	¹⁸⁶ Eu	61.760	¹⁷⁴ Gd	-23.630	¹⁶¹ Tb	-67.470
²⁰⁶ Nd	344.210 †	¹⁹⁷ Pm	215.170 †	¹⁹¹ Sm	126.160 †	¹⁸⁷ Eu	68.370	¹⁷⁵ Gd	-18.330	¹⁶² Tb	-65.560
²⁰⁸ Nd	367.170 †	¹⁹⁹ Pm	236.730 †	¹⁹² Sm	135.770 †	¹⁸⁸ Eu	76.450 †	¹⁷⁶ Gd	-14.290	¹⁶³ Tb	-64.650
²¹⁰ Nd	390.270 †	²⁰¹ Pm	258.620 †	¹⁹⁴ Sm	156.420 †	¹⁸⁹ Eu	84.150	¹⁷⁷ Gd	-8.580	¹⁶⁴ Tb	-61.980
²¹² Nd	413.610 †	²⁰³ Pm	280.810 †	¹⁹⁶ Sm	177.400 †	¹⁹⁰ Eu	94.580 †	¹⁷⁸ Gd	-4.430	¹⁶⁵ Tb	-60.470
²¹⁴ Nd	437.190 †	²⁰⁵ Pm	303.230 †	¹⁹⁸ Sm	198.360 †	¹⁹¹ Eu	104.000 †	¹⁷⁹ Gd	1.880	¹⁶⁶ Tb	-57.620
		²⁰⁷ Pm	325.590 †	²⁰⁰ Sm	219.270 †	¹⁹² Eu	114.470 †	¹⁸⁰ Gd	6.300	¹⁶⁷ Tb	-55.610
¹²² Pm	-19.670 †	²⁰⁹ Pm	347.980 †	²⁰² Sm	240.550 †	¹⁹³ Eu	123.870 †	¹⁸¹ Gd	12.840	¹⁶⁸ Tb	-52.310
¹²³ Pm	-26.420 †	²¹³ Pm	393.320 †	²⁰⁴ Sm	262.090 †	¹⁹⁴ Eu	134.540 †	¹⁸² Gd	17.880	¹⁶⁹ Tb	-49.760
¹²⁴ Pm	-30.630 †	²¹⁵ Pm	416.270 †	²⁰⁶ Sm	283.730 †	¹⁹⁵ Eu	143.940 †	¹⁸³ Gd	24.780	¹⁷⁰ Tb	-45.970
¹²⁵ Pm	-36.650 †			²⁰⁸ Sm	305.430 †	¹⁹⁶ Eu	154.700 †	¹⁸⁴ Gd	30.370	¹⁷¹ Tb	-43.020
¹²⁶ Pm	-40.310 †	¹²⁴ Sm	-19.530 †	²¹⁰ Sm	327.210 †	¹⁹⁷ Eu	164.170 †	¹⁸⁵ Gd	37.680	¹⁷² Tb	-39.080
¹²⁷ Pm	-45.600 †	¹²⁵ Sm	-23.740 †	²¹² Sm	349.330 †	¹⁹⁸ Eu	174.800 †	¹⁸⁶ Gd	43.510	¹⁷³ Tb	-36.040
¹²⁸ Pm	-48.570 †	¹²⁶ Sm	-30.400 †	²¹⁴ Sm	371.300 †	¹⁹⁹ Eu	184.380 †	¹⁸⁷ Gd	50.970	¹⁷⁴ Tb	-31.630
¹²⁹ Pm	-53.380 †	¹²⁷ Sm	-33.990	²¹⁶ Sm	393.690 †	²⁰⁰ Eu	195.070 †	¹⁸⁸ Gd	57.230	¹⁷⁵ Tb	-28.100
¹³⁰ Pm	-55.650	¹²⁸ Sm	-39.900			²⁰¹ Eu	204.780 †	¹⁸⁹ Gd	65.180	¹⁷⁶ Tb	-23.220
¹³¹ Pm	-59.900	¹²⁹ Sm	-42.850	¹²⁶ Eu	-14.360 †	²⁰² Eu	215.630 †	¹⁹⁰ Gd	72.100	¹⁷⁷ Tb	-19.340
¹³² Pm	-61.760	¹³⁰ Sm	-48.230	¹²⁷ Eu	-20.950 †	²⁰³ Eu	225.380 †	¹⁹¹ Gd	82.410 †	¹⁷⁸ Tb	-14.150
¹³³ Pm	-65.320	¹³¹ Sm	-50.570	¹²⁸ Eu	-25.160 †	²⁰⁴ Eu	236.280 †	¹⁹² Gd	91.280 †	¹⁷⁹ Tb	-10.050
¹³⁴ Pm	-66.780	¹³² Sm	-55.360	¹²⁹ Eu	-31.050 †	²⁰⁵ Eu	246.230 †	¹⁹³ Gd	101.540 †	¹⁸⁰ Tb	-4.320
¹³⁵ Pm	-70.170	¹³³ Sm	-57.020	¹³⁰ Eu	-34.560 †	²⁰⁶ Eu	257.140 †	¹⁹⁴ Gd	110.420 †	¹⁸¹ Tb	-0.010
¹³⁶ Pm	-71.240	¹³⁴ Sm	-61.410	¹³¹ Eu	-40.010 †	²⁰⁷ Eu	266.940 †	¹⁹⁵ Gd	121.030 †	¹⁸² Tb	6.160
¹³⁷ Pm	-74.090	¹³⁵ Sm	-62.860	¹³² Eu	-42.900 †	²⁰⁸ Eu	277.920 †	¹⁹⁶ Gd	129.790 †	¹⁸³ Tb	10.990
¹³⁸ Pm	-75.030	¹³⁶ Sm	-66.720	¹³³ Eu	-47.490 †	²⁰⁹ Eu	288.060 †	¹⁹⁷ Gd	140.440 †	¹⁸⁴ Tb	17.510
¹³⁹ Pm	-77.550	¹³⁷ Sm	-67.810	¹³⁴ Eu	-49.990	²¹¹ Eu	309.490 †	¹⁹⁸ Gd	149.290 †	¹⁸⁵ Tb	22.850
¹⁴⁰ Pm	-78.300	¹³⁸ Sm	-71.170	¹³⁵ Eu	-54.360	²¹² Eu	320.530 †	¹⁹⁹ Gd	159.790 †	¹⁸⁶ Tb	29.710
¹⁴¹ Pm	-80.520	¹³⁹ Sm	-72.260	¹³⁶ Eu	-56.280	²¹³ Eu	330.870 †	²⁰⁰ Gd	168.840 †	¹⁸⁷ Tb	35.320
¹⁴² Pm	-81.070	¹⁴⁰ Sm	-75.420	¹³⁷ Eu	-60.160	²¹⁵ Eu	352.210 †	²⁰¹ Gd	179.560 †	¹⁸⁸ Tb	42.430
¹⁴³ Pm	-82.930	¹⁴¹ Sm	-76.020	¹³⁸ Eu	-61.750	²¹⁷ Eu	373.990 †	²⁰² Gd	188.640 †	¹⁸⁹ Tb	48.560
¹⁴⁴ Pm	-81.480	¹⁴² Sm	-78.990	¹³⁹ Eu	-65.260			²⁰³ Gd	199.440 †	¹⁹⁰ Tb	55.730
¹⁴⁵ Pm	-81.280	¹⁴³ Sm	-79.570	¹⁴⁰ Eu	-66.990	¹²⁸ Gd	-13.670 †	²⁰⁴ Gd	208.580 †	¹⁹¹ Tb	62.540
¹⁴⁶ Pm	-79.490	¹⁴⁴ Sm	-82.010	¹⁴¹ Eu	-70.000	¹²⁹ Gd	-17.860 †	²⁰⁵ Gd	219.390 †	¹⁹² Tb	72.300 †
¹⁴⁷ Pm	-79.010	¹⁴⁵ Sm	-80.590	¹⁴² Eu	-71.360	¹³⁰ Gd	-24.310 †	²⁰⁶ Gd	228.660 †	¹⁹³ Tb	80.960 †
¹⁴⁸ Pm	-76.940	¹⁴⁶ Sm	-80.960	¹⁴³ Eu	-74.360	¹³¹ Gd	-27.900 †	²⁰⁷ Gd	239.320 †	¹⁹⁴ Tb	90.700 †
¹⁴⁹ Pm	-76.260	¹⁴⁷ Sm	-79.230	¹⁴⁴ Eu	-75.520	¹³² Gd	-33.890	²⁰⁸ Gd	248.700 †	¹⁹⁵ Tb	99.520 †
¹⁵⁰ Pm	-73.890	¹⁴⁸ Sm	-79.310	¹⁴⁵ Eu	-77.990	¹³³ Gd	-36.580	²⁰⁹ Gd	259.530 †	¹⁹⁶ Tb	109.490 †
¹⁵¹ Pm	-73.360	¹⁴⁹ Sm	-77.090	¹⁴⁶ Eu	-77.140	¹³⁴ Gd	-42.000	²¹⁰ Gd	269.220 †	¹⁹⁷ Tb	118.140 †
¹⁵² Pm	-71.180	¹⁵⁰ Sm	-76.790	¹⁴⁷ Eu	-77.570	¹³⁵ Gd	-44.480	²¹² Gd	290.030 †	¹⁹⁸ Tb	128.170 †
¹⁵³ Pm	-70.470	¹⁵¹ Sm	-74.680	¹⁴⁸ Eu	-76.350	¹³⁶ Gd	-49.330			¹⁹⁹ Tb	136.890 †

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
²⁰⁰ Tb	146.860 †	¹⁸⁷ Dy	20.860	¹⁷⁷ Ho	-36.670	¹⁶⁶ Er	-65.080	¹⁵⁸ Tm	-58.840	¹⁴⁹ Yb	-33.120
²⁰¹ Tb	155.940 †	¹⁸⁸ Dy	26.130	¹⁷⁸ Ho	-32.470	¹⁶⁷ Er	-63.260	¹⁵⁹ Tm	-60.750	¹⁵⁰ Yb	-38.500
²⁰² Tb	166.020 †	¹⁸⁹ Dy	33.100	¹⁷⁹ Ho	-29.160	¹⁶⁸ Er	-62.970	¹⁶⁰ Tm	-60.470	¹⁵¹ Yb	-41.400
²⁰³ Tb	175.050 †	¹⁹⁰ Dy	38.450	¹⁸⁰ Ho	-24.600	¹⁶⁹ Er	-60.970	¹⁶¹ Tm	-62.010	¹⁵² Yb	-46.330
²⁰⁴ Tb	185.250 †	¹⁹¹ Dy	45.500	¹⁸¹ Ho	-21.190	¹⁷⁰ Er	-60.160	¹⁶² Tm	-61.680	¹⁵³ Yb	-47.290
²⁰⁵ Tb	194.300 †	¹⁹² Dy	51.760	¹⁸² Ho	-15.940	¹⁷¹ Er	-57.760	¹⁶³ Tm	-62.720	¹⁵⁴ Yb	-50.100
²⁰⁶ Tb	204.430 †	¹⁹³ Dy	61.310 †	¹⁸³ Ho	-12.200	¹⁷² Er	-56.520	¹⁶⁴ Tm	-61.990	¹⁵⁵ Yb	-50.830
²⁰⁷ Tb	213.450 †	¹⁹⁴ Dy	69.460 †	¹⁸⁴ Ho	-6.630	¹⁷³ Er	-53.640	¹⁶⁵ Tm	-62.820	¹⁵⁶ Yb	-53.310
²⁰⁸ Tb	223.690 †	¹⁹⁵ Dy	79.140 †	¹⁸⁵ Ho	-2.430	¹⁷⁴ Er	-51.860	¹⁶⁶ Tm	-61.900	¹⁵⁷ Yb	-53.640
²⁰⁹ Tb	232.910 †	¹⁹⁶ Dy	87.320 †	¹⁸⁶ Ho	3.390	¹⁷⁵ Er	-48.730	¹⁶⁷ Tm	-62.360	¹⁵⁸ Yb	-55.900
²¹⁰ Tb	243.290 †	¹⁹⁷ Dy	97.180 †	¹⁸⁷ Ho	8.070	¹⁷⁶ Er	-46.770	¹⁶⁸ Tm	-61.260	¹⁵⁹ Yb	-55.650
²¹¹ Tb	253.080 †	¹⁹⁸ Dy	105.200 ‡	¹⁸⁸ Ho	14.360	¹⁷⁷ Er	-43.130	¹⁶⁹ Tm	-61.260	¹⁶⁰ Yb	-58.060
²¹² Tb	263.550 †	¹⁹⁹ Dy	115.110 †	¹⁸⁹ Ho	19.490	¹⁷⁸ Er	-40.710	¹⁷⁰ Tm	-59.810	¹⁶¹ Yb	-57.820
²¹³ Tb	273.150 †	²⁰⁰ Dy	123.300 †	¹⁹⁰ Ho	25.690	¹⁷⁹ Er	-36.560	¹⁷¹ Tm	-59.200	¹⁶² Yb	-59.860
²¹⁴ Tb	283.560 †	²⁰¹ Dy	133.300 †	¹⁹¹ Ho	30.920	¹⁸⁰ Er	-33.820	¹⁷² Tm	-57.360	¹⁶³ Yb	-59.370
²¹⁵ Tb	293.270 †	²⁰² Dy	141.740 †	¹⁹² Ho	37.420	¹⁸¹ Er	-29.370	¹⁷³ Tm	-56.270	¹⁶⁴ Yb	-60.980
²¹⁶ Tb	303.800 †	²⁰³ Dy	151.770 †	¹⁹³ Ho	43.470	¹⁸² Er	-26.330	¹⁷⁴ Tm	-53.850	¹⁶⁵ Yb	-60.140
²¹⁷ Tb	313.440 †	²⁰⁴ Dy	160.200 †	¹⁹⁴ Ho	52.500 †	¹⁸³ Er	-21.290	¹⁷⁵ Tm	-52.270	¹⁶⁶ Yb	-61.540
²¹⁸ Tb	324.160 †	²⁰⁵ Dy	170.300 †	¹⁹⁵ Ho	60.590 †	¹⁸⁴ Er	-17.940	¹⁷⁶ Tm	-49.550	¹⁶⁷ Yb	-60.570
²¹⁹ Tb	334.050 †	²⁰⁶ Dy	178.680 †	¹⁹⁶ Ho	69.630 †	¹⁸⁵ Er	-12.610	¹⁷⁷ Tm	-47.770	¹⁶⁸ Yb	-61.610
¹³² Dy	-6.590 †	²⁰⁷ Dy	188.560 †	¹⁹⁷ Ho	77.700 ‡	¹⁸⁶ Er	-8.860	¹⁷⁸ Tm	-44.640	¹⁶⁹ Yb	-60.380
¹³³ Dy	-10.530 †	²⁰⁸ Dy	197.160 †	¹⁹⁸ Ho	86.930 †	¹⁸⁷ Er	-3.260	¹⁷⁹ Tm	-42.270	¹⁷⁰ Yb	-60.870
¹³⁴ Dy	-17.150 ‡	²⁰⁹ Dy	207.240 †	¹⁹⁹ Ho	94.840 ‡	¹⁸⁸ Er	1.070	¹⁸⁰ Tm	-38.700	¹⁷¹ Yb	-59.330
¹³⁵ Dy	-20.660 ‡	²¹⁰ Dy	216.020 †	²⁰⁰ Ho	104.210 †	¹⁸⁹ Er	7.230	¹⁸¹ Tm	-36.080	¹⁷² Yb	-59.250
¹³⁶ Dy	-26.540 ‡	²¹¹ Dy	226.490 †	²⁰¹ Ho	112.430 †	¹⁹⁰ Er	11.580	¹⁸² Tm	-31.990	¹⁷³ Yb	-57.550
¹³⁷ Dy	-29.510 ‡	²¹² Dy	235.560 †	²⁰² Ho	121.790 †	¹⁹¹ Er	17.660	¹⁸³ Tm	-29.160	¹⁷⁴ Yb	-56.930
¹³⁸ Dy	-34.880	²¹³ Dy	246.000 †	²⁰³ Ho	130.180 †	¹⁹² Er	22.340	¹⁸⁴ Tm	-24.500	¹⁷⁵ Yb	-54.710
¹³⁹ Dy	-37.470	²¹⁴ Dy	255.000 †	²⁰⁴ Ho	139.610 †	¹⁹³ Er	28.640	¹⁸⁵ Tm	-21.400	¹⁷⁶ Yb	-53.540
¹⁴⁰ Dy	-42.640	²¹⁵ Dy	265.380 †	²⁰⁵ Ho	147.940 †	¹⁹⁴ Er	34.170	¹⁸⁶ Tm	-16.520	¹⁷⁷ Yb	-50.990
¹⁴¹ Dy	-44.870	²¹⁶ Dy	274.560 †	²⁰⁶ Ho	157.370 †	¹⁹⁵ Er	43.140 †	¹⁸⁷ Tm	-12.990	¹⁷⁸ Yb	-49.720
¹⁴² Dy	-49.630	²¹⁷ Dy	285.020 †	²⁰⁷ Ho	165.500 †	¹⁹⁶ Er	50.590 ‡	¹⁸⁸ Tm	-7.730	¹⁷⁹ Yb	-46.650
¹⁴³ Dy	-52.000	²¹⁸ Dy	294.090 †	²⁰⁸ Ho	174.960 †	¹⁹⁷ Er	59.510 †	¹⁸⁹ Tm	-3.540	¹⁸⁰ Yb	-44.850
¹⁴⁴ Dy	-56.370	²¹⁹ Dy	304.850 †	²⁰⁹ Ho	183.400 †	¹⁹⁸ Er	66.960 ‡	¹⁹⁰ Tm	1.840	¹⁸¹ Yb	-41.390
¹⁴⁵ Dy	-58.370	²²⁰ Dy	313.970 †	²¹⁰ Ho	193.040 †	¹⁹⁹ Er	76.070 †	¹⁹¹ Tm	6.070	¹⁸² Yb	-39.140
¹⁴⁶ Dy	-62.550	¹³⁶ Ho	-10.810 †	²¹¹ Ho	201.910 †	²⁰⁰ Er	83.450 ‡	¹⁹² Tm	11.600	¹⁸³ Yb	-35.260
¹⁴⁷ Dy	-64.360	¹³⁷ Ho	-16.710 †	²¹² Ho	211.670 †	²⁰¹ Er	92.840 †	¹⁹³ Tm	16.080	¹⁸⁴ Yb	-32.810
¹⁴⁸ Dy	-67.980	¹³⁸ Ho	-20.180 †	²¹³ Ho	220.710 †	²⁰² Er	100.420 ‡	¹⁹⁴ Tm	21.860	¹⁸⁵ Yb	-28.400
¹⁴⁹ Dy	-67.720	¹³⁹ Ho	-25.700 †	²¹⁴ Ho	230.550 †	²⁰³ Er	109.740 †	¹⁹⁵ Tm	27.320	¹⁸⁶ Yb	-25.750
¹⁵⁰ Dy	-69.300	¹⁴⁰ Ho	-28.930 †	²¹⁵ Ho	239.520 †	²⁰⁴ Er	117.530 ‡	¹⁹⁶ Tm	35.660 †	¹⁸⁷ Yb	-21.090
¹⁵¹ Dy	-68.660	¹⁴¹ Ho	-33.950 †	²¹⁶ Ho	249.360 †	²⁰⁵ Er	126.870 †	¹⁹⁷ Tm	43.000	¹⁸⁸ Yb	-17.900
¹⁵² Dy	-70.050	¹⁴² Ho	-36.950 †	²¹⁷ Ho	258.470 †	²⁰⁶ Er	134.520 ‡	¹⁹⁸ Tm	51.300 †	¹⁸⁹ Yb	-12.970
¹⁵³ Dy	-69.050	¹⁴³ Ho	-41.740 †	²¹⁸ Ho	268.360 †	²⁰⁷ Er	143.700 †	¹⁹⁹ Tm	58.630	¹⁹⁰ Yb	-9.390
¹⁵⁴ Dy	-70.270	¹⁴⁴ Ho	-44.680 †	²¹⁹ Ho	277.470 †	²⁰⁸ Er	151.400 ‡	²⁰⁰ Tm	67.200 †	¹⁹¹ Yb	-4.110
¹⁵⁵ Dy	-69.110	¹⁴⁵ Ho	-49.090	²²⁰ Ho	287.460 †	²⁰⁹ Er	160.710 †	²⁰¹ Tm	74.600	¹⁹² Yb	-0.430
¹⁵⁶ Dy	-70.560	¹⁴⁶ Ho	-51.650	²²¹ Ho	296.670 †	²¹⁰ Er	168.700 ‡	²⁰² Tm	83.360 †	¹⁹³ Yb	4.900
¹⁵⁷ Dy	-69.500	¹⁴⁷ Ho	-55.890	¹³⁶ Er	1.430 †	²¹¹ Er	178.440 †	²⁰³ Tm	90.890 ‡	¹⁹⁴ Yb	8.850
¹⁵⁸ Dy	-70.550	¹⁴⁸ Ho	-58.220	¹³⁷ Er	-2.570 †	²¹² Er	186.590 †	²⁰⁴ Tm	99.610 †	¹⁹⁵ Yb	14.570
¹⁵⁹ Dy	-69.180	¹⁴⁹ Ho	-61.850	¹³⁸ Er	-8.970 †	²¹³ Er	196.320 †	²⁰⁵ Tm	107.300 ‡	¹⁹⁶ Yb	19.400
¹⁶⁰ Dy	-69.830	¹⁵⁰ Ho	-62.210	¹³⁹ Er	-12.590 †	²¹⁴ Er	204.760 †	²⁰⁶ Tm	115.960 †	¹⁹⁷ Yb	27.620 †
¹⁶¹ Dy	-68.060	¹⁵¹ Ho	-63.720	¹⁴⁰ Er	-18.750 ‡	²¹⁵ Er	214.570 †	²⁰⁷ Tm	123.370	¹⁹⁸ Yb	34.340
¹⁶² Dy	-68.180	¹⁵² Ho	-63.820	¹⁴¹ Er	-21.830 ‡	²¹⁶ Er	223.010 †	²⁰⁸ Tm	132.130 †	¹⁹⁹ Yb	42.520 †
¹⁶³ Dy	-66.440	¹⁵³ Ho	-65.140	¹⁴² Er	-27.620 ‡	²¹⁷ Er	232.780 †	²⁰⁹ Tm	139.670 ‡	²⁰⁰ Yb	49.310
¹⁶⁴ Dy	-65.960	¹⁵⁴ Ho	-64.770	¹⁴³ Er	-30.640	²¹⁸ Er	241.320 †	²¹⁰ Tm	148.530 †	²⁰¹ Yb	57.910 †
¹⁶⁵ Dy	-63.630	¹⁵⁵ Ho	-66.060	¹⁴⁴ Er	-36.000	²¹⁹ Er	251.250 †	²¹¹ Tm	156.620 †	²⁰² Yb	64.680
¹⁶⁶ Dy	-62.630	¹⁵⁶ Ho	-65.360	¹⁴⁵ Er	-38.980	²²⁰ Er	259.590 †	²¹² Tm	165.640 †	²⁰³ Yb	73.390 †
¹⁶⁷ Dy	-59.980	¹⁵⁷ Ho	-66.980	¹⁴⁶ Er	-43.950	²²¹ Er	269.660 †	²¹³ Tm	173.770 †	²⁰⁴ Yb	80.320
¹⁶⁸ Dy	-58.480	¹⁵⁸ Ho	-66.260	¹⁴⁷ Er	-46.580	²²² Er	278.440 †	²¹⁴ Tm	182.900 †	²⁰⁵ Yb	88.940 †
¹⁶⁹ Dy	-55.320	¹⁵⁹ Ho	-67.260	¹⁴⁸ Er	-51.330	¹⁴⁰ Tm	-2.770 †	²¹⁵ Tm	191.310 †	²⁰⁶ Yb	95.960
¹⁷⁰ Dy	-53.320	¹⁶⁰ Ho	-66.390	¹⁴⁹ Er	-53.670	¹⁴¹ Tm	-8.780 †	²¹⁶ Tm	200.590 †	²⁰⁷ Yb	104.370 †
¹⁷¹ Dy	-49.740	¹⁶¹ Ho	-67.080	¹⁵⁰ Er	-57.920	¹⁴² Tm	-12.620 †	²¹⁷ Tm	208.950 †	²⁰⁸ Yb	111.350
¹⁷² Dy	-47.350	¹⁶² Ho	-65.940	¹⁵¹ Er	-58.220	¹⁴³ Tm	-18.430 †	²¹⁸ Tm	218.150 †	²⁰⁹ Yb	119.950 †
¹⁷³ Dy	-43.540	¹⁶³ Ho	-66.320	¹⁵² Er	-60.470	¹⁴⁴ Tm	-22.030 †	²¹⁹ Tm	226.730 †	²¹⁰ Yb	127.060
¹⁷⁴ Dy	-40.980	¹⁶⁴ Ho	-65.060	¹⁵³ Er	-60.500	¹⁴⁵ Tm	-27.420 †	²²⁰ Tm	235.890 †	²¹¹ Yb	136.010 †
¹⁷⁵ Dy	-36.760	¹⁶⁵ Ho	-64.920	¹⁵⁴ Er	-62.440	¹⁴⁶ Tm	-30.970 †	²²¹ Tm	244.310 †	²¹² Yb	143.380 ‡
¹⁷⁶ Dy	-33.650	¹⁶⁶ Ho	-63.090	¹⁵⁵ Er	-62.150	¹⁴⁷ Tm	-36.000 †	²²² Tm	253.950 †	²¹³ Yb	152.370 †
¹⁷⁷ Dy	-28.930	¹⁶⁷ Ho	-62.300	¹⁵⁶ Er	-63.900	¹⁴⁸ Tm	-39.140 †	²²³ Tm	262.510 †	²¹⁴ Yb	159.900 ‡
¹⁷⁸ Dy	-25.570	¹⁶⁸ Ho	-60.150	¹⁵⁷ Er	-63.370	¹⁴⁹ Tm	-43.910 †	¹⁴⁰ Yb	9.930 †	²¹⁵ Yb	169.000 †
¹⁷⁹ Dy	-20.430	¹⁶⁹ Ho	-58.790	¹⁵⁸ Er	-65.330	¹⁵⁰ Tm	-46.870	¹⁴¹ Yb	5.810 †	²¹⁶ Yb	176.880 ‡
¹⁸⁰ Dy	-16.910	¹⁷⁰ Ho	-56.190	¹⁵⁹ Er	-64.550	¹⁵¹ Tm	-51.060	¹⁴² Yb	-0.960 †	²¹⁷ Yb	186.080 †
¹⁸¹ Dy	-11.290	¹⁷¹ Ho	-54.400	¹⁶⁰ Er	-66.060	¹⁵² Tm	-52.100	¹⁴³ Yb	-4.830 †	²¹⁸ Yb	193.880 †
¹⁸² Dy	-7.350	¹⁷² Ho	-51.370	¹⁶¹ Er	-65.220	¹⁵³ Tm	-54.280	¹⁴⁴ Yb	-11.210 ‡	²¹⁹ Yb	203.120 †
¹⁸³ Dy	-1.390	¹⁷³ Ho	-49.120	¹⁶² Er	-66.410	¹⁵⁴ Tm	-54.930	¹⁴⁵ Yb	-14.840 ‡	²²⁰ Yb	210.930 ‡
¹⁸⁴ Dy	3.060	¹⁷⁴ Ho	-45.790	¹⁶³ Er	-65.120	¹⁵⁵ Tm	-56.950	¹⁴⁶ Yb	-20.800 ‡	²²¹ Yb	220.170 †
¹⁸⁵ Dy	9.330	¹⁷⁵ Ho	-43.420	¹⁶⁴ Er	-66.060	¹⁵⁶ Tm	-57.110	¹⁴⁷ Yb	-24.410	²²² Yb	228.160 ‡
¹⁸⁶ Dy	14.220	¹⁷⁶ Ho	-39.620	¹⁶⁵ Er	-64.570	¹⁵⁷ Tm	-59.030	¹⁴⁸ Yb	-29.960	²²³ Yb	237.590 †

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
²²⁴ Yb	245.730 †	²¹⁸ Lu	173.610 †	²¹¹ Hf	99.320 †	²⁰⁷ Ta	55.280	²⁰² W	8.880	²⁰⁰ Re	-10.490		
¹⁴⁴ Lu	5.080 †	²¹⁹ Lu	181.440 ‡	²¹² Hf	105.800	²⁰⁸ Ta	62.550	²⁰³ W	15.860	²⁰¹ Re	-7.020		
¹⁴⁵ Lu	-1.340 †	²²⁰ Lu	189.920 †	²¹³ Hf	114.010 †	²⁰⁹ Ta	68.740	²⁰⁴ W	21.400	²⁰² Re	-0.690		
¹⁴⁶ Lu	-5.540 †	²²¹ Lu	197.810 ‡	²¹⁴ Hf	120.750	²¹⁰ Ta	76.130	²⁰⁵ W	28.620	²⁰³ Re	4.710		
¹⁴⁷ Lu	-11.560 †	²²² Lu	206.620 †	²¹⁵ Hf	129.110 †	²¹¹ Ta	82.610	²⁰⁶ W	33.970	²⁰⁴ Re	11.100		
¹⁴⁸ Lu	-15.680 †	²²³ Lu	214.400 ‡	²¹⁶ Hf	136.070	²¹² Ta	90.140	²⁰⁷ W	41.060	²⁰⁵ Re	16.540		
¹⁴⁹ Lu	-21.240 †	²²⁴ Lu	223.410 †	²¹⁷ Hf	144.570 †	²¹³ Ta	96.590	²⁰⁸ W	46.550	²⁰⁶ Re	23.090		
¹⁵⁰ Lu	-25.020 †	²²⁵ Lu	231.530 †	²¹⁸ Hf	151.810	²¹⁴ Ta	104.200	²⁰⁹ W	53.660	²⁰⁷ Re	28.180		
¹⁵¹ Lu	-30.340 †	¹⁴⁴ Hf	18.200 †	²¹⁹ Hf	160.480 †	²¹⁵ Ta	110.910	²¹⁰ W	59.410	²⁰⁸ Re	34.850		
¹⁵² Lu	-33.980 †	¹⁴⁵ Hf	13.720 †	²²⁰ Hf	167.540	²¹⁶ Ta	118.740	²¹¹ W	66.890	²⁰⁹ Re	40.180		
¹⁵³ Lu	-38.840 †	¹⁴⁶ Hf	6.730 †	²²¹ Hf	176.100 †	²¹⁷ Ta	125.630	²¹² W	72.650	²¹⁰ Re	46.850		
¹⁵⁴ Lu	-40.430	¹⁴⁷ Hf	2.470 †	²²² Hf	183.560	²¹⁸ Ta	133.560	²¹³ W	80.160	²¹¹ Re	52.690		
¹⁵⁵ Lu	-43.310	¹⁴⁸ Hf	-4.060 †	²²³ Hf	192.160 †	²¹⁹ Ta	140.830	²¹⁴ W	86.010	²¹² Re	59.460		
¹⁵⁶ Lu	-44.500	¹⁴⁹ Hf	-8.200 †	²²⁴ Hf	199.520	²²⁰ Ta	148.740	²¹⁵ W	93.580	²¹³ Re	65.190		
¹⁵⁷ Lu	-47.150	¹⁵⁰ Hf	-14.380 ‡	²²⁵ Hf	208.510 †	²²¹ Ta	155.880	²¹⁶ W	99.770	²¹⁴ Re	72.100		
¹⁵⁸ Lu	-47.810	¹⁵¹ Hf	-18.090 ‡	²²⁶ Hf	216.090 ‡	²²² Ta	164.010 †	²¹⁷ W	107.520	²¹⁵ Re	77.910		
¹⁵⁹ Lu	-50.020	¹⁵² Hf	-24.160	¹⁴⁸ Ta	12.510 †	²²³ Ta	171.260	²¹⁸ W	113.840	²¹⁶ Re	84.960		
¹⁶⁰ Lu	-50.280	¹⁵³ Hf	-27.730	¹⁴⁹ Ta	5.960 †	¹⁴⁹ Ta	179.440 †	²¹⁹ W	121.800	²¹⁷ Re	91.070		
¹⁶¹ Lu	-52.720	¹⁵⁴ Hf	-33.210	¹⁵⁰ Ta	1.200 †	²²⁵ Ta	186.780	²²⁰ W	128.320	²¹⁸ Re	98.260		
¹⁶² Lu	-52.980	¹⁵⁵ Hf	-34.870	¹⁵¹ Ta	-4.920 †	²²⁶ Ta	195.230 †	²²¹ W	136.300	²¹⁹ Re	104.610		
¹⁶³ Lu	-54.870	¹⁵⁶ Hf	-38.220	¹⁵² Ta	-9.370 †	²²⁷ Ta	202.800	²²² W	143.020	²²⁰ Re	111.810		
¹⁶⁴ Lu	-54.950	¹⁵⁷ Hf	-39.570	¹⁵³ Ta	-15.360 †	¹⁴⁸ W	26.120 †	²²³ W	150.930	²²¹ Re	118.400		
¹⁶⁵ Lu	-56.440	¹⁵⁸ Hf	-42.550	¹⁵⁴ Ta	-19.560 †	¹⁴⁹ W	21.330 †	²²⁴ W	157.760	²²² Re	125.960		
¹⁶⁶ Lu	-56.170	¹⁵⁹ Hf	-43.170	¹⁵⁵ Ta	-25.120 †	¹⁵⁰ W	14.160 †	²²⁵ W	165.920 †	²²³ Re	132.460		
¹⁶⁷ Lu	-57.520	¹⁶⁰ Hf	-45.880	¹⁵⁶ Ta	-27.240 †	¹⁵¹ W	9.470 †	²²⁶ W	172.720	²²⁴ Re	139.960		
¹⁶⁸ Lu	-57.140	¹⁶¹ Hf	-46.170	¹⁵⁷ Ta	-30.750 †	¹⁵² W	2.610 †	²²⁷ W	181.160 †	²²⁵ Re	146.760		
¹⁶⁹ Lu	-58.050	¹⁶² Hf	-49.120	¹⁵⁸ Ta	-32.440	¹⁵³ W	-1.770 †	²²⁸ W	188.270	²²⁶ Re	154.390		
¹⁷⁰ Lu	-57.250	¹⁶³ Hf	-49.230	¹⁵⁹ Ta	-35.370	¹⁵⁴ W	-8.390 ‡	¹⁵² Re	19.540 †	²²⁷ Re	161.170		
¹⁷¹ Lu	-57.760	¹⁶⁴ Hf	-51.680	¹⁶⁰ Ta	-36.500	¹⁵⁵ W	-12.660 ‡	¹⁵³ Re	12.750 †	²²⁸ Re	169.160		
¹⁷² Lu	-56.790	¹⁶⁵ Hf	-51.640	¹⁶¹ Ta	-39.240	¹⁵⁶ W	-18.670	¹⁵⁴ Re	7.740 †	²²⁹ Re	176.260		
¹⁷³ Lu	-56.800	¹⁶⁶ Hf	-53.700	¹⁶² Ta	-40.030	¹⁵⁷ W	-20.960	¹⁵⁵ Re	1.050 †	¹⁵² Os	33.940 †		
¹⁷⁴ Lu	-55.480	¹⁶⁷ Hf	-53.390	¹⁶³ Ta	-42.820	¹⁵⁸ W	-24.810	¹⁵⁶ Re	-3.680 †	¹⁵³ Os	28.580 †		
¹⁷⁵ Lu	-55.190	¹⁶⁸ Hf	-55.320	¹⁶⁴ Ta	-43.500	¹⁵⁹ W	-26.450	¹⁵⁷ Re	-9.860 †	¹⁵⁴ Os	21.170 †		
¹⁷⁶ Lu	-53.380	¹⁶⁹ Hf	-54.800	¹⁶⁵ Ta	-45.840	¹⁶⁰ W	-29.890	¹⁵⁸ Re	-12.490 †	¹⁵⁵ Os	16.080 †		
¹⁷⁷ Lu	-52.380	¹⁷⁰ Hf	-56.150	¹⁶⁶ Ta	-46.370	¹⁶¹ W	-31.040	¹⁵⁹ Re	-16.290 †	¹⁵⁶ Os	8.940 †		
¹⁷⁸ Lu	-50.340	¹⁷¹ Hf	-55.370	¹⁶⁷ Ta	-48.380	¹⁶² W	-34.290	¹⁶⁰ Re	-18.430 †	¹⁵⁷ Os	4.040 †		
¹⁷⁹ Lu	-49.130	¹⁷² Hf	-56.450	¹⁶⁸ Ta	-48.650	¹⁶³ W	-34.930	¹⁶¹ Re	-21.900 †	¹⁵⁸ Os	-2.480 †		
¹⁸⁰ Lu	-46.630	¹⁷³ Hf	-55.490	¹⁶⁹ Ta	-50.450	¹⁶⁴ W	-38.290	¹⁶² Re	-23.560 †	¹⁵⁹ Os	-5.060 †		
¹⁸¹ Lu	-44.950	¹⁷⁴ Hf	-55.870	¹⁷⁰ Ta	-50.360	¹⁶⁵ W	-38.850	¹⁶³ Re	-26.650 †	¹⁶⁰ Os	-9.360 †		
¹⁸² Lu	-41.850	¹⁷⁵ Hf	-54.450	¹⁷¹ Ta	-51.740	¹⁶⁶ W	-41.760	¹⁶⁴ Re	-27.850	¹⁶¹ Os	-11.540 ‡		
¹⁸³ Lu	-39.810	¹⁷⁶ Hf	-54.670	¹⁷² Ta	-51.530	¹⁶⁷ W	-42.240	¹⁶⁵ Re	-31.100	¹⁶² Os	-15.510		
¹⁸⁴ Lu	-36.320	¹⁷⁷ Hf	-52.900	¹⁷³ Ta	-52.620	¹⁶⁸ W	-44.840	¹⁶⁶ Re	-32.230	¹⁶³ Os	-17.010		
¹⁸⁵ Lu	-34.110	¹⁷⁸ Hf	-52.430	¹⁷⁴ Ta	-52.020	¹⁶⁹ W	-44.970	¹⁶⁷ Re	-35.090	¹⁶⁴ Os	-20.670		
¹⁸⁶ Lu	-30.160	¹⁷⁹ Hf	-50.450	¹⁷⁵ Ta	-52.300	¹⁷⁰ W	-47.200	¹⁶⁸ Re	-36.160	¹⁶⁵ Os	-21.760		
¹⁸⁷ Lu	-27.720	¹⁸⁰ Hf	-49.800	¹⁷⁶ Ta	-51.540	¹⁷¹ W	-47.150	¹⁶⁹ Re	-38.620	¹⁶⁶ Os	-25.570		
¹⁸⁸ Lu	-23.410	¹⁸¹ Hf	-47.420	¹⁷⁷ Ta	-51.720	¹⁷² W	-49.090	¹⁷⁰ Re	-39.190	¹⁶⁷ Os	-26.660		
¹⁸⁹ Lu	-20.360	¹⁸² Hf	-46.110	¹⁷⁸ Ta	-50.330	¹⁷³ W	-48.890	¹⁷¹ Re	-41.450	¹⁶⁸ Os	-30.110		
¹⁹⁰ Lu	-16.020	¹⁸³ Hf	-43.220	¹⁷⁹ Ta	-50.290	¹⁷⁴ W	-50.340	¹⁷² Re	-41.960	¹⁶⁹ Os	-33.040		
¹⁹¹ Lu	-12.720	¹⁸⁴ Hf	-41.560	¹⁸⁰ Ta	-48.920	¹⁷⁵ W	-49.640	¹⁷³ Re	-43.900	¹⁷⁰ Os	-31.930		
¹⁹² Lu	-8.000	¹⁸⁵ Hf	-38.320	¹⁸¹ Ta	-48.440	¹⁷⁶ W	-50.580	¹⁷⁴ Re	-44.070	¹⁷¹ Os	-34.530		
¹⁹³ Lu	-4.530	¹⁸⁶ Hf	-36.570	¹⁸² Ta	-46.420	¹⁷⁷ W	-49.780	¹⁷⁵ Re	-45.420	¹⁷² Os	-37.360		
¹⁹⁴ Lu	0.270	¹⁸⁷ Hf	-32.820	¹⁸³ Ta	-45.320	¹⁷⁸ W	-50.350	¹⁷⁶ Re	-45.380	¹⁷³ Os	-37.870		
¹⁹⁵ Lu	4.170	¹⁸⁸ Hf	-30.730	¹⁸⁴ Ta	-42.810	¹⁷⁹ W	-49.270	¹⁷⁷ Re	-46.290	¹⁷⁴ Os	-40.190		
¹⁹⁶ Lu	9.250	¹⁸⁹ Hf	-26.560	¹⁸⁵ Ta	-41.400	¹⁸⁰ W	-49.530	¹⁷⁸ Re	-45.870	¹⁷⁵ Os	-40.250		
¹⁹⁷ Lu	13.970	¹⁹⁰ Hf	-24.290	¹⁸⁶ Ta	-38.610	¹⁸¹ W	-48.230	¹⁷⁹ Re	-46.750	¹⁷⁶ Os	-42.270		
¹⁹⁸ Lu	21.560	¹⁹¹ Hf	-20.060	¹⁸⁷ Ta	-37.070	¹⁸² W	-48.250	¹⁸⁰ Re	-45.980	¹⁷⁷ Os	-42.190		
¹⁹⁹ Lu	28.160	¹⁹² Hf	-17.310	¹⁸⁸ Ta	-33.680	¹⁸³ W	-46.410	¹⁸¹ Re	-46.300	¹⁷⁸ Os	-43.480		
²⁰⁰ Lu	35.800	¹⁹³ Hf	-12.810	¹⁸⁹ Ta	-31.730	¹⁸⁴ W	-45.690	¹⁸² Re	-45.470	¹⁷⁹ Os	-43.370		
²⁰¹ Lu	42.620	¹⁹⁴ Hf	-9.850	¹⁹⁰ Ta	-28.330	¹⁸⁵ W	-43.440	¹⁸³ Re	-45.660	¹⁸⁰ Os	-44.550		
²⁰² Lu	50.590	¹⁹⁵ Hf	-5.110	¹⁹¹ Ta	-26.170	¹⁸⁶ W	-42.470	¹⁸⁴ Re	-43.970	¹⁸¹ Os	-43.840		
²⁰³ Lu	57.300	¹⁹⁶ Hf	-1.850	¹⁹² Ta	-22.500	¹⁸⁷ W	-39.900	¹⁸⁵ Re	-43.770	¹⁸² Os	-44.640		
²⁰⁴ Lu	65.420 †	¹⁹⁷ Hf	3.120	¹⁹³ Ta	-19.960	¹⁸⁸ W	-38.710	¹⁸⁶ Re	-41.980	¹⁸³ Os	-43.970		
²⁰⁵ Lu	72.250	¹⁹⁸ Hf	7.210	¹⁹⁴ Ta	-15.970	¹⁸⁹ W	-35.450	¹⁸⁷ Re	-41.230	¹⁸⁴ Os	-44.200		
²⁰⁶ Lu	80.190	¹⁹⁹ Hf	14.690	¹⁹⁵ Ta	-13.070	¹⁹⁰ W	-34.280	¹⁸⁸ Re	-39.010	¹⁸⁵ Os	-42.870		
²⁰⁷ Lu	86.970	²⁰⁰ Hf	20.750	¹⁹⁶ Ta	-8.970	¹⁹¹ W	-31.000	¹⁸⁹ Re	-37.950	¹⁸⁶ Os	-42.850		
²⁰⁸ Lu	94.960	²⁰¹ Hf	28.420	¹⁹⁷ Ta	-5.820	¹⁹² W	-29.390	¹⁹⁰ Re	-35.480	¹⁸⁷ Os	-41.080		
²⁰⁹ Lu	101.780	²⁰² Hf	34.600	¹⁹⁸ Ta	-1.480	¹⁹³ W	-25.920	¹⁹¹ Re	-34.420	¹⁸⁸ Os	-41.260		
²¹⁰ Lu	109.940 †	²⁰³ Hf	42.520	¹⁹⁹ Ta	2.490	¹⁹⁴ W	-23.900	¹⁹² Re	-31.690	¹⁸⁹ Os	-39.030		
²¹¹ Lu	117.130	²⁰⁴ Hf	48.640	²⁰⁰ Ta	9.430	¹⁹⁵ W	-19.970	¹⁹³ Re	-30.290	¹⁹⁰ Os	-38.760		
²¹² Lu	125.370 †	²⁰⁵ Hf	56.650	²⁰¹ Ta	15.520	¹⁹⁶ W	-17.720	¹⁹⁴ Re	-27.340	¹⁹¹ Os	-36.390		
²¹³ Lu	132.720	²⁰⁶ Hf	62.810	²⁰² Ta	22.560	¹⁹⁷ W	-13.720	¹⁹⁵ Re	-25.380	¹⁹² Os	-35.880		
²¹⁴ Lu	141.110 †	²⁰⁷ Hf	70.500	²⁰³ Ta	28.690	¹⁹⁸ W	-11.200	¹⁹⁶ Re	-22.090	¹⁹³ Os	-33.360		
²¹⁵ Lu	148.600	²⁰⁸ Hf	76.850	²⁰⁴ Ta	36.010	¹⁹⁹ W	-6.980	¹⁹⁷ Re	-19.940	¹⁹⁴ Os	-32.480		
²¹⁶ Lu	157.170 †	²⁰⁹ Hf	84.690	²⁰⁵ Ta	42.030	²⁰⁰ W	-3.540	¹⁹⁸ Re	-16.580				

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁹⁷ Os	-25.090	¹⁹⁹ Ir	-24.320	¹⁹⁸ Pt	-29.900	²⁰⁴ Au	-20.640	²⁰⁵ Hg	-22.380	²¹⁵ Tl	10.820
¹⁹⁸ Os	-23.570	²⁰⁰ Ir	-21.600	¹⁹⁹ Pt	-27.460	²⁰⁵ Au	-18.560	²⁰⁶ Hg	-20.970	²¹⁶ Tl	15.680
¹⁹⁹ Os	-20.320	²⁰¹ Ir	-19.710	²⁰⁰ Pt	-26.600	²⁰⁶ Au	-13.650	²⁰⁷ Hg	-16.310	²¹⁷ Tl	19.540
²⁰⁰ Os	-18.460	²⁰² Ir	-16.630	²⁰¹ Pt	-23.850	²⁰⁷ Au	-9.870	²⁰⁸ Hg	-12.950	²¹⁸ Tl	24.470
²⁰¹ Os	-14.740	²⁰³ Ir	-13.850	²⁰² Pt	-22.600	²⁰⁸ Au	-4.920	²⁰⁹ Hg	-8.160	²¹⁹ Tl	28.430
²⁰² Os	-11.910	²⁰⁴ Ir	-8.170	²⁰³ Pt	-19.570	²⁰⁹ Au	-0.990	²¹⁰ Hg	-4.670	²²⁰ Tl	33.410
²⁰³ Os	-5.630	²⁰⁵ Ir	-3.460	²⁰⁴ Pt	-17.390	²¹⁰ Au	4.290	²¹¹ Hg	0.700	²²¹ Tl	37.410
²⁰⁴ Os	-0.830	²⁰⁶ Ir	2.150	²⁰⁵ Pt	-11.800	²¹¹ Au	8.450	²¹² Hg	4.140	²²² Tl	42.730
²⁰⁵ Os	5.460	²⁰⁷ Ir	6.670	²⁰⁶ Pt	-7.770	²¹² Au	13.890	²¹³ Hg	9.560	²²³ Tl	46.980
²⁰⁶ Os	10.230	²⁰⁸ Ir	12.540	²⁰⁷ Pt	-2.400	²¹³ Au	18.130	²¹⁴ Hg	13.200	²²⁴ Tl	52.460
²⁰⁷ Os	16.520	²⁰⁹ Ir	17.060	²⁰⁸ Pt	1.690	²¹⁴ Au	23.550	²¹⁵ Hg	18.590	²²⁵ Tl	57.050
²⁰⁸ Os	21.200	²¹⁰ Ir	23.130	²⁰⁹ Pt	7.410	²¹⁵ Au	28.020	²¹⁶ Hg	22.520	²²⁶ Tl	62.710
²⁰⁹ Os	27.710	²¹¹ Ir	28.110	²¹⁰ Pt	11.480	²¹⁶ Au	33.590	²¹⁷ Hg	28.020	²²⁷ Tl	67.660
²¹⁰ Os	32.600	²¹² Ir	34.150	²¹¹ Pt	17.640	²¹⁷ Au	38.090	²¹⁸ Hg	31.950	²²⁸ Tl	73.560
²¹¹ Os	39.360	²¹³ Ir	39.250	²¹² Pt	21.900	²¹⁸ Au	43.790	²¹⁹ Hg	37.690	²²⁹ Tl	78.600
²¹² Os	44.480	²¹⁴ Ir	45.390	²¹³ Pt	27.920	²¹⁹ Au	48.470	²²⁰ Hg	41.610	²³⁰ Tl	84.370
²¹³ Os	51.220	²¹⁵ Ir	50.490	²¹⁴ Pt	32.420	²²⁰ Au	54.150	²²¹ Hg	47.370	²³¹ Tl	89.490
²¹⁴ Os	56.350	²¹⁶ Ir	56.830	²¹⁵ Pt	38.520	²²¹ Au	59.050	²²² Hg	51.830	²³² Tl	95.470
²¹⁵ Os	63.230	²¹⁷ Ir	62.050	²¹⁶ Pt	43.090	²²² Au	65.150	²²³ Hg	57.720	²³³ Tl	100.600
²¹⁶ Os	68.520	²¹⁸ Ir	68.460	²¹⁷ Pt	49.360	²²³ Au	70.180	²²⁴ Hg	62.330	²³⁴ Tl	106.940
²¹⁷ Os	75.490	²¹⁹ Ir	74.030	²¹⁸ Pt	54.010	²²⁴ Au	76.400	²²⁵ Hg	68.530	²³⁵ Tl	112.450
²¹⁸ Os	81.030	²²⁰ Ir	80.490	²¹⁹ Pt	60.450	²²⁵ Au	81.900	²²⁶ Hg	73.500	¹⁶⁶ Pb	49.060 †
²¹⁹ Os	88.250	²²¹ Ir	86.160	²²⁰ Pt	65.270	²²⁶ Au	88.270	²²⁷ Hg	79.850	¹⁶⁷ Pb	45.560 †
²²⁰ Os	93.850	²²² Ir	93.010	²²¹ Pt	71.800	²²⁷ Au	93.780	²²⁸ Hg	84.910	¹⁶⁸ Pb	40.180 †
²²¹ Os	101.130	²²³ Ir	98.950	²²² Pt	77.050	²²⁸ Au	100.250	²²⁹ Hg	91.360	¹⁶⁹ Pb	37.260 †
²²² Os	107.280	²²⁴ Ir	105.880	²²³ Pt	83.680	²²⁹ Au	106.040	²³⁰ Hg	96.460	¹⁷⁰ Pb	32.300 †
²²³ Os	114.630	²²⁵ Ir	111.940	²²⁴ Pt	89.210	²³⁰ Au	112.490	²³¹ Hg	102.930	¹⁷¹ Pb	29.780 †
²²⁴ Os	120.710	²²⁶ Ir	118.880	²²⁵ Pt	96.110	²³¹ Au	118.140	²³² Hg	108.090	¹⁷² Pb	24.540 †
²²⁵ Os	128.180	²²⁷ Ir	125.130	²²⁶ Pt	101.640	²³² Au	124.950	²³³ Hg	114.870	¹⁷³ Pb	21.970 †
²²⁶ Os	134.450	²²⁸ Ir	132.290	²²⁷ Pt	108.560	²³³ Au	130.860	²³⁴ Hg	120.350	¹⁷⁴ Pb	17.260 †
²²⁷ Os	142.060	²²⁹ Ir	138.610	²²⁸ Pt	114.360	¹⁶⁰ Hg	49.230 †	¹⁷⁰ Tl	20.450 †	¹⁷⁵ Pb	15.020 †
²²⁸ Os	148.400	²³⁰ Ir	145.890	²²⁹ Pt	121.500	¹⁶¹ Hg	43.500 †	¹⁷¹ Tl	15.770 †	¹⁷⁶ Pb	10.600 †
²²⁹ Os	156.370	²³¹ Ir	152.330	²³⁰ Pt	127.130	¹⁶² Hg	36.000 †	¹⁷² Tl	13.210 †	¹⁷⁷ Pb	8.540 †
²³⁰ Os	162.780	¹⁵⁶ Pt	41.580 †	²³¹ Pt	134.440	¹⁶³ Hg	32.530 †	¹⁷³ Tl	8.870 †	¹⁷⁸ Pb	4.430 †
¹⁵⁸ Ir	14.140 †	¹⁵⁷ Pt	35.870 †	²³² Pt	140.380	¹⁶⁴ Hg	27.280 †	¹⁷⁴ Tl	6.530 †	¹⁷⁹ Pb	2.330 ‡
¹⁵⁹ Ir	7.670 †	¹⁵⁸ Pt	28.220 †	¹⁶⁴ Au	15.500 †	¹⁶⁵ Hg	24.310 †	¹⁷⁵ Tl	2.770 †	¹⁸⁰ Pb	-1.500 ‡
¹⁶⁰ Ir	4.580 †	¹⁵⁹ Pt	23.030 †	¹⁶⁵ Au	11.230 †	¹⁶⁶ Hg	19.470 †	¹⁷⁶ Tl	0.670 †	¹⁸¹ Pb	-3.250
¹⁶¹ Ir	0.250 †	¹⁶⁰ Pt	16.060 †	¹⁶⁶ Au	8.710 †	¹⁶⁷ Hg	16.990 †	¹⁷⁷ Tl	-3.050 †	¹⁸² Pb	-6.760
¹⁶² Ir	-2.430 †	¹⁶¹ Pt	12.940 †	¹⁶⁷ Au	4.640 †	¹⁶⁸ Hg	12.340 †	¹⁷⁸ Tl	-4.840 †	¹⁸³ Pb	-8.380
¹⁶³ Ir	-6.250 †	¹⁶² Pt	8.110 †	¹⁶⁸ Au	2.450 †	¹⁶⁹ Hg	10.280 †	¹⁷⁹ Tl	-8.370 †	¹⁸⁴ Pb	-11.020
¹⁶⁴ Ir	-8.320 †	¹⁶³ Pt	5.580 †	¹⁶⁹ Au	-1.770 †	¹⁷⁰ Hg	5.630 †	¹⁸⁰ Tl	-10.060 †	¹⁸⁵ Pb	-12.310
¹⁶⁵ Ir	-11.860 †	¹⁶⁴ Pt	1.200 †	¹⁷⁰ Au	-3.740 †	¹⁷¹ Hg	3.630 †	¹⁸¹ Tl	-13.090 †	¹⁸⁶ Pb	-14.760
¹⁶⁶ Ir	-13.520 †	¹⁶⁵ Pt	-0.760 †	¹⁷¹ Au	-7.510 †	¹⁷² Hg	-0.700 ‡	¹⁸² Tl	-14.550	¹⁸⁷ Pb	-15.400
¹⁶⁷ Ir	-17.290 †	¹⁶⁶ Pt	-4.870 ‡	¹⁷² Au	-9.470 †	¹⁷³ Hg	-2.670 ‡	¹⁸³ Tl	-17.150	¹⁸⁸ Pb	-17.760
¹⁶⁸ Ir	-18.960 †	¹⁶⁷ Pt	-6.480 ‡	¹⁷³ Au	-12.970 †	¹⁷⁴ Hg	-6.540	¹⁸⁴ Tl	-18.090	¹⁸⁹ Pb	-18.390
¹⁶⁹ Ir	-22.260 †	¹⁶⁸ Pt	-10.830 ‡	¹⁷⁴ Au	-14.500 †	¹⁷⁵ Hg	-7.970	¹⁸⁵ Tl	-20.360	¹⁹⁰ Pb	-20.390
¹⁷⁰ Ir	-23.630 †	¹⁶⁹ Pt	-12.360	¹⁷⁵ Au	-17.600 †	¹⁷⁶ Hg	-11.730	¹⁸⁶ Tl	-20.860	¹⁹¹ Pb	-20.740
¹⁷¹ Ir	-26.560 †	¹⁷⁰ Pt	-16.110	¹⁷⁶ Au	-19.050	¹⁷⁷ Hg	-13.140	¹⁸⁷ Tl	-22.530	¹⁹² Pb	-22.660
¹⁷² Ir	-27.720	¹⁷¹ Pt	-17.510	¹⁷⁷ Au	-21.880	¹⁷⁸ Hg	-16.360	¹⁸⁸ Tl	-23.260	¹⁹³ Pb	-22.670
¹⁷³ Ir	-30.550	¹⁷² Pt	-21.000	¹⁷⁸ Au	-22.960	¹⁷⁹ Hg	-17.740	¹⁸⁹ Tl	-24.750	¹⁹⁴ Pb	-24.660
¹⁷⁴ Ir	-31.430	¹⁷³ Pt	-22.170	¹⁷⁹ Au	-25.630	¹⁸⁰ Hg	-20.720	¹⁹⁰ Tl	-24.830	¹⁹⁵ Pb	-24.160
¹⁷⁵ Ir	-33.650	¹⁷⁴ Pt	-25.370	¹⁸⁰ Au	-26.550	¹⁸¹ Hg	-21.700	¹⁹¹ Tl	-26.320	¹⁹⁶ Pb	-25.780
¹⁷⁶ Ir	-34.370	¹⁷⁵ Pt	-26.150	¹⁸¹ Au	-28.510	¹⁸² Hg	-24.140	¹⁹² Tl	-26.370	¹⁹⁷ Pb	-25.090
¹⁷⁷ Ir	-36.350	¹⁷⁶ Pt	-29.020	¹⁸² Au	-29.250	¹⁸³ Hg	-25.030	¹⁹³ Tl	-27.620	¹⁹⁸ Pb	-26.330
¹⁷⁸ Ir	-36.660	¹⁷⁷ Pt	-29.710	¹⁸³ Au	-31.120	¹⁸⁴ Hg	-26.960	¹⁹⁴ Tl	-27.280	¹⁹⁹ Pb	-25.430
¹⁷⁹ Ir	-38.260	¹⁷⁸ Pt	-32.070	¹⁸⁴ Au	-31.090	¹⁸⁵ Hg	-27.270	¹⁹⁵ Tl	-28.320	²⁰⁰ Pb	-26.470
¹⁸⁰ Ir	-38.460	¹⁷⁹ Pt	-32.690	¹⁸⁵ Au	-32.450	¹⁸⁶ Hg	-28.800	¹⁹⁶ Tl	-27.710	²⁰¹ Pb	-25.360
¹⁸¹ Ir	-39.690	¹⁸⁰ Pt	-34.590	¹⁸⁶ Au	-32.350	¹⁸⁷ Hg	-28.840	¹⁹⁷ Tl	-28.470	²⁰² Pb	-26.010
¹⁸² Ir	-39.460	¹⁸¹ Pt	-34.850	¹⁸⁷ Au	-33.250	¹⁸⁸ Hg	-30.440	¹⁹⁸ Tl	-27.500	²⁰³ Pb	-24.810
¹⁸³ Ir	-40.420	¹⁸² Pt	-36.570	¹⁸⁸ Au	-32.920	¹⁸⁹ Hg	-30.000	¹⁹⁹ Tl	-28.120	²⁰⁴ Pb	-25.100
¹⁸⁴ Ir	-39.790	¹⁸³ Pt	-36.490	¹⁸⁹ Au	-33.620	¹⁹⁰ Hg	-31.220	²⁰⁰ Tl	-27.020	²⁰⁵ Pb	-23.790
¹⁸⁵ Ir	-40.380	¹⁸⁴ Pt	-37.500	¹⁹⁰ Au	-32.970	¹⁹¹ Hg	-30.830	²⁰¹ Tl	-27.090	²⁰⁶ Pb	-23.880
¹⁸⁶ Ir	-39.220	¹⁸⁵ Pt	-37.220	¹⁹¹ Au	-33.820	¹⁹² Hg	-32.130	²⁰² Tl	-25.910	²⁰⁷ Pb	-22.470
¹⁸⁷ Ir	-39.330	¹⁸⁶ Pt	-37.980	¹⁹² Au	-32.780	¹⁹³ Hg	-31.050	²⁰³ Tl	-25.830	²⁰⁸ Pb	-21.730
¹⁸⁸ Ir	-38.270	¹⁸⁷ Pt	-36.960	¹⁹³ Au	-33.250	¹⁹⁴ Hg	-32.250	²⁰⁴ Tl	-24.370	²⁰⁹ Pb	-17.650
¹⁸⁹ Ir	-38.340	¹⁸⁸ Pt	-37.770	¹⁹⁴ Au	-32.220	¹⁹⁵ Hg	-31.070	²⁰⁵ Tl	-23.860	²¹⁰ Pb	-14.890
¹⁹⁰ Ir	-36.600	¹⁸⁹ Pt	-36.600	¹⁹⁵ Au	-32.480	¹⁹⁶ Hg	-31.900	²⁰⁶ Tl	-22.210	²¹¹ Pb	-10.450
¹⁹¹ Ir	-36.660	¹⁹⁰ Pt	-37.190	¹⁹⁶ Au	-31.110	¹⁹⁷ Hg	-30.450	²⁰⁷ Tl	-21.050	²¹² Pb	-7.580
¹⁹² Ir	-34.850	¹⁹¹ Pt	-35.710	¹⁹⁷ Au	-31.180	¹⁹⁸ Hg	-31.000	²⁰⁸ Tl	-16.800	²¹³ Pb	-2.960
¹⁹³ Ir	-34.550	¹⁹² Pt	-36.210	¹⁹⁸ Au	-29.640	¹⁹⁹ Hg	-29.480	²⁰⁹ Tl	-13.600	²¹⁴ Pb	-0.140
¹⁹⁴ Ir	-32.550	¹⁹³ Pt	-34.450	¹⁹⁹ Au	-29.180	²⁰⁰ Hg	-29.560	²¹⁰ Tl	-9.260	²¹⁵ Pb	4.640
¹⁹⁵ Ir	-31.730	¹⁹⁴ Pt	-34.870	²⁰⁰ Au	-27.280	²⁰¹ Hg	-27.630	²¹¹ Tl	-5.670	²¹⁶ Pb	7.720
¹⁹⁶ Ir	-29.480	¹⁹⁵ Pt	-32.800	²⁰¹ Au	-26.390	²⁰² Hg	-27.380	²¹² Tl	-1.020	²¹⁷ Pb	12.500
¹⁹⁷ Ir	-28.270	¹⁹⁶ Pt	-32.620	²⁰² Au	-24.280	²⁰³ Hg	-25.320	²¹³ Tl	2.400	²¹⁸ Pb	15.800
¹⁹⁸ Ir	-25.720	¹⁹⁷ Pt	-30.480	²⁰³ Au	-23.070	²⁰⁴ Hg	-24.710	²¹⁴ Tl	7.210	²¹⁹ Pb	20.770

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
²²⁰ Pb	23.970	¹⁷⁸ Po	31.840 †	²⁰⁰ At	-8.780	²¹⁷ Rn	3.600	²⁴¹ Fr	83.040	²¹⁰ Ac	8.580		
²²¹ Pb	29.020	¹⁷⁹ Po	29.080 †	²⁰¹ At	-10.490	²¹⁸ Rn	5.220	¹⁸⁶ Ra	59.640 †	²¹¹ Ac	7.200		
²²² Pb	32.590	¹⁸⁰ Po	24.360 †	²⁰² At	-10.580	²¹⁹ Rn	8.870	¹⁸⁷ Ra	56.550 †	²¹² Ac	7.290		
²²³ Pb	37.700	¹⁸¹ Po	21.900 †	²⁰³ At	-12.170	²²⁰ Rn	10.580	¹⁸⁸ Ra	51.470 †	²¹³ Ac	6.160		
²²⁴ Pb	41.530	¹⁸² Po	17.530 †	²⁰⁴ At	-11.920	²²¹ Rn	14.140	¹⁸⁹ Ra	48.560 †	²¹⁴ Ac	6.270		
²²⁵ Pb	46.990	¹⁸³ Po	15.140 †	²⁰⁵ At	-13.010	²²² Rn	16.360	¹⁹⁰ Ra	44.150 †	²¹⁵ Ac	5.800		
²²⁶ Pb	51.040	¹⁸⁴ Po	11.420 †	²⁰⁶ At	-12.500	²²³ Rn	19.990	¹⁹¹ Ra	41.170 †	²¹⁶ Ac	7.850		
²²⁷ Pb	56.680	¹⁸⁵ Po	9.410 †	²⁰⁷ At	-13.270	²²⁴ Rn	22.210	¹⁹² Ra	36.780 †	²¹⁷ Ac	8.650		
²²⁸ Pb	61.180	¹⁸⁶ Po	6.240 †	²⁰⁸ At	-12.480	²²⁵ Rn	26.180	¹⁹³ Ra	34.370 †	²¹⁸ Ac	10.710		
²²⁹ Pb	67.070	¹⁸⁷ Po	4.640 †	²⁰⁹ At	-12.960	²²⁶ Rn	28.560	¹⁹⁴ Ra	30.200 †	²¹⁹ Ac	11.490		
²³⁰ Pb	71.420	¹⁸⁸ Po	1.360 †	²¹⁰ At	-12.060	²²⁷ Rn	32.680	¹⁹⁵ Ra	27.810 †	²²⁰ Ac	13.680		
²³¹ Pb	77.210	¹⁸⁹ Po	0.130 †	²¹¹ At	-11.610	²²⁸ Rn	35.490	¹⁹⁶ Ra	23.990 ‡	²²¹ Ac	14.580		
²³² Pb	81.840	¹⁹⁰ Po	-2.640 ‡	²¹² At	-8.480	²²⁹ Rn	39.920	¹⁹⁷ Ra	22.170 ‡	²²² Ac	16.690		
²³³ Pb	87.790	¹⁹¹ Po	-4.050	²¹³ At	-6.670	²³⁰ Rn	42.810	¹⁹⁸ Ra	18.730 ‡	²²³ Ac	17.950		
²³⁴ Pb	92.480	¹⁹² Po	-6.750	²¹⁴ At	-3.420	²³¹ Rn	47.320	¹⁹⁹ Ra	17.090	²²⁴ Ac	20.290		
²³⁵ Pb	98.860	¹⁹³ Po	-7.500	²¹⁵ At	-1.240	²³² Rn	50.640	²⁰⁰ Ra	13.780	²²⁵ Ac	21.700		
²³⁶ Pb	103.870	¹⁹⁴ Po	-10.120	²¹⁶ At	2.230	²³³ Rn	55.340	²⁰¹ Ra	12.830	²²⁶ Ac	24.290		
¹⁸⁰ Bi	12.550 †	¹⁹⁵ Po	-10.710	²¹⁷ At	4.410	²³⁴ Rn	58.750	²⁰² Ra	9.750	²²⁷ Ac	25.930		
¹⁸¹ Bi	8.660 †	¹⁹⁶ Po	-13.120	²¹⁸ At	8.020	²³⁵ Rn	63.610	²⁰³ Ra	8.920	²²⁸ Ac	28.900		
¹⁸² Bi	6.430 †	¹⁹⁷ Po	-13.120	²¹⁹ At	10.490	²³⁶ Rn	67.310	²⁰⁴ Ra	6.330	²²⁹ Ac	30.790		
¹⁸³ Bi	2.760 †	¹⁹⁸ Po	-15.130	²²⁰ At	13.980	²³⁷ Rn	72.230	²⁰⁵ Ra	5.800	²³⁰ Ac	33.760		
¹⁸⁴ Bi	1.100 †	¹⁹⁹ Po	-15.000	²²¹ At	16.630	²³⁸ Rn	75.970	²⁰⁶ Ra	3.540	²³¹ Ac	35.880		
¹⁸⁵ Bi	-1.900 †	²⁰⁰ Po	-16.730	²²² At	20.480	²³⁹ Rn	81.320	²⁰⁷ Ra	3.300	²³² Ac	39.150		
¹⁸⁶ Bi	-3.360 †	²⁰¹ Po	-16.250	²²³ At	23.110	²⁴⁰ Rn	85.530	²⁰⁸ Ra	1.690	²³³ Ac	41.540		
¹⁸⁷ Bi	-5.950 †	²⁰² Po	-17.850	²²⁴ At	27.110	¹⁹⁰ Fr	32.520 †	²⁰⁹ Ra	1.770	²³⁴ Ac	45.080		
¹⁸⁸ Bi	-7.280 †	²⁰³ Po	-17.300	²²⁵ At	30.020	¹⁹¹ Fr	28.570 †	²¹⁰ Ra	0.440	²³⁵ Ac	47.980		
¹⁸⁹ Bi	-9.530 †	²⁰⁴ Po	-18.240	²²⁶ At	34.160	¹⁹² Fr	26.130 †	²¹¹ Ra	0.800	²³⁶ Ac	51.770		
¹⁹⁰ Bi	-10.680 †	²⁰⁵ Po	-17.500	²²⁷ At	37.410	¹⁹³ Fr	22.690 †	²¹² Ra	-0.230	²³⁷ Ac	54.590		
¹⁹¹ Bi	-12.950 †	²⁰⁶ Po	-18.160	²²⁸ At	41.860	¹⁹⁴ Fr	20.140 †	²¹³ Ra	0.250	²³⁸ Ac	58.470		
¹⁹² Bi	-13.730	²⁰⁷ Po	-17.180	²²⁹ At	45.440	¹⁹⁵ Fr	16.900 †	²¹⁴ Ra	-0.040	²³⁹ Ac	61.630		
¹⁹³ Bi	-15.620	²⁰⁸ Po	-17.520	²³⁰ At	49.920	¹⁹⁶ Fr	15.000 †	²¹⁵ Ra	2.430	²⁴⁰ Ac	65.890		
¹⁹⁴ Bi	-16.360	²⁰⁹ Po	-16.380	²³¹ At	53.740	¹⁹⁷ Fr	12.040 †	²¹⁶ Ra	3.270	²⁴¹ Ac	69.140		
¹⁹⁵ Bi	-18.200	²¹⁰ Po	-15.880	²³² At	58.470	¹⁹⁸ Fr	10.470 †	²¹⁷ Ra	5.880	²⁴² Ac	73.810		
¹⁹⁶ Bi	-18.270	²¹¹ Po	-12.490	²³³ At	62.320	¹⁹⁹ Fr	7.590 †	²¹⁸ Ra	6.730	²⁴³ Ac	77.560		
¹⁹⁷ Bi	-19.810	²¹² Po	-10.410	²³⁴ At	67.150	²⁰⁰ Fr	6.620 †	²¹⁹ Ra	9.420	¹⁹¹ Th	70.100 †		
¹⁹⁸ Bi	-19.600	²¹³ Po	-6.710	²³⁵ At	71.340	²⁰¹ Fr	4.120 †	²²⁰ Ra	10.350	¹⁹² Th	64.990 †		
¹⁹⁹ Bi	-20.910	²¹⁴ Po	-4.470	²³⁶ At	76.390	²⁰² Fr	3.270	²²¹ Ra	13.040	¹⁹³ Th	61.610 †		
²⁰⁰ Bi	-20.440	²¹⁵ Po	-0.480	²³⁷ At	80.490	²⁰³ Fr	0.990	²²² Ra	14.280	¹⁹⁴ Th	56.520 †		
²⁰¹ Bi	-21.470	²¹⁶ Po	1.780	²³⁸ At	85.880	²⁰⁴ Fr	0.610	²²³ Ra	17.210	¹⁹⁵ Th	53.540 †		
²⁰² Bi	-20.930	²¹⁷ Po	5.960	²³⁹ At	90.360	²⁰⁵ Fr	-1.430	²²⁴ Ra	18.810	¹⁹⁶ Th	48.950 †		
²⁰³ Bi	-21.560	²¹⁸ Po	8.390	¹⁸² Rn	45.590 †	²⁰⁶ Fr	-1.560	²²⁵ Ra	22.010	¹⁹⁷ Th	46.060 †		
²⁰⁴ Bi	-20.670	²¹⁹ Po	12.640	¹⁸³ Rn	42.490 †	²⁰⁷ Fr	-2.980	²²⁶ Ra	23.670	¹⁹⁸ Th	41.840 †		
²⁰⁵ Bi	-21.110	²²⁰ Po	15.210	¹⁸⁴ Rn	37.910 †	²⁰⁸ Fr	-2.770	²²⁷ Ra	27.080	¹⁹⁹ Th	39.470 †		
²⁰⁶ Bi	-20.030	²²¹ Po	19.490	¹⁸⁵ Rn	35.130 †	²⁰⁹ Fr	-3.860	²²⁸ Ra	29.000	²⁰⁰ Th	35.530 †		
²⁰⁷ Bi	-20.170	²²² Po	22.340	¹⁸⁶ Rn	30.890 †	²¹⁰ Fr	-3.450	²²⁹ Ra	32.650	²⁰¹ Th	33.480 †		
²⁰⁸ Bi	-18.900	²²³ Po	26.750	¹⁸⁷ Rn	28.560 †	²¹¹ Fr	-4.210	²³⁰ Ra	34.750	²⁰² Th	29.620 ‡		
²⁰⁹ Bi	-18.320	²²⁴ Po	29.690	¹⁸⁸ Rn	24.560 †	²¹² Fr	-3.630	²³¹ Ra	38.520	²⁰³ Th	28.100 ‡		
²¹⁰ Bi	-14.680	²²⁵ Po	34.360	¹⁸⁹ Rn	22.360 †	²¹³ Fr	-3.550	²³² Ra	40.930	²⁰⁴ Th	24.730 ‡		
²¹¹ Bi	-11.830	²²⁶ Po	37.630	¹⁹⁰ Rn	18.670 †	²¹⁴ Fr	-0.900	²³³ Ra	44.920	²⁰⁵ Th	23.440		
²¹² Bi	-8.110	²²⁷ Po	42.530	¹⁹¹ Rn	16.670 †	²¹⁵ Fr	0.360	²³⁴ Ra	47.780	²⁰⁶ Th	20.480		
²¹³ Bi	-5.270	²²⁸ Po	46.120	¹⁹² Rn	13.190 ‡	²¹⁶ Fr	3.010	²³⁵ Ra	52.070	²⁰⁷ Th	19.620		
²¹⁴ Bi	-1.250	²²⁹ Po	51.300	¹⁹³ Rn	11.380 ‡	²¹⁷ Fr	4.410	²³⁶ Ra	55.020	²⁰⁸ Th	17.060		
²¹⁵ Bi	1.540	²³⁰ Po	55.090	¹⁹⁴ Rn	7.980 ‡	²¹⁸ Fr	7.170	²³⁷ Ra	59.250	²⁰⁹ Th	16.500		
²¹⁶ Bi	5.800	²³¹ Po	60.310	¹⁹⁵ Rn	6.660	²¹⁹ Fr	8.610	²³⁸ Ra	62.460	²¹⁰ Th	14.510		
²¹⁷ Bi	8.800	²³² Po	64.190	¹⁹⁶ Rn	3.610	²²⁰ Fr	11.330	²³⁹ Ra	66.980	²¹¹ Th	14.300		
²¹⁸ Bi	13.010	²³³ Po	69.460	¹⁹⁷ Rn	2.530	²²¹ Fr	13.260	²⁴⁰ Ra	70.410	²¹² Th	12.650		
²¹⁹ Bi	16.340	²³⁴ Po	73.620	¹⁹⁸ Rn	-0.280	²²² Fr	16.390	²⁴¹ Ra	75.310	²¹³ Th	12.640		
²²⁰ Bi	20.550	²³⁵ Po	79.170	¹⁹⁹ Rn	-0.830	²²³ Fr	18.390	²⁴² Ra	79.120	²¹⁴ Th	11.140		
²²¹ Bi	23.830	²³⁶ Po	83.390	²⁰⁰ Rn	-3.340	²²⁴ Fr	21.610	¹⁹⁴ Ac	44.400 †	²¹⁵ Th	11.070		
²²² Bi	28.450	²³⁷ Po	89.150	²⁰¹ Rn	-3.620	²²⁵ Fr	23.810	¹⁹⁵ Ac	40.380 †	²¹⁶ Th	10.180		
²²³ Bi	31.800	²³⁸ Po	93.670	²⁰² Rn	-5.910	²²⁶ Fr	27.240	¹⁹⁶ Ac	37.420 †	²¹⁷ Th	12.190		
²²⁴ Bi	36.500	¹⁸⁶ At	19.590 †	²⁰³ Rn	-5.980	²²⁷ Fr	29.610	¹⁹⁷ Ac	33.670 †	²¹⁸ Th	12.440		
²²⁵ Bi	40.310	¹⁸⁷ At	16.290 †	²⁰⁴ Rn	-7.880	²²⁸ Fr	33.280	¹⁹⁸ Ac	31.370 †	²¹⁹ Th	14.430		
²²⁶ Bi	45.220	¹⁸⁸ At	13.990 †	²⁰⁵ Rn	-7.780	²²⁹ Fr	36.070	¹⁹⁹ Ac	27.860 †	²²⁰ Th	14.710		
²²⁷ Bi	49.260	¹⁸⁹ At	10.810 †	²⁰⁶ Rn	-9.090	²³⁰ Fr	39.810	²⁰⁰ Ac	25.800 †	²²¹ Th	16.870		
²²⁸ Bi	54.450	¹⁹⁰ At	9.070 †	²⁰⁷ Rn	-8.690	²³¹ Fr	42.720	²⁰¹ Ac	22.510 †	²²² Th	17.190		
²²⁹ Bi	58.940	¹⁹¹ At	6.030 †	²⁰⁸ Rn	-9.640	²³² Fr	46.730	²⁰² Ac	20.980 †	²²³ Th	19.320		
²³⁰ Bi	64.140	¹⁹² At	4.190 †	²⁰⁹ Rn	-8.990	²³³ Fr	50.030	²⁰³ Ac	17.910 †	²²⁴ Th	20.000		
²³¹ Bi	68.510	¹⁹³ At	1.520 †	²¹⁰ Rn	-9.710	²³⁴ Fr	54.290	²⁰⁴ Ac	16.770 †	²²⁵ Th	22.220		
²³² Bi	73.810	¹⁹⁴ At	0.040 †	²¹¹ Rn	-8.860	²³⁵ Fr	57.740	²⁰⁵ Ac	14.040 †	²²⁶ Th	23.140		
²³³ Bi	78.400	¹⁹⁵ At	-2.430 †	²¹² Rn	-8.670	²³⁶ Fr	62.100	²⁰⁶ Ac	13.280 †	²²⁷ Th	25.710		
²³⁴ Bi	83.920	¹⁹⁶ At	-3.590	²¹³ Rn	-5.650	²³⁷ Fr	65.670	²⁰⁷ Ac	10.910 †	²²⁸ Th	26.720		
²³⁵ Bi	88.640	¹⁹⁷ At	-5.920	²¹⁴ Rn	-4.210	²³⁸ Fr	70.230	²⁰⁸ Ac	10.490	²²⁹ Th	29.630		
²³⁶ Bi	94.520	¹⁹⁸ At	-6.400	²¹⁵ Rn	-1.140	²³⁹ Fr	73.920	²⁰⁹ Ac	8.740	²³⁰ Th	30.840		
²³⁷ Bi	99.400	¹⁹⁹ At	-8.490	²¹⁶ Rn	0.290	²⁴							

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
²³² Th	35.460	²¹¹ U	31.800 ‡	²⁴⁵ Np	65.830	²³⁸ Am	48.450	²⁴² Bk	57.720	²⁵⁴ Es	82.030
²³³ Th	38.700	²¹² U	29.500 ‡	²⁴⁶ Np	69.700	²³⁹ Am	49.390	²⁴³ Bk	58.690	²⁵⁵ Es	84.070
²³⁴ Th	40.650	²¹³ U	28.920 ‡	²⁴⁷ Np	72.550	²⁴⁰ Am	51.520	²⁴⁴ Bk	60.700	²²² Fm	102.090 †
²³⁵ Th	44.230	²¹⁴ U	26.800	²⁰² Pu	83.120 †	²⁴¹ Am	52.920	²⁴⁵ Bk	61.840	²²³ Fm	99.370 †
²³⁶ Th	46.620	²¹⁵ U	26.240	²⁰³ Pu	79.780 †	²⁴² Am	55.470	²⁴⁶ Bk	64.010	²²⁴ Fm	94.920 †
²³⁷ Th	50.290	²¹⁶ U	24.140	²⁰⁴ Pu	74.990 †	²⁴³ Am	57.150	²⁴⁷ Bk	65.460	²²⁵ Fm	91.980 †
²³⁸ Th	52.750	²¹⁷ U	23.600	²⁰⁵ Pu	71.930 †	²⁴⁴ Am	59.870	²⁴⁸ Bk	68.100	²²⁶ Fm	88.140 †
²³⁹ Th	56.580	²¹⁸ U	22.130	²⁰⁶ Pu	67.390 †	²⁴⁵ Am	61.910	²⁴⁹ Bk	69.790	²²⁷ Fm	87.190 †
²⁴⁰ Th	59.490	²¹⁹ U	23.520	²⁰⁷ Pu	65.090 †	²⁴⁶ Am	64.940	²⁵⁰ Bk	72.950	²²⁸ Fm	84.490 †
²⁴¹ Th	63.560	²²⁰ U	23.210	²⁰⁸ Pu	61.050 †	²⁴⁷ Am	67.020	²⁵¹ Bk	75.220	²²⁹ Fm	83.560 †
²⁴² Th	66.580	²²¹ U	24.660	²⁰⁹ Pu	59.100 †	²⁴⁸ Am	70.500	²¹⁸ Cf	86.550 †	²³⁰ Fm	80.850 †
²⁴³ Th	71.200	²²² U	24.320	²¹⁰ Pu	55.470 †	²⁴⁹ Am	73.000	²¹⁹ Cf	84.350 †	²³¹ Fm	80.010 †
²⁴⁴ Th	74.540	²²³ U	25.930	²¹¹ Pu	53.990 †	²¹¹ Cm	80.350 †	²²⁰ Cf	80.470 †	²³² Fm	77.430 ‡
²⁰⁰ Pa	49.500 †	²²⁴ U	25.690	²¹² Pu	50.740 †	²¹² Cm	76.400 †	²²¹ Cf	78.290 †	²³³ Fm	76.520 ‡
²⁰¹ Pa	45.580 †	²²⁵ U	27.120	²¹³ Pu	49.510 †	²¹³ Cm	74.550 †	²²² Cf	74.420 †	²³⁴ Fm	74.370 ‡
²⁰² Pa	42.960 †	²²⁶ U	27.180	²¹⁴ Pu	46.740 †	²¹⁴ Cm	70.820 †	²²³ Cf	72.180 †	²³⁵ Fm	73.770
²⁰³ Pa	39.110 †	²²⁷ U	28.850	²¹⁵ Pu	45.610 †	²¹⁵ Cm	69.050 †	²²⁴ Cf	68.950 †	²³⁶ Fm	71.940
²⁰⁴ Pa	37.280 †	²²⁸ U	29.170	²¹⁶ Pu	42.890 †	²¹⁶ Cm	65.670 †	²²⁵ Cf	68.550 †	²³⁷ Fm	71.750
²⁰⁵ Pa	33.770 †	²²⁹ U	31.170	²¹⁷ Pu	41.870 †	²¹⁷ Cm	64.080 †	²²⁶ Cf	66.450 †	²³⁸ Fm	70.090
²⁰⁶ Pa	32.250 †	²³⁰ U	31.590	²¹⁸ Pu	39.180 ‡	²¹⁸ Cm	60.770 †	²²⁷ Cf	66.090 †	²³⁹ Fm	70.180
²⁰⁷ Pa	29.190 †	²³¹ U	33.810	²¹⁹ Pu	38.030	²¹⁹ Cm	59.140 †	²²⁸ Cf	63.980 ‡	²⁴⁰ Fm	68.980
²⁰⁸ Pa	28.130 †	²³² U	34.590	²²⁰ Pu	35.980	²²⁰ Cm	55.870 †	²²⁹ Cf	63.760	²⁴¹ Fm	69.340
²⁰⁹ Pa	25.430 †	²³³ U	36.930	²²¹ Pu	36.840	²²¹ Cm	54.190 †	²³⁰ Cf	61.710	²⁴² Fm	68.640
²¹⁰ Pa	24.630 †	²³⁴ U	38.160	²²² Pu	35.910	²²² Cm	51.530 ‡	²³¹ Cf	61.400	²⁴³ Fm	69.430
²¹¹ Pa	22.590 †	²³⁵ U	40.960	²²³ Pu	36.810	²²³ Cm	51.830 ‡	²³² Cf	59.730	²⁴⁴ Fm	69.090
²¹² Pa	22.120 †	²³⁶ U	42.430	²²⁴ Pu	35.910	²²⁴ Cm	50.340	²³³ Cf	59.610	²⁴⁵ Fm	70.110
²¹³ Pa	20.370 †	²³⁷ U	45.390	²²⁵ Pu	36.810	²²⁵ Cm	50.540	²³⁴ Cf	58.330	²⁴⁶ Fm	70.150
²¹⁴ Pa	19.990 †	²³⁸ U	47.300	²²⁶ Pu	35.950	²²⁶ Cm	49.020	²³⁵ Cf	58.630	²⁴⁷ Fm	71.540
²¹⁵ Pa	18.300	²³⁹ U	50.560	²²⁷ Pu	36.830	²²⁷ Cm	49.370	²³⁶ Cf	57.490	²⁴⁸ Fm	71.860
²¹⁶ Pa	17.810	²⁴⁰ U	52.720	²²⁸ Pu	36.300	²²⁸ Cm	47.920	²³⁷ Cf	58.130	²⁴⁹ Fm	73.390
²¹⁷ Pa	16.880	²⁴¹ U	56.100	²²⁹ Pu	37.390	²²⁹ Cm	48.220	²³⁸ Cf	57.370	²⁵⁰ Fm	74.040
²¹⁸ Pa	18.350	²⁴² U	58.600	²³⁰ Pu	37.120	²³⁰ Cm	47.090	²³⁹ Cf	58.180	²⁵¹ Fm	75.970
²¹⁹ Pa	18.530	²⁴³ U	62.380	²³¹ Pu	38.510	²³¹ Cm	47.580	²⁴⁰ Cf	57.910	²⁵² Fm	76.870
²²⁰ Pa	20.020	²⁴⁴ U	64.940	²³² Pu	38.380	²³² Cm	46.760	²⁴¹ Cf	59.140	²⁵³ Fm	79.360
²²¹ Pa	20.260	²⁴⁵ U	69.160	²³³ Pu	40.010	²³³ Cm	47.550	²⁴² Cf	59.330	²⁵⁴ Fm	80.850
²²² Pa	21.840	²⁴⁶ U	72.150	²³⁴ Pu	40.310	²³⁴ Cm	46.950	²⁴³ Cf	60.890	²⁵⁵ Fm	83.760
²²³ Pa	22.190	²⁰⁶ Np	55.650 †	²³⁵ Pu	42.170	²³⁵ Cm	48.090	²⁴⁴ Cf	61.460	²⁵⁶ Fm	85.490
²²⁴ Pa	23.730	²⁰⁷ Np	51.800 †	²³⁶ Pu	42.850	²³⁶ Cm	47.850	²⁴⁵ Cf	63.330	²⁵⁷ Fm	88.580
²²⁵ Pa	24.290	²⁰⁸ Np	49.990 †	²³⁷ Pu	45.090 †	²³⁷ Cm	49.210	²⁴⁶ Cf	64.090	²³⁰ Md	93.620 †
²²⁶ Pa	26.020	²⁰⁹ Np	46.600 †	²³⁸ Pu	46.150	²³⁸ Cm	49.380	²⁴⁷ Cf	66.150	²³¹ Md	90.860 †
²²⁷ Pa	26.880	²¹⁰ Np	45.170 †	²³⁹ Pu	48.590	²³⁹ Cm	51.060	²⁴⁸ Cf	67.280	²³² Md	89.530 †
²²⁸ Pa	28.920	²¹¹ Np	42.180 †	²⁴⁰ Pu	50.130	²⁴⁰ Cm	51.680	²⁴⁹ Cf	69.710	²³³ Md	86.840 †
²²⁹ Pa	29.890	²¹² Np	41.060 †	²⁴¹ Pu	52.930	²⁴¹ Cm	53.680	²⁵⁰ Cf	71.130	²³⁴ Md	85.560 †
²³⁰ Pa	32.170	²¹³ Np	38.650 †	²⁴² Pu	54.680	²⁴² Cm	54.780	²⁵¹ Cf	74.110	²³⁵ Md	83.290 †
²³¹ Pa	33.430	²¹⁴ Np	37.710 †	²⁴³ Pu	57.780	²⁴³ Cm	57.190	²⁵² Cf	76.040	²³⁶ Md	82.280 †
²³² Pa	35.910	²¹⁵ Np	35.410 †	²⁴⁴ Pu	59.810	²⁴⁴ Cm	58.480	²²⁵ Es	79.190 †	²³⁷ Md	80.370 †
²³³ Pa	37.510	²¹⁶ Np	34.430 †	²⁴⁵ Pu	63.190	²⁴⁵ Cm	61.020	²²⁶ Es	78.300 †	²³⁸ Md	79.740 †
²³⁴ Pa	40.320	²¹⁷ Np	32.280 †	²⁴⁶ Pu	65.410	²⁴⁶ Cm	62.580	²²⁷ Es	76.130 †	²³⁹ Md	77.960 †
²³⁵ Pa	42.300	²¹⁸ Np	31.200 †	²⁴⁷ Pu	69.130	²⁴⁷ Cm	65.540	²²⁸ Es	75.240 †	²⁴⁰ Md	77.730 †
²³⁶ Pa	45.380	²¹⁹ Np	29.660 †	²⁴⁸ Pu	71.750	²⁴⁸ Cm	67.370	²²⁹ Es	73.100 †	²⁴¹ Md	76.400 †
²³⁷ Pa	47.650	²²⁰ Np	30.550	²¹⁴ Am	59.690 †	²⁴⁹ Cm	70.750	²³⁰ Es	72.310 †	²⁴² Md	76.460
²³⁸ Pa	50.950	²²¹ Np	30.190	²¹⁵ Am	56.730 †	²⁵⁰ Cm	72.990	²³¹ Es	70.210 †	²⁴³ Md	75.620
²³⁹ Pa	53.370	²²² Np	31.070	²¹⁶ Am	55.190 †	²²⁰ Bk	69.100 †	²³² Es	69.410 †	²⁴⁴ Md	76.020
²⁴⁰ Pa	56.940	²²³ Np	30.760	²¹⁷ Am	52.420 †	²²¹ Bk	65.800 †	²³³ Es	67.630 †	²⁴⁵ Md	75.530
²⁴¹ Pa	59.660	²²⁴ Np	31.770	²¹⁸ Am	50.860 †	²²² Bk	63.540 †	²³⁴ Es	67.150 †	²⁴⁶ Md	76.170
²⁴² Pa	63.510	²²⁵ Np	31.420	²¹⁹ Am	48.090 †	²²³ Bk	60.900 †	²³⁵ Es	65.740 †	²⁴⁷ Md	76.110
²⁴³ Pa	66.470	²²⁶ Np	32.350	²²⁰ Am	46.440 †	²²⁴ Bk	60.620 †	²³⁶ Es	65.630	²⁴⁸ Md	77.170
²⁴⁴ Pa	70.680	²²⁷ Np	32.350	²²¹ Am	44.360 †	²²⁵ Bk	59.010 †	²³⁷ Es	64.400	²⁴⁹ Md	77.280
²⁴⁵ Pa	74.030	²²⁸ Np	33.490	²²² Am	44.640 †	²²⁶ Bk	58.710 †	²³⁸ Es	64.610	²⁵⁰ Md	78.550
¹⁹⁶ U	78.050 †	²²⁹ Np	33.770	²²³ Am	43.740 †	²²⁷ Bk	57.140 †	²³⁹ Es	63.730	²⁵¹ Md	78.960
¹⁹⁷ U	74.570 †	²³⁰ Np	35.220	²²⁴ Am	44.050	²²⁸ Bk	56.950 †	²⁴⁰ Es	64.220	²⁵² Md	80.610
¹⁹⁸ U	69.580 †	²³¹ Np	35.580	²²⁵ Am	43.030	²²⁹ Bk	55.460 †	²⁴¹ Es	63.820	²⁵³ Md	81.290
¹⁹⁹ U	66.140 †	²³² Np	37.320	²²⁶ Am	43.430	²³⁰ Bk	55.200	²⁴² Es	64.750	²⁵⁴ Md	83.570
²⁰⁰ U	61.420 †	²³³ Np	37.980	²²⁷ Am	42.520	²³¹ Bk	54.020	²⁴³ Es	64.800	²⁵⁵ Md	84.890
²⁰¹ U	58.640 †	²³⁴ Np	39.960	²²⁸ Am	42.860	²³² Bk	54.020	²⁴⁴ Es	65.970	²⁵⁶ Md	87.490
²⁰² U	54.140 †	²³⁵ Np	41.060	²²⁹ Am	42.290	²³³ Bk	53.090	²⁴⁵ Es	66.390	²⁵⁷ Md	89.000
²⁰³ U	51.530 †	²³⁶ Np	43.380	²³⁰ Am	42.830	²³⁴ Bk	53.520	²⁴⁶ Es	67.880	²⁵⁸ Md	91.770
²⁰⁴ U	47.380 †	²³⁷ Np	44.870	²³¹ Am	42.500	²³⁵ Bk	52.790	²⁴⁷ Es	68.530	²²⁸ No	109.220 †
²⁰⁵ U	45.400 †	²³⁸ Np	47.460	²³² Am	43.410	²³⁶ Bk	53.520	²⁴⁸ Es	70.270	²²⁹ No	107.690 †
²⁰⁶ U	41.660 †	²³⁹ Np	49.320	²³³ Am	43.170	²³⁷ Bk	53.200	²⁴⁹ Es	71.190	²³⁰ No	104.390 †
²⁰⁷ U	40.040 †	²⁴⁰ Np	52.320	²³⁴ Am	44.430	²³⁸ Bk	54.120	²⁵⁰ Es	73.360	²³¹ No	102.850 †
²⁰⁸ U	36.780 †	²⁴¹ Np	54.290	²³⁵ Am	44.600	²³⁹ Bk	54.170	²⁵¹ Es	74.530	²³² No	99.610 †
²⁰⁹ U	35.600 †	²⁴² Np	57.450	²³⁶ Am	46.050	²⁴⁰ Bk	55.530	²⁵² Es	77.240	²³³ No	98.170 †
²¹⁰ U	32.660 ‡	²⁴³ Np	59.890	²³⁷ Am	46.650	²⁴¹ Bk	56.020	²⁵³ Es	78.950	²³⁴ No	95.110 †

Isotope Mass Excess

²³⁵ No	93.710 †
²³⁶ No	91.030 †
²³⁷ No	89.920 †
²³⁸ No	87.580 ‡
²³⁹ No	86.830 ‡
²⁴⁰ No	84.730 ‡
²⁴¹ No	84.380
²⁴² No	82.750
²⁴³ No	82.670
²⁴⁴ No	81.430
²⁴⁵ No	81.680
²⁴⁶ No	80.820
²⁴⁷ No	81.350
²⁴⁸ No	80.960
²⁴⁹ No	81.810
²⁵⁰ No	81.660
²⁵¹ No	82.690
²⁵² No	82.820
²⁵³ No	84.250
²⁵⁴ No	84.720
²⁵⁵ No	86.830
²⁵⁶ No	87.840
²⁵⁷ No	90.220
²⁵⁸ No	91.410
²⁵⁹ No	94.020
²³⁶ Lr	103.610 †
²³⁷ Lr	100.850 †
²³⁸ Lr	99.310 †
²³⁹ Lr	96.850 †
²⁴⁰ Lr	95.780 †
²⁴¹ Lr	93.560 †
²⁴² Lr	92.890 †
²⁴³ Lr	91.130 †
²⁴⁴ Lr	90.650 †
²⁴⁵ Lr	89.270 †
²⁴⁶ Lr	89.150 †
²⁴⁷ Lr	88.170 †
²⁴⁸ Lr	88.380
²⁴⁹ Lr	87.780
²⁵⁰ Lr	88.370
²⁵¹ Lr	87.980
²⁵² Lr	88.730
²⁵³ Lr	88.640
²⁵⁴ Lr	89.860
²⁵⁵ Lr	90.160
²⁵⁶ Lr	91.950
²⁵⁷ Lr	92.740
²⁵⁸ Lr	94.810
²⁵⁹ Lr	95.840
²⁶⁰ Lr	98.130