

T. Tachibana, M. Uno, M. Yamada, and S. Yamada 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
² H	13.110	¹⁰ C	14.930	²¹ F	-0.510	³⁸ Na	60.210 †	⁵⁰ Al	114.740 †	⁴⁴ P	8.460
³ H	14.500	¹¹ C	10.090	²² F	2.780	³⁹ Na	66.810	⁵¹ Al	123.710 †	⁴⁵ P	14.570
⁴ H	26.320 †	¹³ C	3.840	²³ F	3.660	⁴⁰ Na	76.750 †	⁵² Al	135.160 †	⁴⁶ P	22.610
⁵ H	32.200 ‡	¹⁴ C	4.140	²⁴ F	8.850	⁴¹ Na	85.970 †	⁵³ Al	144.680 †	⁴⁷ P	29.480
⁶ H	43.220 †	¹⁵ C	11.220	²⁵ F	12.960	⁴² Na	97.000 †			⁴⁸ P	38.410 †
		¹⁶ C	13.600	²⁶ F	19.900	⁴³ Na	106.860 †	²⁰ Si	64.950 †	⁴⁹ P	45.530
³ He	14.360	¹⁷ C	21.130	²⁷ F	25.380			²¹ Si	50.540 †	⁵⁰ P	55.080 †
⁴ He	0.050	¹⁸ C	24.380	²⁸ F	33.320	¹⁶ Mg	79.060 †	²² Si	33.430 ‡	⁵¹ P	62.500 ‡
⁵ He	13.650 †	¹⁹ C	32.780 †	²⁹ F	39.400	¹⁷ Mg	63.270 †	²³ Si	23.840	⁵² P	72.530 †
⁶ He	17.210 ‡	²⁰ C	36.860	³⁰ F	49.320 †	¹⁸ Mg	42.920 †	²⁴ Si	10.540	⁵³ P	80.230 ‡
⁷ He	27.440 †	²¹ C	46.840 †	³¹ F	56.760 ‡	¹⁹ Mg	31.410 ‡	²⁵ Si	3.240	⁵⁴ P	90.450 †
⁸ He	30.750	²² C	54.070 ‡	³² F	66.360 †	²⁰ Mg	17.160	²⁶ Si	-7.590	⁵⁵ P	98.740 †
⁹ He	42.500 †	²³ C	65.500 †	³³ F	73.830 ‡	²¹ Mg	10.390	²⁷ Si	-12.640	⁵⁶ P	109.410 †
¹⁰ He	50.670 †	²⁴ C	73.830 †	³⁴ F	83.330 †	²² Mg	-0.160	²⁸ Si	-21.320	⁵⁷ P	117.870 †
¹¹ He	65.460 †	²⁵ C	85.920 †	³⁵ F	91.310 ‡	²³ Mg	-4.800	²⁹ Si	-21.540	⁵⁸ P	128.810 †
¹² He	75.040 †	²⁶ C	94.560 †	³⁶ F	101.180 †	²⁴ Mg	-13.020	³⁰ Si	-24.290	⁵⁹ P	137.190 †
¹³ He	89.340 †			³⁷ F	109.420 †	²⁵ Mg	-12.950	³¹ Si	-22.430	⁶⁰ P	148.030 †
¹⁴ He	98.930 †	¹⁰ N	38.830 †	³⁸ F	120.950 †	²⁶ Mg	-16.770	³² Si	-23.390	⁶¹ P	156.690 †
		¹¹ N	24.850 †	³⁹ F	131.780 †	²⁷ Mg	-14.580	³³ Si	-20.190	⁶² P	167.620 †
⁴ Li	26.550 †	¹² N	16.930			²⁸ Mg	-15.000	³⁴ Si	-20.110	⁶³ P	176.370 †
⁵ Li	13.970 †	¹³ N	6.110	¹³ Ne	75.090 †	²⁹ Mg	-10.870	³⁵ Si	-14.690	⁶⁴ P	187.200 †
⁶ Li	11.630	¹⁴ N	2.030	¹⁴ Ne	53.980 †	³⁰ Mg	-9.630	³⁶ Si	-12.920	⁶⁵ P	196.010 †
⁷ Li	14.730	¹⁵ N	1.550	¹⁵ Ne	41.520 †	³¹ Mg	-4.300	³⁷ Si	-7.460	⁶⁶ P	208.640 †
⁸ Li	21.660	¹⁶ N	5.860	¹⁶ Ne	24.340 ‡	³² Mg	-2.150	³⁸ Si	-5.280	⁶⁷ P	220.770 †
⁹ Li	24.220	¹⁷ N	7.560	¹⁷ Ne	15.990	³³ Mg	5.290	³⁹ Si	0.410		
¹⁰ Li	32.560 †	¹⁸ N	12.570	¹⁸ Ne	4.870	³⁴ Mg	9.010	⁴⁰ Si	3.410	²³ S	75.520 †
¹¹ Li	39.670	¹⁹ N	15.240	¹⁹ Ne	1.170	³⁵ Mg	16.360	⁴¹ Si	9.690	²⁴ S	55.690 †
¹² Li	51.150 †	²⁰ N	21.330	²⁰ Ne	-6.410	³⁶ Mg	20.390	⁴² Si	13.210	²⁵ S	43.400 †
¹³ Li	59.850 †	²¹ N	24.920	²¹ Ne	-5.100	³⁷ Mg	27.850	⁴³ Si	21.320 †	²⁶ S	27.480 †
¹⁴ Li	71.240 †	²² N	32.730	²² Ne	-7.750	³⁸ Mg	32.580	⁴⁴ Si	27.640	²⁷ S	17.630
¹⁵ Li	80.160 †	²³ N	39.490	²³ Ne	-5.010	³⁹ Mg	40.560	⁴⁵ Si	36.960 †	²⁸ S	4.330
		²⁴ N	48.880 †	²⁴ Ne	-6.280	⁴⁰ Mg	45.750	⁴⁶ Si	44.050 ‡	²⁹ S	-3.140
⁵ Be	33.470 ‡	²⁵ N	56.810 ‡	²⁵ Ne	-1.590	⁴¹ Mg	55.460 †	⁴⁷ Si	54.220 †	³⁰ S	-14.160
⁶ Be	18.450 ‡	²⁶ N	67.000 †	²⁶ Ne	0.450	⁴² Mg	63.320 ‡	⁴⁸ Si	61.540 ‡	³¹ S	-18.930
⁷ Be	15.580	²⁷ N	75.310 †	²⁷ Ne	6.930	⁴³ Mg	74.140 †	⁴⁹ Si	72.270 †	³² S	-26.070
⁸ Be	6.280	²⁸ N	87.400 †	²⁸ Ne	10.460	⁴⁴ Mg	82.700 †	⁵⁰ Si	79.870 ‡	³³ S	-26.440
⁹ Be	12.540	²⁹ N	96.930 †	²⁹ Ne	18.000	⁴⁵ Mg	94.300 †	⁵¹ Si	91.040 †	³⁴ S	-29.590
¹⁰ Be	12.020			³⁰ Ne	22.270	⁴⁶ Mg	103.020 †	⁵² Si	98.890 ‡	³⁵ S	-28.480
¹¹ Be	19.590	¹⁰ O	59.970 †	³¹ Ne	31.800 †	⁴⁷ Mg	115.110 †	⁵³ Si	110.200 †	³⁶ S	-30.450
¹² Be	23.550	¹¹ O	48.210 †	³² Ne	37.520	⁴⁸ Mg	124.040 †	⁵⁴ Si	118.640 †	³⁷ S	-27.060
¹³ Be	34.200 †	¹² O	31.020 ‡	³³ Ne	46.800 †	⁴⁹ Mg	136.500 †	⁵⁵ Si	130.350 †	³⁸ S	-27.230
¹⁴ Be	39.970 ‡	¹³ O	22.290	³⁴ Ne	52.680	⁵⁰ Mg	145.620 †	⁵⁶ Si	138.940 †	³⁹ S	-23.640
¹⁵ Be	50.700 †	¹⁴ O	8.560	³⁵ Ne	61.930 †			⁵⁷ Si	150.890 †	⁴⁰ S	-23.270
¹⁶ Be	56.990 ‡	¹⁵ O	3.710	³⁶ Ne	68.410	²⁰ Al	42.020 †	⁵⁸ Si	159.380 †	⁴¹ S	-19.340
¹⁷ Be	68.300 †	¹⁶ O	-3.950	³⁷ Ne	78.060 †	²¹ Al	27.170 †	⁵⁹ Si	171.190 †	⁴² S	-18.050
¹⁸ Be	75.130 ‡	¹⁷ O	-0.400	³⁸ Ne	84.870 ‡	²² Al	18.120 †	⁶⁰ Si	179.950 †	⁴³ S	-13.410
¹⁹ Be	87.800 †	¹⁸ O	-1.340	³⁹ Ne	96.190 †	²³ Al	7.010	⁶¹ Si	191.820 †	⁴⁴ S	-11.490
²⁰ Be	97.620 †	¹⁹ O	3.050	⁴⁰ Ne	105.630 †	²⁴ Al	0.210	⁶² Si	200.680 †	⁴⁵ S	-4.980
²¹ Be	111.510 †	²⁰ O	3.300	⁴¹ Ne	117.990 †	²⁵ Al	-8.550	⁶³ Si	212.440 †	⁴⁶ S	-0.270
²² Be	122.200 †	²¹ O	8.840	⁴² Ne	128.040 †	²⁶ Al	-13.100	⁶⁴ Si	221.390 †	⁴⁷ S	7.500
		²² O	10.220			²⁷ Al	-17.410			⁴⁸ S	13.070
⁶ B	45.740 †	²³ O	17.530	¹⁶ Na	53.400 †	²⁸ Al	-17.170	²² P	63.200 †	⁴⁹ S	21.750 †
⁷ B	29.780 †	²⁴ O	22.160	¹⁷ Na	35.600 †	²⁹ Al	-18.050	²³ P	45.560 †	⁵⁰ S	27.640
⁸ B	23.560 †	²⁵ O	31.110 †	¹⁸ Na	24.700 †	³⁰ Al	-15.760	²⁴ P	33.830 †	⁵¹ S	36.970 †
⁹ B	13.570 †	²⁶ O	37.040	¹⁹ Na	12.900 †	³¹ Al	-14.950	²⁵ P	20.020 †	⁵² S	43.220
¹⁰ B	9.440	²⁷ O	46.860 †	²⁰ Na	6.750	³² Al	-11.360	²⁶ P	10.670 †	⁵³ S	53.050 †
¹¹ B	8.260	²⁸ O	53.320 ‡	²¹ Na	-1.480	³³ Al	-9.590	²⁷ P	-0.650	⁵⁴ S	59.620 ‡
¹² B	12.810	²⁹ O	65.050 †	²² Na	-5.550	³⁴ Al	-3.820	²⁸ P	-7.640	⁵⁵ S	69.660 †
¹³ B	16.000	³⁰ O	72.840 ‡	²³ Na	-8.760	³⁵ Al	-0.440	²⁹ P	-16.790	⁵⁶ S	76.880 ‡
¹⁴ B	23.770	³¹ O	84.080 †	²⁴ Na	-8.160	³⁶ Al	5.340	³⁰ P	-21.100	⁵⁷ S	87.380 †
¹⁵ B	28.840	³² O	91.830 ‡	²⁵ Na	-9.920	³⁷ Al	9.060	³¹ P	-24.300	⁵⁸ S	94.810 ‡
¹⁶ B	36.950 †	³³ O	102.850 †	²⁶ Na	-7.260	³⁸ Al	15.030	³² P	-24.220	⁵⁹ S	105.610 †
¹⁷ B	42.680	³⁴ O	111.060 †	²⁷ Na	-5.700	³⁹ Al	19.490	³³ P	-25.600	⁶⁰ S	113.010 ‡
¹⁸ B	51.580 †			²⁸ Na	-1.140	⁴⁰ Al	26.060	³⁴ P	-24.080	⁶¹ S	123.730 †
¹⁹ B	57.960	¹² F	62.850 †	²⁹ Na	1.960	⁴¹ Al	31.010	³⁵ P	-24.390	⁶² S	131.450 ‡
²⁰ B	68.390 †	¹³ F	44.750 †	³⁰ Na	7.690	⁴² Al	39.360 †	³⁶ P	-20.590	⁶³ S	142.290 †
²¹ B	77.760 †	¹⁴ F	33.050 †	³¹ Na	11.580	⁴³ Al	46.980	³⁷ P	-19.170	⁶⁴ S	150.150 ‡
²² B	89.570 †	¹⁵ F	18.600 †	³² Na	19.380	⁴⁴ Al	56.510 †	³⁸ P	-15.240	⁶⁵ S	160.950 †
²³ B	99.900 †	¹⁶ F	10.970	³³ Na	24.760	⁴⁵ Al	64.860 †	³⁹ P	-13.370	⁶⁶ S	169.000 ‡
		¹⁷ F	2.510	³⁴ Na	32.440	⁴⁶ Al	75.210 †	⁴⁰ P	-9.140	⁶⁷ S	181.500 †
⁷ C	54.840 †	¹⁸ F	-0.440	³⁵ Na	38.030	⁴⁷ Al	83.750 †	⁴¹ P	-6.430	⁶⁸ S	192.620 †
⁸ C	35.160 ‡	¹⁹ F	-2.110	³⁶ Na	45.770	⁴⁸ Al	94.650 †	⁴² P	-1.540		
⁹ C	28.070	²⁰ F	-0.170	³⁷ Na	51.990	⁴⁹ Al	103.420 †	⁴³ P	1.690	²⁶ Cl	56.070 †

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
²⁷ Cl	39.670 †	⁵⁸ Ar	50.720 †	⁴⁷ Ca	-42.280	⁷⁸ Sc	134.450 †	⁵⁶ V	-45.850	⁷⁹ Cr	56.240 †
²⁸ Cl	27.870 †	⁶⁰ Ar	56.980	⁴⁸ Ca	-43.500	⁷⁹ Sc	144.030 †	⁵⁷ V	-44.450	⁸⁰ Cr	63.840 ‡
²⁹ Cl	14.100 †	⁶¹ Ar	66.620 †	⁴⁹ Ca	-40.130			⁵⁸ V	-40.440	⁸¹ Cr	74.100 †
³⁰ Cl	4.780 †	⁶² Ar	72.930	⁵⁰ Ca	-38.580	³⁴ Ti	65.400 †	⁵⁹ V	-38.450	⁸² Cr	81.990 ‡
³¹ Cl	-6.660 †	⁶³ Ar	82.560 †	⁵¹ Ca	-33.840	³⁵ Ti	51.470 †	⁶⁰ V	-33.720	⁸³ Cr	92.570 †
³² Cl	-13.230	⁶⁴ Ar	89.220 ‡	⁵² Ca	-31.280	³⁶ Ti	34.160 †	⁶¹ V	-31.180	⁸⁴ Cr	100.520 ‡
³³ Cl	-20.820	⁶⁵ Ar	99.020 †	⁵³ Ca	-25.510	³⁷ Ti	23.070 †	⁶² V	-25.980	⁸⁵ Cr	111.120 †
³⁴ Cl	-24.870	⁶⁶ Ar	105.890 ‡	⁵⁴ Ca	-22.460	³⁸ Ti	9.630 ‡	⁶³ V	-22.640	⁸⁶ Cr	119.150 ‡
³⁵ Cl	-28.440	⁶⁷ Ar	115.720 †	⁵⁵ Ca	-15.930	³⁹ Ti	1.160	⁶⁴ V	-16.800	⁸⁷ Cr	129.880 †
³⁶ Cl	-28.990	⁶⁸ Ar	122.850 ‡	⁵⁶ Ca	-12.380	⁴⁰ Ti	-9.890	⁶⁵ V	-13.030	⁸⁸ Cr	138.070 †
³⁷ Cl	-31.340	⁶⁹ Ar	134.340 †	⁵⁷ Ca	-5.230	⁴¹ Ti	-16.410	⁶⁶ V	-6.700	⁸⁹ Cr	149.090 †
³⁸ Cl	-29.530	⁷⁰ Ar	144.420 †	⁵⁸ Ca	-1.220	⁴² Ti	-25.780	⁶⁷ V	-2.740	⁹⁰ Cr	157.550 †
³⁹ Cl	-30.080	⁷¹ Ar	156.570 †	⁵⁹ Ca	6.290	⁴³ Ti	-29.760	⁶⁸ V	3.740	⁹¹ Cr	168.790 †
⁴⁰ Cl	-27.990	⁷² Ar	166.660 †	⁶⁰ Ca	11.040	⁴⁴ Ti	-37.000	⁶⁹ V	8.140	⁹² Cr	177.350 †
⁴¹ Cl	-27.930	³⁰ K	48.590 †	⁶¹ Ca	19.120 †	⁴⁵ Ti	-38.760	⁷⁰ V	14.910	⁹³ Cr	188.690 †
⁴² Cl	-25.420	³¹ K	32.540 †	⁶² Ca	24.210	⁴⁶ Ti	-43.560	⁷¹ V	19.600	⁹⁴ Cr	197.390 †
⁴³ Cl	-24.420	³² K	21.020 †	⁶³ Ca	32.690 †	⁴⁷ Ti	-44.610	⁷² V	26.510	⁹⁵ Cr	208.830 †
⁴⁴ Cl	-21.130	³³ K	7.400 †	⁶⁴ Ca	37.880	⁴⁸ Ti	-48.250	⁷³ V	31.560	⁹⁶ Cr	217.680 †
⁴⁵ Cl	-19.450	³⁴ K	-1.300 †	⁶⁵ Ca	46.400 †	⁴⁹ Ti	-48.390	⁷⁴ V	40.160 †	⁹⁷ Cr	229.210 †
⁴⁶ Cl	-14.260	³⁵ K	-11.070	⁶⁶ Ca	51.990	⁵⁰ Ti	-51.130	⁷⁵ V	48.090 ‡	⁹⁸ Cr	238.050 †
⁴⁷ Cl	-9.840	³⁶ K	-17.190	⁶⁷ Ca	60.730 †	⁵¹ Ti	-49.310	⁷⁶ V	57.450 †	⁹⁹ Cr	249.510 †
⁴⁸ Cl	-3.350	³⁷ K	-24.700	⁶⁸ Ca	66.580	⁵² Ti	-49.290	⁷⁷ V	65.490 ‡	¹⁰⁰ Cr	258.630 †
⁴⁹ Cl	1.960	³⁸ K	-28.960	⁶⁹ Ca	75.380 †	⁵³ Ti	-46.060	⁷⁸ V	75.230 †		
⁵⁰ Cl	9.420	³⁹ K	-33.280	⁷⁰ Ca	81.530	⁵⁴ Ti	-44.980	⁷⁹ V	83.650 †	⁴¹ Mn	39.640 †
⁵¹ Cl	15.080	⁴⁰ K	-33.410	⁷¹ Ca	92.020 †	⁵⁵ Ti	-40.670	⁸⁰ V	94.010 †	⁴² Mn	27.910 †
⁵² Cl	23.220 †	⁴¹ K	-35.860	⁷² Ca	101.100 †	⁵⁶ Ti	-39.050	⁸¹ V	102.690 †	⁴³ Mn	14.740 †
⁵³ Cl	29.270	⁴² K	-35.560	⁷³ Ca	112.290 †	⁵⁷ Ti	-33.930	⁸² V	113.370 †	⁴⁴ Mn	5.050 †
⁵⁴ Cl	37.960 †	⁴³ K	-37.270	⁷⁴ Ca	121.440 †	⁵⁸ Ti	-31.740	⁸³ V	122.090 †	⁴⁵ Mn	-6.370 †
⁵⁵ Cl	44.350	⁴⁴ K	-36.430	⁷⁵ Ca	132.960 †	⁵⁹ Ti	-25.940	⁸⁴ V	132.780 †	⁴⁶ Mn	-13.380
⁵⁶ Cl	53.310 †	⁴⁵ K	-37.120	⁷⁶ Ca	142.440 †	⁶⁰ Ti	-23.200	⁸⁵ V	141.550 †	⁴⁷ Mn	-22.580
⁵⁷ Cl	60.360	⁴⁶ K	-35.410	³³ Sc	54.820 †	⁶¹ Ti	-16.970	⁸⁶ V	152.370 †	⁴⁸ Mn	-28.760
⁵⁸ Cl	69.810 †	⁴⁷ K	-35.320	³⁴ Sc	41.250 †	⁶² Ti	-13.440	⁸⁷ V	161.290 †	⁴⁹ Mn	-36.880
⁵⁹ Cl	77.100 ‡	⁴⁸ K	-31.700	³⁵ Sc	25.550 †	⁶³ Ti	-6.600	⁸⁸ V	172.390 †	⁵⁰ Mn	-42.170
⁶⁰ Cl	86.890 †	⁴⁹ K	-28.870	³⁶ Sc	14.830 †	⁶⁴ Ti	-2.650	⁸⁹ V	181.570 †	⁵¹ Mn	-47.670
⁶¹ Cl	94.170 ‡	⁵⁰ K	-23.880	³⁷ Sc	2.990 †	⁶⁵ Ti	4.660	³⁸ Cr	56.320 †	⁵² Mn	-50.580
⁶² Cl	103.930 †	⁵¹ K	-20.100	³⁸ Sc	-5.110 †	⁶⁶ Ti	8.790	³⁹ Cr	43.340 †	⁵³ Mn	-55.100
⁶³ Cl	111.540 ‡	⁵² K	-14.090	³⁹ Sc	-14.610 †	⁶⁷ Ti	16.220	⁴⁰ Cr	28.040 †	⁵⁴ Mn	-55.960
⁶⁴ Cl	121.450 †	⁵³ K	-9.870	⁴⁰ Sc	-20.780	⁶⁸ Ti	20.770	⁴¹ Cr	17.740 †	⁵⁵ Mn	-57.650
⁶⁵ Cl	129.230 ‡	⁵⁴ K	-3.120	⁴¹ Sc	-28.660	⁶⁹ Ti	28.460	⁴² Cr	17.470 †	⁵⁶ Mn	-57.000
⁶⁶ Cl	139.140 †	⁵⁵ K	1.560	⁴² Sc	-32.260	⁷⁰ Ti	33.290	⁴³ Cr	4.870 ‡	⁵⁷ Mn	-57.570
⁶⁷ Cl	147.140 ‡	⁵⁶ K	8.920	⁴³ Sc	-36.560	⁷¹ Ti	41.090	⁴⁴ Cr	-3.430	⁵⁸ Mn	-55.740
⁶⁸ Cl	158.740 †	⁵⁷ K	14.020	⁴⁴ Sc	-38.000	⁷² Ti	46.260	⁴⁵ Cr	-14.540	⁵⁹ Mn	-55.670
⁶⁹ Cl	169.730 †	⁵⁸ K	21.710	⁴⁵ Sc	-41.420	⁷³ Ti	55.730 †	⁴⁶ Cr	-20.230	⁶⁰ Mn	-52.940
²⁷ Ar	67.380 †	⁵⁹ K	27.520	⁴⁶ Sc	-42.200	⁷⁴ Ti	63.790 ‡	⁴⁷ Cr	-29.160	⁶¹ Mn	-52.240
²⁸ Ar	49.000 †	⁶⁰ K	35.770 †	⁴⁷ Sc	-44.530	⁷⁵ Ti	73.990 †	⁴⁸ Cr	-34.020	⁶² Mn	-48.750
²⁹ Ar	36.750 †	⁶¹ K	41.880	⁴⁸ Sc	-44.390	⁷⁶ Ti	82.140 †	⁴⁹ Cr	-41.840	⁶³ Mn	-47.470
³⁰ Ar	21.110 ‡	⁶² K	50.510 †	⁴⁹ Sc	-45.860	⁷⁷ Ti	92.710 †	⁵⁰ Cr	-44.510	⁶⁴ Mn	-43.480
³¹ Ar	11.350	⁶³ K	56.690	⁵⁰ Sc	-43.770	⁷⁸ Ti	101.230 †	⁵¹ Cr	-49.730	⁶⁵ Mn	-41.350
³² Ar	-1.870	⁶⁴ K	65.350 †	⁵¹ Sc	-42.500	⁷⁹ Ti	112.380 †	⁵² Cr	-51.400	⁶⁶ Mn	-36.670
³³ Ar	-8.870	⁶⁵ K	71.890	⁵² Sc	-39.010	⁸⁰ Ti	121.150 †	⁵³ Cr	-55.650	⁶⁷ Mn	-34.090
³⁴ Ar	-18.220	⁶⁶ K	80.760 †	⁵³ Sc	-36.720	⁸¹ Ti	132.590 †	⁵⁴ Cr	-55.310	⁶⁸ Mn	-28.880
³⁵ Ar	-22.700	⁶⁷ K	87.530	⁵⁴ Sc	-32.150	⁸² Ti	141.400 †	⁵⁵ Cr	-54.970	⁶⁹ Mn	-26.080
³⁶ Ar	-29.810	⁶⁸ K	96.450 †	⁵⁵ Sc	-29.360	⁸³ Ti	152.830 †	⁵⁶ Cr	-55.310	⁷⁰ Mn	-20.710
³⁷ Ar	-30.740	⁶⁹ K	103.490	⁵⁶ Sc	-24.010	⁸⁴ Ti	161.690 †	⁵⁷ Cr	-52.370	⁷¹ Mn	-17.430
³⁸ Ar	-34.700	⁷⁰ K	114.090 †	⁵⁷ Sc	-20.690	⁸⁵ Ti	173.230 †	⁵⁸ Cr	-52.100	⁷² Mn	-11.720
³⁹ Ar	-33.290	⁷¹ K	124.060 †	⁵⁸ Sc	-14.670	⁸⁶ Ti	182.230 †	⁵⁹ Cr	-48.310	⁷³ Mn	-8.090
⁴⁰ Ar	-35.390	⁷² K	135.350 †	⁵⁹ Sc	-10.850	³⁷ V	46.510 †	⁶⁰ Cr	-47.410	⁷⁴ Mn	-2.210
⁴¹ Ar	-33.630	⁷³ K	145.340 †	⁶⁰ Sc	-4.420	³⁸ V	33.870 †	⁶¹ Cr	-42.880	⁷⁵ Mn	1.790
⁴² Ar	-35.030	³¹ Ca	58.700 †	⁶¹ Sc	0.150	³⁹ V	20.080 †	⁶² Cr	-41.400	⁷⁶ Mn	9.410
⁴³ Ar	-32.810	³² Ca	40.880 †	⁶² Sc	7.180	⁴⁰ V	10.110 †	⁶³ Cr	-36.400	⁷⁷ Mn	16.380
⁴⁴ Ar	-33.200	³³ Ca	28.970 †	⁶³ Sc	12.120	⁴¹ V	-1.280 †	⁶⁴ Cr	-34.080	⁷⁸ Mn	24.790 †
⁴⁵ Ar	-30.180	³⁴ Ca	13.640 ‡	⁶⁴ Sc	19.600	⁴² V	-9.250	⁶⁵ Cr	-28.430	⁷⁹ Mn	31.890
⁴⁶ Ar	-29.820	³⁵ Ca	4.550	⁶⁵ Sc	24.690	⁴³ V	-18.950	⁶⁶ Cr	-25.650	⁸⁰ Mn	40.720 †
⁴⁷ Ar	-24.910	³⁶ Ca	-6.880	⁶⁶ Sc	32.260	⁴⁴ V	-24.320	⁶⁷ Cr	-19.490	⁸¹ Mn	48.220 ‡
⁴⁸ Ar	-21.810	³⁷ Ca	-13.390	⁶⁷ Sc	37.740	⁴⁵ V	-31.870	⁶⁸ Cr	-16.500	⁸² Mn	57.720 †
⁴⁹ Ar	-15.570	³⁸ Ca	-22.490	⁶⁸ Sc	45.570	⁴⁶ V	-36.430	⁶⁹ Cr	-10.180	⁸³ Mn	65.530 ‡
⁵⁰ Ar	-11.540	³⁹ Ca	-27.120	⁶⁹ Sc	51.300	⁴⁷ V	-41.540	⁷⁰ Cr	-6.720	⁸⁴ Mn	75.360 †
⁵¹ Ar	-4.320	⁴⁰ Ca	-34.640	⁷⁰ Sc	59.230	⁴⁸ V	-43.920	⁷¹ Cr	-0.100	⁸⁵ Mn	83.230 ‡
⁵² Ar	0.130	⁴¹ Ca	-35.120	⁷¹ Sc	65.270	⁴⁹ V	-47.850	⁷² Cr	3.690	⁸⁶ Mn	93.090 †
⁵³ Ar	8.040	⁴² Ca	-39.040	⁷² Sc	74.880 †	⁵⁰ V	-49.240	⁷³ Cr	10.470	⁸⁷ Mn	101.030 ‡
⁵⁴ Ar	12.920	⁴³ Ca	-39.070	⁷³ Sc	83.820 †	⁵¹ V	-52.250	⁷⁴ Cr	14.640	⁸⁸ Mn	111.030 †
⁵⁵ Ar	21.400 †	⁴⁴ Ca	-42.200	⁷⁴ Sc	94.140 †	⁵² V	-51.660	⁷⁵ Cr	23.110 †	⁸⁹ Mn	119.140 †
⁵⁶ Ar	26.690	⁴⁵ Ca	-41.660	⁷⁵ Sc	103.150 †	⁵³ V	-51.900	⁷⁶ Cr	30.180	⁹⁰ Mn	129.450 †
⁵⁷ Ar	35.450 †	⁴⁶ Ca	-43.700	⁷⁶ Sc	113.830 †	⁵⁴ V	-49.850	⁷⁷ Cr	39.410 †	⁹¹ Mn	137.830 †
⁵⁸ Ar	41.430			⁷⁷ Sc	123.180 †	⁵⁵ V	-49.020	⁷⁸ Cr	46.610 ‡	⁹² Mn	148.380 †
										⁹³ Mn	156.860 †

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
⁹⁴ Mn	167.520 †	¹⁰⁶ Fe	249.360 †	⁴⁸ Ni	17.030 †	⁵⁹ Cu	-56.710	⁷⁰ Zn	-69.750	⁸² Ga	-54.610
⁹⁵ Mn	176.140 †	¹⁰⁷ Fe	260.450 †	⁴⁹ Ni	8.140 ‡	⁶⁰ Cu	-58.720	⁷¹ Zn	-67.580	⁸³ Ga	-50.640
⁹⁶ Mn	186.920 †	¹⁰⁸ Fe	269.580 †	⁵⁰ Ni	-3.960	⁶¹ Cu	-61.950	⁷² Zn	-68.240	⁸⁴ Ga	-45.130
⁹⁷ Mn	195.690 †			⁵¹ Ni	-11.970	⁶² Cu	-62.740	⁷³ Zn	-65.460	⁸⁵ Ga	-40.930
⁹⁸ Mn	206.560 †	⁴⁴ Co	48.850 †	⁵² Ni	-22.890	⁶³ Cu	-65.310	⁷⁴ Zn	-65.800	⁸⁶ Ga	-34.910
⁹⁹ Mn	215.330 †	⁴⁵ Co	33.990 †	⁵³ Ni	-29.960	⁶⁴ Cu	-65.120	⁷⁵ Zn	-62.760	⁸⁷ Ga	-30.220
¹⁰⁰ Mn	226.140 †	⁴⁶ Co	22.660 †	⁵⁴ Ni	-39.470	⁶⁵ Cu	-66.960	⁷⁶ Zn	-62.510	⁸⁸ Ga	-23.470
¹⁰¹ Mn	235.190 †	⁴⁷ Co	9.580 †	⁵⁵ Ni	-45.440	⁶⁶ Cu	-65.910	⁷⁷ Zn	-59.050	⁸⁹ Ga	-18.390
¹⁰² Mn	246.200 †	⁴⁸ Co	0.970 †	⁵⁶ Ni	-54.030	⁶⁷ Cu	-67.090	⁷⁸ Zn	-58.380	⁹⁰ Ga	-11.240
¹⁰³ Mn	255.540 †	⁴⁹ Co	-9.850 †	⁵⁷ Ni	-56.570	⁶⁸ Cu	-65.480	⁷⁹ Zn	-54.690	⁹¹ Ga	-6.010
		⁵⁰ Co	-17.580	⁵⁸ Ni	-60.590	⁶⁹ Cu	-65.730	⁸⁰ Zn	-53.610	⁹² Ga	1.260
⁴¹ Fe	66.070 †	⁵¹ Co	-27.270	⁵⁹ Ni	-61.480	⁷⁰ Cu	-63.350	⁸¹ Zn	-48.090	⁹³ Ga	6.650
⁴² Fe	49.020 †	⁵² Co	-34.070	⁶⁰ Ni	-64.440	⁷¹ Cu	-63.080	⁸² Zn	-43.910	⁹⁴ Ga	14.150
⁴³ Fe	36.980 †	⁵³ Co	-42.360	⁶¹ Ni	-64.140	⁷² Cu	-60.100	⁸³ Zn	-37.550	⁹⁵ Ga	19.800
⁴⁴ Fe	22.410 †	⁵⁴ Co	-48.000	⁶² Ni	-66.480	⁷³ Cu	-59.550	⁸⁴ Zn	-33.190	⁹⁶ Ga	27.670
⁴⁵ Fe	12.410 †	⁵⁵ Co	-54.100	⁶³ Ni	-65.230	⁷⁴ Cu	-56.330	⁸⁵ Zn	-26.350	⁹⁷ Ga	33.670
⁴⁶ Fe	-0.380	⁵⁶ Co	-56.390	⁶⁴ Ni	-66.860	⁷⁵ Cu	-55.210	⁸⁶ Zn	-21.520	⁹⁸ Ga	41.850 †
⁴⁷ Fe	-7.680	⁵⁷ Co	-59.400	⁶⁵ Ni	-64.780	⁷⁶ Cu	-51.620	⁸⁷ Zn	-13.970	⁹⁹ Ga	48.040
⁴⁸ Fe	-18.210	⁵⁸ Co	-60.090	⁶⁶ Ni	-65.760	⁷⁷ Cu	-50.230	⁸⁸ Zn	-8.740	¹⁰⁰ Ga	56.410 †
⁴⁹ Fe	-24.680	⁵⁹ Co	-61.990	⁶⁷ Ni	-63.150	⁷⁸ Cu	-46.600	⁸⁹ Zn	-0.800	¹⁰¹ Ga	62.810
⁵⁰ Fe	-34.090	⁶⁰ Co	-61.470	⁶⁸ Ni	-63.210	⁷⁹ Cu	-45.060	⁹⁰ Zn	4.550	¹⁰² Ga	71.370 †
⁵¹ Fe	-39.660	⁶¹ Co	-62.730	⁶⁹ Ni	-59.860	⁸⁰ Cu	-39.290	⁹¹ Zn	12.580	¹⁰³ Ga	77.980
⁵² Fe	-47.680	⁶² Co	-61.270	⁷⁰ Ni	-59.410	⁸¹ Cu	-33.920	⁹² Zn	18.080	¹⁰⁴ Ga	86.710 †
⁵³ Fe	-50.860	⁶³ Co	-61.850	⁷¹ Ni	-55.490	⁸² Cu	-27.260	⁹³ Zn	26.320 †	¹⁰⁵ Ga	93.370
⁵⁴ Fe	-56.620	⁶⁴ Co	-59.570	⁷² Ni	-54.770	⁸³ Cu	-21.940	⁹⁴ Zn	32.060	¹⁰⁶ Ga	102.090 †
⁵⁵ Fe	-57.740	⁶⁵ Co	-59.530	⁷³ Ni	-50.650	⁸⁴ Cu	-14.910	⁹⁵ Zn	40.660 †	¹⁰⁷ Ga	109.080
⁵⁶ Fe	-60.580	⁶⁶ Co	-56.730	⁷⁴ Ni	-49.370	⁸⁵ Cu	-9.230	⁹⁶ Zn	46.750	¹⁰⁸ Ga	118.060 †
⁵⁷ Fe	-60.170	⁶⁷ Co	-55.800	⁷⁵ Ni	-44.900	⁸⁶ Cu	-1.520	⁹⁷ Zn	55.630 †	¹⁰⁹ Ga	125.380 ‡
⁵⁸ Fe	-61.860	⁶⁸ Co	-52.270	⁷⁶ Ni	-43.400	⁸⁷ Cu	4.510	⁹⁸ Zn	61.890	¹¹⁰ Ga	134.610 †
⁵⁹ Fe	-60.260	⁶⁹ Co	-50.860	⁷⁷ Ni	-38.980	⁸⁸ Cu	12.620 †	⁹⁹ Zn	70.950 †	¹¹¹ Ga	142.190 ‡
⁶⁰ Fe	-61.300	⁷⁰ Co	-46.770	⁷⁸ Ni	-37.360	⁸⁹ Cu	18.760	¹⁰⁰ Zn	77.410	¹¹² Ga	151.430 †
⁶¹ Fe	-58.770	⁷¹ Co	-45.110	⁷⁹ Ni	-30.730	⁹⁰ Cu	26.930 †	¹⁰¹ Zn	86.640 †	¹¹³ Ga	159.300 ‡
⁶² Fe	-59.140	⁷² Co	-40.820	⁸⁰ Ni	-25.140	⁹¹ Cu	33.180	¹⁰² Zn	93.310	¹¹⁴ Ga	170.350 †
⁶³ Fe	-55.850	⁷³ Co	-38.630	⁸¹ Ni	-17.620	⁹² Cu	41.540 †	¹⁰³ Zn	102.680 †	¹¹⁵ Ga	180.270 †
⁶⁴ Fe	-55.600	⁷⁴ Co	-33.990	⁸² Ni	-12.120	⁹³ Cu	48.010	¹⁰⁴ Zn	109.390	¹¹⁶ Ga	191.580 †
⁶⁵ Fe	-51.810	⁷⁵ Co	-31.490	⁸³ Ni	-4.270	⁹⁴ Cu	56.720 †	¹⁰⁵ Zn	118.740 †	¹¹⁷ Ga	201.710 †
⁶⁶ Fe	-50.690	⁷⁶ Co	-26.760	⁸⁴ Ni	1.550	⁹⁵ Cu	63.510	¹⁰⁶ Zn	125.780 ‡	⁵³ Ge	54.000 †
⁶⁷ Fe	-46.190	⁷⁷ Co	-24.050	⁸⁵ Ni	10.050 †	⁹⁶ Cu	72.500 †	¹⁰⁷ Zn	135.370 †	⁵⁴ Ge	38.830 †
⁶⁸ Fe	-44.590	⁷⁸ Co	-17.330	⁸⁶ Ni	16.210	⁹⁷ Cu	79.440	¹⁰⁸ Zn	142.740 ‡	⁵⁵ Ge	27.850 †
⁶⁹ Fe	-39.560	⁷⁹ Co	-11.120	⁸⁷ Ni	25.100 †	⁹⁸ Cu	88.590 †	¹⁰⁹ Zn	152.550 †	⁵⁶ Ge	14.040 †
⁷⁰ Fe	-37.720	⁸⁰ Co	-3.570	⁸⁸ Ni	31.350	⁹⁹ Cu	95.700 ‡	¹¹⁰ Zn	160.160 ‡	⁵⁷ Ge	4.160 †
⁷¹ Fe	-32.510	⁸¹ Co	2.640	⁸⁹ Ni	40.280 †	¹⁰⁰ Cu	105.010 †	¹¹¹ Zn	169.960 †	⁵⁸ Ge	-8.150 †
⁷² Fe	-30.150	⁸² Co	10.580	⁹⁰ Ni	46.640	¹⁰¹ Cu	112.300 ‡	¹¹² Zn	177.830 ‡	⁵⁹ Ge	-16.740 †
⁷³ Fe	-24.600	⁸³ Co	17.180	⁹¹ Ni	55.740 †	¹⁰² Cu	121.740 †	¹¹³ Zn	189.520 †	⁶⁰ Ge	-27.780
⁷⁴ Fe	-21.890	⁸⁴ Co	25.790 †	⁹² Ni	62.290	¹⁰³ Cu	129.060 ‡	¹¹⁴ Zn	199.550 †	⁶¹ Ge	-34.200
⁷⁵ Fe	-16.190	⁸⁵ Co	32.720	⁹³ Ni	71.730 †	¹⁰⁴ Cu	138.470 †	¹¹⁵ Zn	211.470 †	⁶² Ge	-42.350
⁷⁶ Fe	-13.150	⁸⁶ Co	41.710 †	⁹⁴ Ni	78.610 ‡	¹⁰⁵ Cu	146.120 ‡	¹¹⁶ Zn	221.680 †	⁶³ Ge	-47.080
⁷⁷ Fe	-5.630	⁸⁷ Co	48.710	⁹⁵ Ni	88.290 †	¹⁰⁶ Cu	155.740 †	⁵⁴ Ga	17.720 †	⁶⁴ Ge	-53.880
⁷⁸ Fe	0.550	⁸⁸ Co	57.740 †	⁹⁶ Ni	95.310 ‡	¹⁰⁷ Cu	163.630 ‡	⁵⁵ Ga	5.060 †	⁶⁵ Ge	-56.250
⁷⁹ Fe	8.860 †	⁸⁹ Co	64.830	⁹⁷ Ni	105.140 †	¹⁰⁸ Cu	173.420 †	⁵⁶ Ga	-4.610 †	⁶⁶ Ge	-61.210
⁸⁰ Fe	15.150	⁹⁰ Co	74.030 †	⁹⁸ Ni	112.330 ‡	¹⁰⁹ Cu	181.430 ‡	⁵⁷ Ga	-15.780 †	⁶⁷ Ge	-62.580
⁸¹ Fe	23.870 †	⁹¹ Co	81.310 ‡	⁹⁹ Ni	122.300 †	¹¹⁰ Cu	191.060 †	⁵⁸ Ga	-24.150 †	⁶⁸ Ge	-66.710
⁸² Fe	30.570	⁹² Co	90.830 †	¹⁰⁰ Ni	129.660 ‡	¹¹¹ Cu	199.260 †	⁵⁹ Ga	-34.110 †	⁶⁹ Ge	-67.190
⁸³ Fe	39.960 †	⁹³ Co	98.420 ‡	¹⁰¹ Ni	139.750 †	¹¹² Cu	211.260 †	⁶⁰ Ga	-40.280	⁷⁰ Ge	-70.550
⁸⁴ Fe	46.990 ‡	⁹⁴ Co	108.190 †	¹⁰² Ni	147.130 ‡	¹¹³ Cu	222.160 †	⁶¹ Ga	-47.300	⁷¹ Ge	-70.360
⁸⁵ Fe	56.730 †	⁹⁵ Co	115.900 ‡	¹⁰³ Ni	157.170 †	⁵⁰ Zn	40.190 †	⁶² Ga	-51.790	⁷² Ge	-72.740
⁸⁶ Fe	63.830 ‡	⁹⁶ Co	125.810 †	¹⁰⁴ Ni	164.870 ‡	⁵¹ Zn	29.700 †	⁶³ Ga	-56.450	⁷³ Ge	-71.740
⁸⁷ Fe	73.600 †	⁹⁷ Co	133.670 ‡	¹⁰⁵ Ni	175.100 †	⁵² Zn	16.050 †	⁶⁴ Ga	-58.580	⁷⁴ Ge	-73.490
⁸⁸ Fe	80.790 ‡	⁹⁸ Co	143.720 †	¹⁰⁶ Ni	183.030 ‡	⁵³ Zn	6.520 †	⁶⁵ Ga	-62.460	⁷⁵ Ge	-71.820
⁸⁹ Fe	90.710 †	⁹⁹ Co	151.750 ‡	¹⁰⁷ Ni	193.400 †	⁵⁴ Zn	-5.890 †	⁶⁶ Ga	-63.560	⁷⁶ Ge	-73.160
⁹⁰ Fe	98.080 ‡	¹⁰⁰ Co	161.900 †	¹⁰⁸ Ni	201.410 ‡	⁵⁵ Zn	-14.400 †	⁶⁷ Ga	-66.670	⁷⁷ Ge	-71.160
⁹¹ Fe	108.310 †	¹⁰¹ Co	169.940 ‡	¹⁰⁹ Ni	211.590 †	⁵⁶ Zn	-25.330	⁶⁸ Ga	-66.890	⁷⁸ Ge	-71.910
⁹² Fe	115.980 ‡	¹⁰² Co	180.040 †	¹¹⁰ Ni	219.790 †	⁵⁷ Zn	-32.590	⁶⁹ Ga	-69.270	⁷⁹ Ge	-69.460
⁹³ Fe	126.450 †	¹⁰³ Co	188.390 †	¹¹¹ Ni	232.430 †	⁵⁸ Zn	-42.340	⁷⁰ Ga	-68.870	⁸⁰ Ge	-69.750
⁹⁴ Fe	134.240 ‡	¹⁰⁴ Co	198.710 †	¹¹² Ni	243.440 †	⁵⁹ Zn	-47.400	⁷¹ Ga	-70.290	⁸¹ Ge	-66.990
⁹⁵ Fe	144.830 †	¹⁰⁵ Co	207.320 †			⁶⁰ Zn	-54.140	⁷² Ga	-69.080	⁸² Ge	-66.760
⁹⁶ Fe	152.770 ‡	¹⁰⁶ Co	217.810 †	⁴⁹ Cu	29.350 †	⁶¹ Zn	-56.470	⁷³ Ga	-69.920	⁸³ Ge	-62.280
⁹⁷ Fe	163.480 †	¹⁰⁷ Co	226.580 †	⁵⁰ Cu	19.170 †	⁶² Zn	-60.880	⁷⁴ Ga	-68.060	⁸⁴ Ge	-59.190
⁹⁸ Fe	171.580 †	¹⁰⁸ Co	236.960 †	⁵¹ Cu	6.790 †	⁶³ Zn	-61.940	⁷⁵ Ga	-68.550	⁸⁵ Ge	-53.850
⁹⁹ Fe	182.390 †	¹⁰⁹ Co	245.920 †	⁵² Cu	-2.450 †	⁶⁴ Zn	-65.590	⁷⁶ Ga	-66.390	⁸⁶ Ge	-50.490
¹⁰⁰ Fe	190.510 †	¹¹⁰ Co	258.450 †	⁵³ Cu	-13.650 †	⁶⁵ Zn	-65.640	⁷⁷ Ga	-66.300	⁸⁷ Ge	-44.630
¹⁰¹ Fe	201.250 †	¹¹¹ Co	269.860 †	⁵⁴ Cu	-21.910 †	⁶⁶ Zn	-68.530	⁷⁸ Ga	-63.700	⁸⁸ Ge	-40.750
¹⁰² Fe	209.660 †			⁵⁵ Cu	-31.680 †	⁶⁷ Zn	-67.720	⁷⁹ Ga	-63.160	⁸⁹ Ge	-34.180
¹⁰³ Fe	220.610 †	⁴⁵ Ni	59.230 †	⁵⁶ Cu	-38.780	⁶⁸ Zn	-69.910	⁸⁰ Ga	-60.280	⁹⁰ Ge	-29.920
¹⁰⁴ Fe	229.310 †	⁴⁶ Ni	43.030 †	⁵⁷ Cu	-47.560	⁶⁹ Zn	-68.520	⁸¹ Ga	-59.270	⁹¹ Ge	-22.950
¹⁰⁵ Fe	240.450 †	⁴⁷ Ni	31.420 †	⁵⁸ Cu	-52.380						

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
⁹² Ge	-18.500	¹⁰⁷ As	61.420	¹²⁰ Se	141.750 †	⁶⁴ Kr	9.350 †	⁶⁷ Rb	0.520 †	⁶⁸ Sr	8.810 †		
⁹³ Ge	-11.390	¹⁰⁸ As	69.490	¹²¹ Se	152.740 †	⁶⁵ Kr	0.350 †	⁶⁸ Rb	-7.780 †	⁶⁹ Sr	0.310 †		
⁹⁴ Ge	-6.730	¹⁰⁹ As	75.840	¹²² Se	161.620 †	⁶⁶ Kr	-10.400 ‡	⁶⁹ Rb	-17.420 †	⁷⁰ Sr	-10.280 ‡		
⁹⁵ Ge	0.640	¹¹⁰ As	84.150 †	¹²³ Se	172.660 †	⁶⁷ Kr	-17.700 ‡	⁷⁰ Rb	-24.370 †	⁷¹ Sr	-17.420 ‡		
⁹⁶ Ge	5.580	¹¹¹ As	90.820	¹²⁴ Se	181.530 †	⁶⁸ Kr	-27.110	⁷¹ Rb	-33.040 †	⁷² Sr	-27.030		
⁹⁷ Ge	13.330	¹¹² As	99.400 †	¹²⁵ Se	192.350 †	⁶⁹ Kr	-33.060	⁷² Rb	-38.870 †	⁷³ Sr	-33.030		
⁹⁸ Ge	18.640	¹¹³ As	106.350	¹²⁶ Se	201.450 †	⁷⁰ Kr	-41.510	⁷³ Rb	-46.530 †	⁷⁴ Sr	-41.630		
⁹⁹ Ge	26.700	¹¹⁴ As	114.970 †	⁶³ Br	0.880 †	⁷¹ Kr	-46.370	⁷⁴ Rb	-51.340	⁷⁵ Sr	-46.600		
¹⁰⁰ Ge	32.230	¹¹⁵ As	122.220	⁶⁴ Br	-7.910 †	⁷² Kr	-53.820	⁷⁵ Rb	-57.150	⁷⁶ Sr	-54.200		
¹⁰¹ Ge	40.500 †	¹¹⁶ As	132.580 †	⁶⁵ Br	-17.620 †	⁷³ Kr	-56.800	⁷⁶ Rb	-60.240	⁷⁷ Sr	-57.460		
¹⁰² Ge	46.260	¹¹⁷ As	141.800 †	⁶⁶ Br	-24.700 †	⁷⁴ Kr	-62.420	⁷⁷ Rb	-65.030	⁷⁸ Sr	-63.160		
¹⁰³ Ge	54.740 †	¹¹⁸ As	152.430 †	⁶⁷ Br	-33.090 †	⁷⁵ Kr	-64.580	⁷⁸ Rb	-67.220	⁷⁹ Sr	-65.510		
¹⁰⁴ Ge	60.740	¹¹⁹ As	161.880 †	⁶⁸ Br	-38.830 †	⁷⁶ Kr	-69.190	⁷⁹ Rb	-71.200	⁸⁰ Sr	-70.400		
¹⁰⁵ Ge	69.390 †	⁵⁸ Se	36.680 †	⁶⁹ Br	-46.290	⁷⁷ Kr	-70.480	⁸⁰ Rb	-72.600	⁸¹ Sr	-71.960		
¹⁰⁶ Ge	75.470	⁵⁹ Se	25.550 †	⁷⁰ Br	-50.930	⁷⁸ Kr	-74.290	⁸¹ Rb	-75.980	⁸² Sr	-76.260		
¹⁰⁷ Ge	84.140 †	⁶⁰ Se	11.960 †	⁷¹ Br	-56.510	⁷⁹ Kr	-74.810	⁸² Rb	-76.840	⁸³ Sr	-77.300		
¹⁰⁸ Ge	90.530	⁶¹ Se	2.100 †	⁷² Br	-59.280	⁸⁰ Kr	-78.060	⁸³ Rb	-79.630	⁸⁴ Sr	-80.960		
¹⁰⁹ Ge	99.450 †	⁶² Se	-10.260 †	⁷³ Br	-63.960	⁸¹ Kr	-78.070	⁸⁴ Rb	-79.980	⁸⁵ Sr	-81.480		
¹¹⁰ Ge	106.180	⁶³ Se	-17.990 †	⁷⁴ Br	-65.940	⁸² Kr	-80.720	⁸⁵ Rb	-82.360	⁸⁶ Sr	-84.690		
¹¹¹ Ge	115.350 †	⁶⁴ Se	-27.470 ‡	⁷⁵ Br	-69.620	⁸³ Kr	-80.240	⁸⁶ Rb	-82.370	⁸⁷ Sr	-84.850		
¹¹² Ge	122.360 ‡	⁶⁵ Se	-33.500	⁷⁶ Br	-70.720	⁸⁴ Kr	-82.480	⁸⁷ Rb	-84.210	⁸⁸ Sr	-87.490		
¹¹³ Ge	131.570 †	⁶⁶ Se	-41.630	⁷⁷ Br	-73.650	⁸⁵ Kr	-81.680	⁸⁸ Rb	-82.480	⁸⁹ Sr	-85.910		
¹¹⁴ Ge	138.880 ‡	⁶⁷ Se	-46.330	⁷⁸ Br	-73.980	⁸⁶ Kr	-83.370	⁸⁹ Rb	-81.510	⁹⁰ Sr	-85.740		
¹¹⁵ Ge	149.830 †	⁶⁸ Se	-53.550	⁷⁹ Br	-76.360	⁸⁷ Kr	-80.840	⁹⁰ Rb	-78.870	⁹¹ Sr	-83.250		
¹¹⁶ Ge	159.130 †	⁶⁹ Se	-56.230	⁸⁰ Br	-76.200	⁸⁸ Kr	-79.710	⁹¹ Rb	-77.560	⁹² Sr	-82.710		
¹¹⁷ Ge	170.340 †	⁷⁰ Se	-61.600	⁸¹ Br	-78.010	⁸⁹ Kr	-76.290	⁹² Rb	-74.370	⁹³ Sr	-79.650		
¹¹⁸ Ge	179.870 †	⁷¹ Se	-63.360	⁸² Br	-77.370	⁹⁰ Kr	-74.830	⁹³ Rb	-72.570	⁹⁴ Sr	-78.580		
⁵⁹ As	3.110 †	⁷² Se	-67.850	⁸³ Br	-78.770	⁹¹ Kr	-70.860	⁹⁴ Rb	-68.720	⁹⁵ Sr	-74.840		
⁶⁰ As	-6.560 †	⁷³ Se	-68.870	⁸⁴ Br	-77.820	⁹² Kr	-68.910	⁹⁵ Rb	-66.530	⁹⁶ Sr	-73.360		
⁶¹ As	-17.840 †	⁷⁴ Se	-72.370	⁸⁵ Br	-78.710	⁹³ Kr	-64.290	⁹⁶ Rb	-62.330	⁹⁷ Sr	-69.230		
⁶² As	-25.330 †	⁷⁵ Se	-72.530	⁸⁶ Br	-76.020	⁹⁴ Kr	-61.950	⁹⁷ Rb	-59.870	⁹⁸ Sr	-67.460		
⁶³ As	-33.740 †	⁷⁶ Se	-75.310	⁸⁷ Br	-74.090	⁹⁵ Kr	-56.980	⁹⁸ Rb	-55.440	⁹⁹ Sr	-63.080		
⁶⁴ As	-39.540 †	⁷⁷ Se	-74.750	⁸⁸ Br	-70.520	⁹⁶ Kr	-54.370	⁹⁹ Rb	-52.590	¹⁰⁰ Sr	-60.930		
⁶⁵ As	-46.580 †	⁷⁸ Se	-77.030	⁸⁹ Br	-68.270	⁹⁷ Kr	-49.180	¹⁰⁰ Rb	-47.760	¹⁰¹ Sr	-56.180		
⁶⁶ As	-51.030	⁷⁹ Se	-76.030	⁹⁰ Br	-64.160	⁹⁸ Kr	-46.210	¹⁰¹ Rb	-44.470	¹⁰² Sr	-53.610		
⁶⁷ As	-56.240	⁸⁰ Se	-77.710	⁹¹ Br	-61.430	⁹⁹ Kr	-40.660	¹⁰² Rb	-39.210	¹⁰³ Sr	-48.410		
⁶⁸ As	-58.660	⁸¹ Se	-76.250	⁹² Br	-56.670	¹⁰⁰ Kr	-37.270	¹⁰³ Kr	-35.470	¹⁰⁴ Sr	-45.390		
⁶⁹ As	-63.020	⁸² Se	-77.510	⁹³ Br	-53.570	¹⁰¹ Kr	-31.290	¹⁰⁴ Rb	-29.800	¹⁰⁵ Sr	-39.790		
⁷⁰ As	-64.520	⁸³ Se	-75.740	⁹⁴ Br	-48.470	¹⁰² Kr	-27.460	¹⁰⁵ Rb	-25.690	¹⁰⁶ Sr	-36.410		
⁷¹ As	-68.070	⁸⁴ Se	-76.480	⁹⁵ Br	-45.130	¹⁰³ Kr	-21.100	¹⁰⁶ Rb	-19.650	¹⁰⁷ Sr	-30.460		
⁷² As	-68.860	⁸⁵ Se	-72.980	⁹⁶ Br	-39.810	¹⁰⁴ Kr	-16.910	¹⁰⁷ Rb	-15.220	¹⁰⁸ Sr	-26.760		
⁷³ As	-71.440	⁸⁶ Se	-70.880	⁹⁷ Br	-36.120	¹⁰⁵ Kr	-10.210	¹⁰⁸ Rb	-8.850	¹⁰⁹ Sr	-20.500		
⁷⁴ As	-71.390	⁸⁷ Se	-66.510	⁹⁸ Br	-30.450	¹⁰⁶ Kr	-5.720	¹⁰⁹ Rb	-4.160	¹¹⁰ Sr	-16.520		
⁷⁵ As	-73.290	⁸⁸ Se	-64.110	⁹⁹ Br	-26.360	¹⁰⁷ Kr	1.290	¹¹⁰ Rb	2.470	¹¹¹ Sr	-10.000		
⁷⁶ As	-72.540	⁸⁹ Se	-59.200	¹⁰⁰ Br	-20.270	¹⁰⁸ Kr	6.040	¹¹¹ Rb	7.250	¹¹² Sr	-5.890		
⁷⁷ As	-73.990	⁹⁰ Se	-56.310	¹⁰¹ Br	-15.760	¹⁰⁹ Kr	13.290	¹¹² Rb	13.970	¹¹³ Sr	0.720		
⁷⁸ As	-72.840	⁹¹ Se	-50.750	¹⁰² Br	-9.290	¹¹⁰ Kr	18.130	¹¹³ Rb	19.000	¹¹⁴ Sr	5.120		
⁷⁹ As	-73.710	⁹² Se	-47.470	¹⁰³ Br	-4.430	¹¹¹ Kr	25.460	¹¹⁴ Rb	25.960	¹¹⁵ Sr	11.990		
⁸⁰ As	-72.110	⁹³ Se	-41.530	¹⁰⁴ Br	2.370	¹¹² Kr	30.560	¹¹⁵ Rb	31.270	¹¹⁶ Sr	16.690		
⁸¹ As	-72.530	⁹⁴ Se	-38.020	¹⁰⁵ Br	7.520	¹¹³ Kr	38.120	¹¹⁶ Rb	38.500	¹¹⁷ Sr	23.850		
⁸² As	-70.610	⁹⁵ Se	-31.890	¹⁰⁶ Br	14.630	¹¹⁴ Kr	43.510	¹¹⁷ Rb	44.120	¹¹⁸ Sr	28.870		
⁸³ As	-70.520	⁹⁶ Se	-28.080	¹⁰⁷ Br	20.010	¹¹⁵ Kr	51.340	¹¹⁸ Rb	51.440	¹¹⁹ Sr	36.120		
⁸⁴ As	-66.860	⁹⁷ Se	-21.640	¹⁰⁸ Br	27.360	¹¹⁶ Kr	57.020	¹¹⁹ Rb	57.380	¹²⁰ Sr	41.480		
⁸⁵ As	-63.940	⁹⁸ Se	-17.470	¹⁰⁹ Br	32.820	¹¹⁷ Kr	64.930	¹²⁰ Rb	66.420 †	¹²¹ Sr	50.440 †		
⁸⁶ As	-59.420	⁹⁹ Se	-10.620	¹¹⁰ Br	40.230	¹¹⁸ Kr	70.940	¹²¹ Rb	74.320 ‡	¹²² Sr	57.770 ‡		
⁸⁷ As	-56.220	¹⁰⁰ Se	-6.040	¹¹¹ Br	45.950	¹¹⁹ Kr	80.560 †	¹²² Rb	83.670 †	¹²³ Sr	67.040 †		
⁸⁸ As	-51.160	¹⁰¹ Se	1.160	¹¹² Br	53.590	¹²⁰ Kr	88.540 ‡	¹²³ Rb	91.820 †	¹²⁴ Sr	74.620 ‡		
⁸⁹ As	-47.450	¹⁰² Se	6.030	¹¹³ Br	59.580	¹²¹ Kr	98.460 †	¹²⁴ Rb	101.590 †	¹²⁵ Sr	84.340 †		
⁹⁰ As	-41.700	¹⁰³ Se	13.520	¹¹⁴ Br	67.490	¹²² Kr	106.680 †	¹²⁵ Rb	109.750 †	¹²⁶ Sr	91.960 ‡		
⁹¹ As	-37.610	¹⁰⁴ Se	18.660	¹¹⁵ Br	73.770	¹²³ Kr	117.030 †	¹²⁶ Rb	119.570 †	¹²⁷ Sr	101.740 †		
⁹² As	-31.460	¹⁰⁵ Se	26.410	¹¹⁶ Br	81.740	¹²⁴ Kr	125.260 †	¹²⁷ Rb	127.730 †	¹²⁸ Sr	109.370 ‡		
⁹³ As	-27.160	¹⁰⁶ Se	31.800	¹¹⁷ Br	88.340	¹²⁵ Kr	135.650 †	¹²⁸ Rb	137.370 †	¹²⁹ Sr	118.970 †		
⁹⁴ As	-20.840	¹⁰⁷ Se	39.760	¹¹⁸ Br	98.040 †	¹²⁶ Kr	143.880 †	¹²⁹ Rb	145.750 †	¹³⁰ Sr	126.850 ‡		
⁹⁵ As	-16.300	¹⁰⁸ Se	45.240	¹¹⁹ Br	106.600 †	¹²⁷ Kr	154.070 †	¹³⁰ Rb	155.670 †	¹³¹ Sr	136.780 †		
⁹⁶ As	-9.690	¹⁰⁹ Se	53.250	¹²⁰ Br	116.580 †	¹²⁸ Kr	162.530 †	¹³¹ Rb	164.100 †	¹³² Sr	144.700 ‡		
⁹⁷ As	-4.840	¹¹⁰ Se	59.010	¹²¹ Br	125.380 †	¹²⁹ Kr	173.010 †	¹³² Rb	174.070 †	¹³³ Sr	154.650 †		
⁹⁸ As	2.180	¹¹¹ Se	67.260 †	¹²² Br	135.790 †	¹³⁰ Kr	181.510 †	¹³³ Rb	182.740 †	¹³⁴ Sr	162.830 †		
⁹⁹ As	7.410	¹¹² Se	73.320	¹²³ Br	144.590 †	¹³¹ Kr	192.020 †	¹³⁴ Rb	192.920 †	¹³⁵ Sr	173.000 †		
¹⁰⁰ As	14.750	¹¹³ Se	81.820 †	¹²⁴ Br	155.040 †	¹³² Kr	200.750 †	¹³⁵ Rb	201.690 †	¹³⁶ Sr	181.250 †		
¹⁰¹ As	20.230	¹¹⁴ Se	88.180	¹²⁵ Br	163.820 †	¹³³ Kr	211.460 †	¹³⁶ Rb	212.040 †	¹³⁷ Sr	191.580 †		
¹⁰² As	27.830	¹¹⁵ Se	96.740 †	¹²⁶ Br	174.070 †	¹³⁴ Kr	220.280 †	¹³⁷ Rb	221.030 †	¹³⁸ Sr	200.060 †		
¹⁰³ As	33.550	¹¹⁶ Se	103.400	¹²⁷ Br	183.070 †	¹³⁵ Kr	231.140 †	¹³⁸ Rb	231.580 †	¹³⁹ Sr	210.600 †		
¹⁰⁴ As	41.380	¹¹⁷ Se	113.680 †	¹²⁸ Br	193.610 †	¹³⁶ Kr	240.170 †	¹³⁹ Rb	240.770 †	¹⁴⁰ Sr	219.290 †		
¹⁰⁵ As	47.340	¹¹⁸ Se	122.320 †	¹²⁹ Br	202.640 †	⁶⁵ Rb	21.520 †	⁶⁶ Sr	31.020 †	¹⁴¹ Sr	230.020 †		
¹⁰⁶ As	55.370	¹¹⁹ Se	132.880 †			⁶⁶ Rb	11.500 †	⁶⁷ Sr	20.790 †	¹⁴² Sr	238.860 †		

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁴³ Sr	249.750 †	¹⁴³ Y	220.340 †	¹⁴³ Zr	191.560 †	¹⁴⁰ Nb	139.340 †	¹³³ Mo	58.580 †	¹²² Tc	-29.490
¹⁴⁴ Sr	258.600 †	¹⁴⁴ Y	230.760 †	¹⁴⁴ Zr	199.860 †	¹⁴¹ Nb	147.230 ‡	¹³⁴ Mo	65.280	¹²³ Tc	-25.880
⁷⁰ Y	11.350 †	¹⁴⁵ Y	239.560 †	¹⁴⁵ Zr	210.250 †	¹⁴² Nb	156.720 †	¹³⁵ Mo	74.040 †	¹²⁴ Tc	-20.520
⁷¹ Y	0.560 †	⁷¹ Zr	20.980 †	¹⁴⁶ Zr	218.550 †	¹⁴³ Nb	164.830 †	¹³⁶ Mo	80.820	¹²⁵ Tc	-16.530
⁷² Y	-7.530 †	⁷² Zr	9.230 †	¹⁴⁷ Zr	229.290 †	¹⁴⁴ Nb	174.520 †	¹³⁷ Mo	89.630 †	¹²⁶ Tc	-9.460
⁷³ Y	-17.340 †	⁷³ Zr	0.950 †	¹⁴⁸ Zr	237.500 †	¹⁴⁵ Nb	182.800 †	¹³⁸ Mo	96.670	¹²⁷ Tc	-3.520
⁷⁴ Y	-24.280 †	⁷⁴ Zr	-9.800 †	¹⁴⁹ Zr	247.680 †	¹⁴⁶ Nb	192.690 †	¹³⁹ Mo	105.730 †	¹²⁸ Tc	3.890
⁷⁵ Y	-33.060 †	⁷⁵ Zr	-16.920 †	¹⁵⁰ Zr	255.930 †	¹⁴⁷ Nb	201.020 †	¹⁴⁰ Mo	112.860 ‡	¹²⁹ Tc	10.120
⁷⁶ Y	-38.950 †	⁷⁶ Zr	-26.620 ‡	⁷³ Nb	21.610 †	¹⁴⁸ Nb	211.230 †	¹⁴¹ Mo	122.100 †	¹³⁰ Tc	18.030
⁷⁷ Y	-46.740 †	⁷⁷ Zr	-32.690	⁷⁴ Nb	12.380 †	¹⁴⁹ Nb	219.520 †	¹⁴² Mo	129.480 ‡	¹³¹ Tc	24.330
⁷⁸ Y	-51.730	⁷⁸ Zr	-41.380	⁷⁵ Nb	1.420 †	¹⁵⁰ Nb	229.290 †	¹⁴³ Mo	138.950 †	¹³² Tc	32.340
⁷⁹ Y	-57.610	⁷⁹ Zr	-46.560	⁷⁶ Nb	-6.650 †	¹⁵¹ Nb	237.560 †	¹⁴⁴ Mo	146.550 ‡	¹³³ Tc	38.690
⁸⁰ Y	-60.840	⁸⁰ Zr	-54.140	⁷⁷ Nb	-16.550 †	¹⁵² Nb	247.790 †	¹⁴⁵ Mo	156.230 †	¹³⁴ Tc	46.560
⁸¹ Y	-65.910	⁸¹ Zr	-57.540	⁷⁸ Nb	-23.550 †	¹⁵³ Nb	256.610 †	¹⁴⁶ Mo	164.000 ‡	¹³⁵ Tc	53.190
⁸² Y	-68.330	⁸² Zr	-63.480	⁷⁹ Nb	-32.410 †	¹⁵⁴ Nb	266.920 †	¹⁴⁷ Mo	173.860 †	¹³⁶ Tc	61.420 †
⁸³ Y	-72.790	⁸³ Zr	-66.070	⁸⁰ Nb	-38.480 †	¹⁵⁵ Nb	275.870 †	¹⁴⁸ Mo	181.630 ‡	¹³⁷ Tc	68.130
⁸⁴ Y	-74.670	⁸⁴ Zr	-71.390	⁸¹ Nb	-46.230 †	⁷⁴ Mo	31.350 †	¹⁴⁹ Mo	191.860 †	¹³⁸ Tc	76.430 †
⁸⁵ Y	-78.500	⁸⁵ Zr	-73.440	⁸² Nb	-51.310	⁷⁵ Mo	21.950 †	¹⁵⁰ Mo	199.560 ‡	¹³⁹ Tc	83.410
⁸⁶ Y	-79.840	⁸⁶ Zr	-78.100	⁸³ Nb	-57.400	⁷⁶ Mo	10.100 †	¹⁵¹ Mo	209.230 †	¹⁴⁰ Tc	91.960 †
⁸⁷ Y	-83.200	⁸⁷ Zr	-79.600	⁸⁴ Nb	-60.840	⁷⁷ Mo	1.880 †	¹⁵² Mo	216.980 ‡	¹⁴¹ Tc	99.030
⁸⁸ Y	-84.160	⁸⁸ Zr	-83.770	⁸⁵ Nb	-66.280	⁷⁸ Mo	-8.920 †	¹⁵³ Mo	227.170 †	¹⁴² Tc	107.770 †
⁸⁹ Y	-86.940	⁸⁹ Zr	-84.880	⁸⁶ Nb	-69.130	⁷⁹ Mo	-16.060 †	¹⁵⁴ Mo	235.520 †	¹⁴³ Tc	115.090
⁹⁰ Y	-86.150	⁹⁰ Zr	-88.450	⁸⁷ Nb	-73.920	⁸⁰ Mo	-25.820 ‡	¹⁵⁵ Mo	245.780 †	¹⁴⁴ Tc	124.070 †
⁹¹ Y	-86.130	⁹¹ Zr	-87.810	⁸⁸ Nb	-76.210	⁸¹ Mo	-32.050	¹⁵⁶ Mo	254.270 †	¹⁴⁵ Tc	131.620 ‡
⁹² Y	-84.420	⁹² Zr	-88.580	⁸⁹ Nb	-80.530	⁸² Mo	-40.670	¹⁵⁷ Mo	264.590 †	¹⁴⁶ Tc	140.810 †
⁹³ Y	-84.030	⁹³ Zr	-87.010	⁹⁰ Nb	-82.420	⁸³ Mo	-45.900	¹⁵⁸ Mo	273.070 †	¹⁴⁷ Tc	148.530 ‡
⁹⁴ Y	-81.720	⁹⁴ Zr	-87.390	⁹¹ Nb	-86.130	⁸⁴ Mo	-53.640	¹⁵⁹ Mo	283.410 †	¹⁴⁸ Tc	157.920 †
⁹⁵ Y	-80.790	⁹⁵ Zr	-85.220	⁹² Nb	-86.280	⁸⁵ Mo	-57.240	¹⁶⁰ Mo	292.130 †	¹⁴⁹ Tc	165.650 ‡
⁹⁶ Y	-77.790	⁹⁶ Zr	-85.040	⁹³ Nb	-87.200	⁸⁶ Mo	-63.570	¹⁶¹ Mo	302.680 †	¹⁵⁰ Tc	175.410 †
⁹⁷ Y	-76.440	⁹⁷ Zr	-82.170	⁹⁴ Nb	-86.400	⁸⁷ Mo	-66.600	¹⁶² Mo	311.690 †	¹⁵¹ Tc	183.070 ‡
⁹⁸ Y	-73.030	⁹⁸ Zr	-81.540	⁹⁵ Nb	-86.930	⁸⁸ Mo	-72.240	⁷⁷ Tc	22.340 †	¹⁵² Tc	192.280 †
⁹⁹ Y	-71.380	⁹⁹ Zr	-78.240	⁹⁶ Nb	-85.510	⁸⁹ Mo	-74.700	⁷⁸ Tc	13.220 †	¹⁵³ Tc	200.000 ‡
¹⁰⁰ Y	-67.710	¹⁰⁰ Zr	-77.300	⁹⁷ Nb	-85.490	⁹⁰ Mo	-79.820	⁷⁹ Tc	2.250 †	¹⁵⁴ Tc	209.740 †
¹⁰¹ Y	-65.680	¹⁰¹ Zr	-73.740	⁹⁸ Nb	-83.390	⁹¹ Mo	-81.860	⁸⁰ Tc	-5.770 †	¹⁵⁵ Tc	218.050 †
¹⁰² Y	-61.620	¹⁰² Zr	-72.420	⁹⁹ Nb	-82.930	⁹² Mo	-86.350	⁸¹ Tc	-15.710 †	¹⁵⁶ Tc	227.860 †
¹⁰³ Y	-59.170	¹⁰³ Zr	-68.460	¹⁰⁰ Nb	-80.410	⁹³ Mo	-86.640	⁸² Tc	-22.800 †	¹⁵⁷ Tc	236.320 †
¹⁰⁴ Y	-54.650	¹⁰⁴ Zr	-66.710	¹⁰¹ Nb	-79.630	⁹⁴ Mo	-88.330	⁸³ Tc	-31.590 †	¹⁵⁸ Tc	246.200 †
¹⁰⁵ Y	-51.740	¹⁰⁵ Zr	-62.290	¹⁰² Nb	-76.810	⁹⁵ Mo	-87.680	⁸⁴ Tc	-37.670 †	¹⁵⁹ Tc	254.640 †
¹⁰⁶ Y	-46.810	¹⁰⁶ Zr	-60.060	¹⁰³ Nb	-75.620	⁹⁶ Mo	-88.960	⁸⁵ Tc	-45.580 †	¹⁶⁰ Tc	264.550 †
¹⁰⁷ Y	-43.540	¹⁰⁷ Zr	-55.230	¹⁰⁴ Nb	-72.390	⁹⁷ Mo	-87.670	⁸⁶ Tc	-50.770	¹⁶¹ Tc	273.240 †
¹⁰⁸ Y	-38.240	¹⁰⁸ Zr	-52.630	¹⁰⁵ Nb	-70.730	⁹⁸ Mo	-88.370	⁸⁷ Tc	-57.250	¹⁶² Tc	283.360 †
¹⁰⁹ Y	-34.650	¹⁰⁹ Zr	-47.450	¹⁰⁶ Nb	-67.030	⁹⁹ Mo	-86.360	⁸⁸ Tc	-61.090	¹⁶³ Tc	292.340 †
¹¹⁰ Y	-29.030	¹¹⁰ Zr	-44.510	¹⁰⁷ Nb	-64.890	¹⁰⁰ Mo	-86.600	⁸⁹ Tc	-66.880	¹⁶⁴ Tc	302.580 †
¹¹¹ Y	-25.150	¹¹¹ Zr	-39.000	¹⁰⁸ Nb	-60.750	¹⁰¹ Mo	-84.140	⁹⁰ Tc	-70.140	¹⁶⁵ Tc	311.740 †
¹¹² Y	-19.260	¹¹² Zr	-35.770	¹⁰⁹ Nb	-58.210	¹⁰² Mo	-84.040	⁹¹ Tc	-75.400	⁷⁸ Ru	31.900 †
¹¹³ Y	-15.250	¹¹³ Zr	-29.980	¹¹⁰ Nb	-53.680	¹⁰³ Mo	-81.290	⁹² Tc	-78.220	⁷⁹ Ru	22.680 †
¹¹⁴ Y	-9.250	¹¹⁴ Zr	-26.610	¹¹¹ Nb	-50.790	¹⁰⁴ Mo	-80.780	⁹³ Tc	-82.850	⁸⁰ Ru	10.840 †
¹¹⁵ Y	-4.950	¹¹⁵ Zr	-20.700	¹¹² Nb	-45.900	¹⁰⁵ Mo	-77.630	⁹⁴ Tc	-83.900	⁸¹ Ru	2.720 †
¹¹⁶ Y	1.320	¹¹⁶ Zr	-17.010	¹¹³ Nb	-42.720	¹⁰⁶ Mo	-76.680	⁹⁵ Tc	-85.750	⁸² Ru	-8.100 †
¹¹⁷ Y	5.940	¹¹⁷ Zr	-10.840	¹¹⁴ Nb	-37.540	¹⁰⁷ Mo	-73.050	⁹⁶ Tc	-85.850	⁸³ Ru	-15.330 †
¹¹⁸ Y	12.500	¹¹⁸ Zr	-6.810	¹¹⁵ Nb	-34.210	¹⁰⁸ Mo	-71.600	⁹⁷ Tc	-87.270	⁸⁴ Ru	-24.980 ‡
¹¹⁹ Y	17.450	¹¹⁹ Zr	-0.330	¹¹⁶ Nb	-28.900	¹⁰⁹ Mo	-67.540	⁹⁸ Tc	-86.730	⁸⁵ Ru	-31.200 ‡
¹²⁰ Y	24.120	¹²⁰ Zr	4.020	¹¹⁷ Nb	-25.280	¹¹⁰ Mo	-65.720	⁹⁹ Tc	-87.560	⁸⁶ Ru	-39.980
¹²¹ Y	29.410	¹²¹ Zr	10.610	¹¹⁸ Nb	-19.700	¹¹¹ Mo	-61.280	¹⁰⁰ Tc	-86.280	⁸⁷ Ru	-45.320
¹²² Y	37.790 †	¹²² Zr	15.330	¹¹⁹ Nb	-15.750	¹¹² Mo	-59.110	¹⁰¹ Tc	-86.650	⁸⁸ Ru	-53.450
¹²³ Y	45.040	¹²³ Zr	23.630 †	¹²⁰ Nb	-9.860	¹¹³ Mo	-54.330	¹⁰² Tc	-84.910	⁸⁹ Ru	-57.490
¹²⁴ Y	53.740 †	¹²⁴ Zr	30.300	¹²¹ Nb	-5.580	¹¹⁴ Mo	-51.840	¹⁰³ Tc	-84.940	⁹⁰ Ru	-64.160
¹²⁵ Y	61.250 ‡	¹²⁵ Zr	38.930 †	¹²² Nb	0.430	¹¹⁵ Mo	-46.770	¹⁰⁴ Tc	-82.890	⁹¹ Ru	-67.600
¹²⁶ Y	70.410 †	¹²⁶ Zr	45.870	¹²³ Nb	5.060	¹¹⁶ Mo	-44.110	¹⁰⁵ Tc	-82.510	⁹² Ru	-73.660
¹²⁷ Y	77.960 ‡	¹²⁷ Zr	54.970 †	¹²⁴ Nb	12.790	¹¹⁷ Mo	-38.910	¹⁰⁶ Tc	-80.040	⁹³ Ru	-76.620
¹²⁸ Y	87.200 †	¹²⁸ Zr	61.970	¹²⁵ Nb	19.380	¹¹⁸ Mo	-35.920	¹⁰⁷ Tc	-79.200	⁹⁴ Ru	-82.020
¹²⁹ Y	94.770 ‡	¹²⁹ Zr	71.140 †	¹²⁶ Nb	27.440	¹¹⁹ Mo	-30.440	¹⁰⁸ Tc	-76.240	⁹⁵ Ru	-83.220
¹³⁰ Y	103.830 †	¹³⁰ Zr	78.170 ‡	¹²⁷ Nb	34.300	¹²⁰ Mo	-27.090	¹⁰⁹ Tc	-74.910	⁹⁶ Ru	-85.810
¹³¹ Y	111.650 ‡	¹³¹ Zr	87.170 †	¹²⁸ Nb	42.830 †	¹²¹ Mo	-21.280	¹¹⁰ Tc	-71.500	⁹⁷ Ru	-86.050
¹³² Y	121.050 †	¹³² Zr	94.470 ‡	¹²⁹ Nb	49.740	¹²² Mo	-17.590	¹¹¹ Tc	-69.780	⁹⁸ Ru	-88.210
¹³³ Y	128.920 ‡	¹³³ Zr	103.820 †	¹³⁰ Nb	58.340 †	¹²³ Mo	-11.660	¹¹² Tc	-65.990	⁹⁹ Ru	-87.790
¹³⁴ Y	138.360 †	¹³⁴ Zr	111.170 ‡	¹³¹ Nb	65.280	¹²⁴ Mo	-7.590	¹¹³ Tc	-63.920	¹⁰⁰ Ru	-89.300
¹³⁵ Y	146.480 †	¹³⁵ Zr	120.560 †	¹³² Nb	73.730 †	¹²⁵ Mo	0.050	¹¹⁴ Tc	-59.770	¹⁰¹ Ru	-88.080
¹³⁶ Y	156.150 †	¹³⁶ Zr	128.170 ‡	¹³³ Nb	80.930	¹²⁶ Mo	6.070	¹¹⁵ Tc	-57.380	¹⁰² Ru	-89.090
¹³⁷ Y	164.350 †	¹³⁷ Zr	137.790 †	¹³⁴ Nb	89.710 †	¹²⁷ Mo	14.050	¹¹⁶ Tc	-52.930	¹⁰³ Ru	-87.380
¹³⁸ Y	174.180 †	¹³⁸ Zr	145.480 ‡	¹³⁵ Nb	96.980	¹²⁸ Mo	20.360	¹¹⁷ Tc	-50.350	¹⁰⁴ Ru	-88.060
¹³⁹ Y	182.610 †	¹³⁹ Zr	155.270 †	¹³⁶ Nb	105.830 †	¹²⁹ Mo	28.820 †	¹¹⁸ Tc	-45.760	¹⁰⁵ Ru	-86.050
¹⁴⁰ Y	192.660 †	¹⁴⁰ Zr	163.200 ‡	¹³⁷ Nb	113.360 ‡	¹³⁰ Mo	35.200	¹¹⁹ Tc	-42.860	¹⁰⁶ Ru	-86.350
¹⁴¹ Y	201.300 †	¹⁴¹ Zr	173.210 †	¹³⁸ Nb	122.430 †	¹³¹ Mo	43.750 †	¹²⁰ Tc	-37.970	¹⁰⁷ Ru	-83.950
¹⁴² Y	211.550 †	¹⁴² Zr	181.350 †	¹³⁹ Nb	130.080 ‡	¹³² Mo	50.180	¹²¹ Tc	-34.710	¹⁰⁸ Ru	-83.810

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁰⁹ Ru	-80.910	⁹⁷ Rh	-82.260	⁸³ Pd	23.440 †	¹⁵⁸ Pd	163.670 ‡	¹⁴³ Ag	31.650	¹²⁸ Cd	-67.810		
¹¹⁰ Ru	-80.280	⁹⁸ Rh	-83.220	⁸⁴ Pd	11.590 †	¹⁵⁹ Pd	172.910 †	¹⁴⁴ Ag	39.160	¹²⁹ Cd	-64.300		
¹¹¹ Ru	-76.940	⁹⁹ Rh	-85.510	⁸⁵ Pd	3.400 †	¹⁶⁰ Pd	180.370 ‡	¹⁴⁵ Ag	45.080	¹³⁰ Cd	-62.690		
¹¹² Ru	-75.940	¹⁰⁰ Rh	-85.810	⁸⁶ Pd	-7.250 †	¹⁶¹ Pd	189.700 ‡	¹⁴⁶ Ag	52.770	¹³¹ Cd	-56.510		
¹¹³ Ru	-72.250	¹⁰¹ Rh	-87.450	⁸⁷ Pd	-14.420 †	¹⁶² Pd	197.180 ‡	¹⁴⁷ Ag	58.960	¹³² Cd	-51.860		
¹¹⁴ Ru	-70.900	¹⁰² Rh	-86.900	⁸⁸ Pd	-24.230 ‡	¹⁶³ Pd	206.540 †	¹⁴⁸ Ag	66.920	¹³³ Cd	-45.390		
¹¹⁵ Ru	-66.870	¹⁰³ Rh	-88.010	⁸⁹ Pd	-30.520 ‡	¹⁶⁴ Pd	214.290 ‡	¹⁴⁹ Ag	73.350	¹³⁴ Cd	-40.650		
¹¹⁶ Ru	-65.180	¹⁰⁴ Rh	-86.960	⁹⁰ Pd	-39.730	¹⁶⁵ Pd	223.880 †	¹⁵⁰ Ag	81.540 †	¹³⁵ Cd	-33.860		
¹¹⁷ Ru	-60.850	¹⁰⁵ Rh	-87.750	⁹¹ Pd	-45.480	¹⁶⁶ Pd	231.920 ‡	¹⁵¹ Ag	88.140	¹³⁶ Cd	-29.210		
¹¹⁸ Ru	-58.980	¹⁰⁶ Rh	-86.400	⁹² Pd	-53.850	¹⁶⁷ Pd	241.630 †	¹⁵² Ag	96.530 †	¹³⁷ Cd	-22.320		
¹¹⁹ Ru	-54.520	¹⁰⁷ Rh	-86.830	⁹³ Pd	-58.250	¹⁶⁸ Pd	249.870 †	¹⁵³ Ag	103.060	¹³⁸ Cd	-17.610		
¹²⁰ Ru	-52.280	¹⁰⁸ Rh	-85.080	⁹⁴ Pd	-65.280	¹⁶⁹ Pd	259.770 †	¹⁵⁴ Ag	111.910 †	¹³⁹ Cd	-10.900		
¹²¹ Ru	-47.490	¹⁰⁹ Rh	-85.070	⁹⁵ Pd	-69.220	¹⁷⁰ Pd	268.190 †	¹⁵⁵ Ag	118.300	¹⁴⁰ Cd	-5.850		
¹²² Ru	-44.830	¹¹⁰ Rh	-82.810	⁹⁶ Pd	-75.660	¹⁷¹ Pd	278.120 †	¹⁵⁶ Ag	126.360	¹⁴¹ Cd	1.310		
¹²³ Ru	-39.700	¹¹¹ Rh	-82.310	⁹⁷ Pd	-77.710	¹⁷² Pd	287.040 †	¹⁵⁷ Ag	132.880	¹⁴² Cd	6.390		
¹²⁴ Ru	-36.670	¹¹² Rh	-79.610	⁹⁸ Pd	-81.070	¹⁷³ Pd	298.690 †	¹⁵⁸ Ag	141.590 †	¹⁴³ Cd	13.560		
¹²⁵ Ru	-31.400	¹¹³ Rh	-78.730	⁹⁹ Pd	-82.130	¹⁷⁴ Pd	308.780 †	¹⁵⁹ Ag	148.830	¹⁴⁴ Cd	18.950		
¹²⁶ Ru	-27.990	¹¹⁴ Rh	-75.670	¹⁰⁰ Pd	-85.110			¹⁶⁰ Ag	157.630 †	¹⁴⁵ Cd	26.410		
¹²⁷ Ru	-20.990	¹¹⁵ Rh	-74.450	¹⁰¹ Pd	-85.510	⁸⁵ Ag	23.720 †	¹⁶¹ Ag	165.040 ‡	¹⁴⁶ Cd	31.830		
¹²⁸ Ru	-15.620	¹¹⁶ Rh	-71.040	¹⁰² Pd	-87.840	⁸⁶ Ag	14.720 †	¹⁶² Ag	173.920 †	¹⁴⁷ Cd	39.470		
¹²⁹ Ru	-8.270	¹¹⁷ Rh	-69.480	¹⁰³ Pd	-87.390	⁸⁷ Ag	3.900 †	¹⁶³ Ag	181.360 ‡	¹⁴⁸ Cd	45.170		
¹³⁰ Ru	-2.590	¹¹⁸ Rh	-65.780	¹⁰⁴ Pd	-89.150	⁸⁸ Ag	-4.060 †	¹⁶⁴ Ag	190.270 †	¹⁴⁹ Cd	53.080		
¹³¹ Ru	5.260	¹¹⁹ Rh	-64.040	¹⁰⁵ Pd	-88.150	⁸⁹ Ag	-14.040 †	¹⁶⁵ Ag	197.950 ‡	¹⁵⁰ Cd	59.030		
¹³² Ru	11.060	¹²⁰ Rh	-60.200	¹⁰⁶ Pd	-89.600	⁹⁰ Ag	-21.120 †	¹⁶⁶ Ag	207.090 †	¹⁵¹ Cd	67.180 †		
¹³³ Ru	19.070	¹²¹ Rh	-58.080	¹⁰⁷ Pd	-88.340	⁹¹ Ag	-30.500 †	¹⁶⁷ Ag	215.060 ‡	¹⁵² Cd	73.280		
¹³⁴ Ru	24.920	¹²² Rh	-53.890	¹⁰⁸ Pd	-89.440	⁹² Ag	-37.030 †	¹⁶⁸ Ag	224.300 †	¹⁵³ Cd	81.630 †		
¹³⁵ Ru	32.750	¹²³ Rh	-51.330	¹⁰⁹ Pd	-87.780	⁹³ Ag	-45.560 †	¹⁶⁹ Ag	232.460 †	¹⁵⁴ Cd	87.660		
¹³⁶ Ru	38.900	¹²⁴ Rh	-46.780	¹¹⁰ Pd	-88.450	⁹⁴ Ag	-51.420	¹⁷⁰ Ag	241.890 †	¹⁵⁵ Cd	96.480 †		
¹³⁷ Ru	47.140 †	¹²⁵ Rh	-43.850	¹¹¹ Pd	-86.290	⁹⁵ Ag	-58.640	¹⁷¹ Ag	250.220 †	¹⁵⁶ Cd	102.360		
¹³⁸ Ru	53.350	¹²⁶ Rh	-39.160	¹¹² Pd	-86.450	⁹⁶ Ag	-63.410	¹⁷² Ag	259.650 †	¹⁵⁷ Cd	110.340		
¹³⁹ Ru	61.620 †	¹²⁷ Rh	-35.840	¹¹³ Pd	-83.840	⁹⁷ Ag	-70.140	¹⁷³ Ag	268.520 †	¹⁵⁸ Cd	116.350		
¹⁴⁰ Ru	68.120	¹²⁸ Rh	-29.390	¹¹⁴ Pd	-83.640	⁹⁸ Ag	-72.890	¹⁷⁴ Ag	279.890 †	¹⁵⁹ Cd	125.010 †		
¹⁴¹ Ru	76.660 †	¹²⁹ Rh	-24.090	¹¹⁵ Pd	-80.680	⁹⁹ Ag	-76.270	¹⁷⁵ Ag	290.050 †	¹⁶⁰ Cd	131.800		
¹⁴² Ru	83.220	¹³⁰ Rh	-17.290	¹¹⁶ Pd	-80.120	¹⁰⁰ Ag	-78.010			¹⁶¹ Cd	140.540 †		
¹⁴³ Ru	91.930 †	¹³¹ Rh	-11.680	¹¹⁷ Pd	-76.820	¹⁰¹ Ag	-81.080	⁸⁶ Cd	33.320 †	¹⁶² Cd	147.510		
¹⁴⁴ Ru	98.740	¹³² Rh	-4.360	¹¹⁸ Pd	-75.930	¹⁰² Ag	-82.180	⁸⁷ Cd	24.160 †	¹⁶³ Cd	156.330 †		
¹⁴⁵ Ru	107.700 †	¹³³ Rh	1.380	¹¹⁹ Pd	-72.340	¹⁰³ Ag	-84.630	⁸⁸ Cd	12.540 †	¹⁶⁴ Cd	163.280		
¹⁴⁶ Ru	114.750	¹³⁴ Rh	8.880	¹²⁰ Pd	-71.270	¹⁰⁴ Ag	-84.870	⁸⁹ Cd	4.430 †	¹⁶⁵ Cd	172.080 †		
¹⁴⁷ Ru	123.930 †	¹³⁵ Rh	14.670	¹²¹ Pd	-67.560	¹⁰⁵ Ag	-86.750	⁹⁰ Cd	-6.350 †	¹⁶⁶ Cd	179.230		
¹⁴⁸ Ru	131.130 ‡	¹³⁶ Rh	21.990	¹²² Pd	-66.060	¹⁰⁶ Ag	-86.410	⁹¹ Cd	-13.580 †	¹⁶⁷ Cd	188.200 †		
¹⁴⁹ Ru	140.500 †	¹³⁷ Rh	28.090	¹²³ Pd	-61.980	¹⁰⁷ Ag	-87.980	⁹² Cd	-23.740 ‡	¹⁶⁸ Cd	195.600 ‡		
¹⁵⁰ Ru	147.660 ‡	¹³⁸ Rh	35.830	¹²⁴ Pd	-60.040	¹⁰⁸ Ag	-87.370	⁹³ Cd	-30.420 ‡	¹⁶⁹ Cd	204.620 †		
¹⁵¹ Ru	157.450 †	¹³⁹ Rh	41.980	¹²⁵ Pd	-55.620	¹⁰⁹ Ag	-88.590	⁹⁴ Cd	-39.740	¹⁷⁰ Cd	212.200 ‡		
¹⁵² Ru	164.490 ‡	¹⁴⁰ Rh	49.750	¹²⁶ Pd	-53.320	¹¹⁰ Ag	-87.590	⁹⁵ Cd	-45.790	¹⁷¹ Cd	221.410 †		
¹⁵³ Ru	173.580 †	¹⁴¹ Rh	56.190	¹²⁷ Pd	-48.790	¹¹¹ Ag	-88.380	⁹⁶ Cd	-54.640	¹⁷² Cd	229.180 ‡		
¹⁵⁴ Ru	180.760 ‡	¹⁴² Rh	64.240	¹²⁸ Pd	-46.140	¹¹² Ag	-86.860	⁹⁷ Cd	-59.820	¹⁷³ Cd	238.350 †		
¹⁵⁵ Ru	190.430 †	¹⁴³ Rh	70.730	¹²⁹ Pd	-39.690	¹¹³ Ag	-87.140	⁹⁸ Cd	-67.710	¹⁷⁴ Cd	246.780 †		
¹⁵⁶ Ru	198.270 ‡	¹⁴⁴ Rh	78.960 †	¹³⁰ Pd	-34.850	¹¹⁴ Ag	-85.170	⁹⁹ Cd	-70.500	¹⁷⁵ Cd	258.430 †		
¹⁵⁷ Ru	208.020 †	¹⁴⁵ Rh	85.710	¹³¹ Pd	-28.070	¹¹⁵ Ag	-85.090	¹⁰⁰ Cd	-74.240	¹⁷⁶ Cd	268.490 †		
¹⁵⁸ Ru	216.000 ‡	¹⁴⁶ Rh	94.190 †	¹³² Pd	-22.950	¹¹⁶ Ag	-82.750	¹⁰¹ Cd	-75.930			⁹⁰ In	15.670 †
¹⁵⁹ Ru	225.820 †	¹⁴⁷ Rh	101.170	¹³³ Pd	-15.670	¹¹⁷ Ag	-82.320	¹⁰² Cd	-79.540			⁹¹ In	4.740 †
¹⁶⁰ Ru	233.820 ‡	¹⁴⁸ Rh	109.890 †	¹³⁴ Pd	-10.450	¹¹⁸ Ag	-79.640	¹⁰³ Cd	-80.700			⁹² In	-3.270 †
¹⁶¹ Ru	243.680 †	¹⁴⁹ Rh	117.030	¹³⁵ Pd	-2.980	¹¹⁹ Ag	-78.860	¹⁰⁴ Cd	-83.810			⁹³ In	-13.570 †
¹⁶² Ru	251.930 †	¹⁵⁰ Rh	125.930 †	¹³⁶ Pd	2.310	¹²⁰ Ag	-75.890	¹⁰⁵ Cd	-84.160			⁹⁴ In	-21.010 †
¹⁶³ Ru	262.020 †	¹⁵¹ Rh	133.020	¹³⁷ Pd	9.580	¹²¹ Ag	-74.950	¹⁰⁶ Cd	-86.720			⁹⁵ In	-30.500 †
¹⁶⁴ Ru	270.560 †	¹⁵² Rh	142.360 †	¹³⁸ Pd	15.190	¹²² Ag	-71.840	¹⁰⁷ Cd	-86.460			⁹⁶ In	-37.330 †
¹⁶⁵ Ru	280.770 †	¹⁵³ Rh	149.320 ‡	¹³⁹ Pd	22.890	¹²³ Ag	-70.430	¹⁰⁸ Cd	-88.680			⁹⁷ In	-46.520 †
¹⁶⁶ Ru	289.510 †	¹⁵⁴ Rh	157.930 †	¹⁴⁰ Pd	28.530	¹²⁴ Ag	-66.950	¹⁰⁹ Cd	-88.150			⁹⁸ In	-53.300
¹⁶⁷ Ru	299.910 †	¹⁵⁵ Rh	165.030	¹⁴¹ Pd	36.250	¹²⁵ Ag	-65.140	¹¹⁰ Cd	-90.030			⁹⁹ In	-61.570
¹⁶⁸ Ru	308.840 †	¹⁵⁶ Rh	174.250 †	¹⁴² Pd	42.200	¹²⁶ Ag	-61.320	¹¹¹ Cd	-89.120			¹⁰⁰ In	-65.040
		¹⁵⁷ Rh	182.020 ‡	¹⁴³ Pd	50.200	¹²⁷ Ag	-59.190	¹¹² Cd	-90.570			¹⁰¹ In	-68.690
⁸² Rh	13.920 †	¹⁵⁸ Rh	191.320 †	¹⁴⁴ Pd	56.190	¹²⁸ Ag	-55.310	¹¹³ Cd	-89.140			¹⁰² In	-70.960
⁸³ Rh	2.930 †	¹⁵⁹ Rh	199.250 ‡	¹⁴⁵ Pd	64.360 †	¹²⁹ Ag	-52.860	¹¹⁴ Cd	-90.080			¹⁰³ In	-74.540
⁸⁴ Rh	-5.130 †	¹⁶⁰ Rh	208.620 †	¹⁴⁶ Pd	70.620	¹³⁰ Ag	-46.860	¹¹⁵ Cd	-88.190			¹⁰⁴ In	-76.320
⁸⁵ Rh	-14.950 †	¹⁶¹ Rh	216.570 ‡	¹⁴⁷ Pd	79.050 †	¹³¹ Ag	-42.000	¹¹⁶ Cd	-88.780			¹⁰⁵ In	-79.530
⁸⁶ Rh	-21.980 †	¹⁶² Rh	225.990 †	¹⁴⁸ Pd	85.550	¹³² Ag	-35.700	¹¹⁷ Cd	-86.540			¹⁰⁶ In	-80.560
⁸⁷ Rh	-30.940 †	¹⁶³ Rh	234.200 †	¹⁴⁹ Pd	94.220 †	¹³³ Ag	-30.620	¹¹⁸ Cd	-84.200			¹⁰⁷ In	-83.260
⁸⁸ Rh	-37.090 †	¹⁶⁴ Rh	243.850 †	¹⁵⁰ Pd	100.870	¹³⁴ Ag	-23.860	¹¹⁹ Cd	-84.200			¹⁰⁸ In	-83.670
⁸⁹ Rh	-45.420 †	¹⁶⁵ Rh	252.350 †	¹⁵¹ Pd	109.730 †	¹³⁵ Ag	-18.710	¹²⁰ Cd	-84.090			¹⁰⁹ In	-86.000
⁹⁰ Rh	-50.990	¹⁶⁶ Rh	262.140 †	¹⁵² Pd	116.320	¹³⁶ Ag	-11.760	¹²¹ Cd	-81.230			¹¹⁰ In	-86.110
⁹¹ Rh	-57.850	¹⁶⁷ Rh	270.840 †	¹⁵³ Pd	125.630 †	¹³⁷ Ag	-6.530	¹²² Cd	-80.910			¹¹¹ In	-88.110
⁹² Rh	-62.080	¹⁶⁸ Rh	280.820 †	¹⁵⁴ Pd	132.080	¹³⁸ Ag	0.230	¹²³ Cd	-77.900			¹¹² In	-87.830
⁹³ Rh	-68.290	¹⁶⁹ Rh	289.710 †	¹⁵⁵ Pd	140.610 †	¹³⁹ Ag	5.770	¹²⁴ Cd	-77.120			¹¹³ In	-89.410
⁹⁴ Rh	-72.030	¹⁷⁰ Rh	299.750 †	¹⁵⁶ Pd	147.200	^{140</}							

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹¹⁶ In	-88.390	¹⁰⁴ Sn	-71.760	¹⁷⁹ Sn	241.770 †	¹⁶⁸ Sb	127.370	¹⁵⁷ Te	34.870	¹⁴⁸ I	-28.130		
¹¹⁷ In	-89.110	¹⁰⁵ Sn	-73.520	¹⁸⁰ Sn	251.880 †	¹⁶⁹ Sb	133.820	¹⁵⁸ Te	39.880	¹⁴⁹ I	-23.970		
¹¹⁸ In	-87.490	¹⁰⁶ Sn	-77.360			¹⁷⁰ Sb	141.720	¹⁵⁹ Te	47.650	¹⁵⁰ I	-18.160		
¹¹⁹ In	-87.850	¹⁰⁷ Sn	-78.510	⁹⁵ Sb	6.870 †	¹⁷¹ Sb	148.450	¹⁶⁰ Te	52.520	¹⁵¹ I	-13.930		
¹²⁰ In	-85.900	¹⁰⁸ Sn	-81.880	⁹⁶ Sb	-1.470 †	¹⁷² Sb	156.400	¹⁶¹ Te	59.480	¹⁵² I	-7.910		
¹²¹ In	-85.910	¹⁰⁹ Sn	-82.430	⁹⁷ Sb	-11.860 †	¹⁷³ Sb	163.330	¹⁶² Te	64.490	¹⁵³ I	-3.370		
¹²² In	-83.640	¹¹⁰ Sn	-85.430	⁹⁸ Sb	-19.590 †	¹⁷⁴ Sb	171.510 †	¹⁶³ Te	72.150	¹⁵⁴ I	2.940		
¹²³ In	-83.420	¹¹¹ Sn	-85.650	⁹⁹ Sb	-29.750 †	¹⁷⁵ Sb	178.650	¹⁶⁴ Te	77.950	¹⁵⁵ I	7.750		
¹²⁴ In	-81.000	¹¹² Sn	-88.300	¹⁰⁰ Sb	-37.490 †	¹⁷⁶ Sb	186.790 †	¹⁶⁵ Te	85.710	¹⁵⁶ I	14.330		
¹²⁵ In	-80.340	¹¹³ Sn	-88.120	¹⁰¹ Sb	-47.390 †	¹⁷⁷ Sb	194.700	¹⁶⁶ Te	91.700	¹⁵⁷ I	19.320		
¹²⁶ In	-77.610	¹¹⁴ Sn	-90.360	¹⁰² Sb	-52.320 †	¹⁷⁸ Sb	205.760 †	¹⁶⁷ Te	99.550	¹⁵⁸ I	26.130		
¹²⁷ In	-76.740	¹¹⁵ Sn	-89.630	¹⁰³ Sb	-56.750 †	¹⁷⁹ Sb	215.620 †	¹⁶⁸ Te	105.540	¹⁵⁹ I	31.100		
¹²⁸ In	-73.860	¹¹⁶ Sn	-91.340	¹⁰⁴ Sb	-59.800 †	¹⁸⁰ Sb	226.710 †	¹⁶⁹ Te	113.380	¹⁶⁰ I	38.390		
¹²⁹ In	-72.870	¹¹⁷ Sn	-90.170	¹⁰⁵ Sb	-64.160 †	¹⁸¹ Sb	236.600 †	¹⁷⁰ Te	119.570	¹⁶¹ I	43.250		
¹³⁰ In	-70.080	¹¹⁸ Sn	-91.540	¹⁰⁶ Sb	-66.730			¹⁷¹ Te	127.580	¹⁶² I	49.790		
¹³¹ In	-68.740	¹¹⁹ Sn	-90.010	¹⁰⁷ Sb	-70.760	⁹⁶ Te	17.600 †	¹⁷² Te	134.030	¹⁶³ I	54.780		
¹³² In	-62.960	¹²⁰ Sn	-91.020	¹⁰⁸ Sb	-72.610	⁹⁷ Te	9.110 †	¹⁷³ Te	142.100	¹⁶⁴ I	61.990		
¹³³ In	-58.180	¹²¹ Sn	-89.160	¹⁰⁹ Sb	-76.110	⁹⁸ Te	-1.990 †	¹⁷⁴ Te	148.740	¹⁶⁵ I	67.740		
¹³⁴ In	-52.070	¹²² Sn	-89.770	¹¹⁰ Sb	-77.340	⁹⁹ Te	-9.820 †	¹⁷⁵ Te	157.020 †	¹⁶⁶ I	75.060		
¹³⁵ In	-47.210	¹²³ Sn	-87.610	¹¹¹ Sb	-80.470	¹⁰⁰ Te	-20.440 †	¹⁷⁶ Te	163.870	¹⁶⁷ I	81.000		
¹³⁶ In	-40.850	¹²⁴ Sn	-87.970	¹¹² Sb	-81.350	¹⁰¹ Te	-22.060 †	¹⁷⁷ Te	172.130 †	¹⁶⁸ I	88.430		
¹³⁷ In	-36.270	¹²⁵ Sn	-85.660	¹¹³ Sb	-84.130	¹⁰² Te	-38.350 †	¹⁷⁸ Te	179.660	¹⁶⁹ I	94.400		
¹³⁸ In	-29.900	¹²⁶ Sn	-85.610	¹¹⁴ Sb	-84.610	¹⁰³ Te	-43.510 †	¹⁷⁹ Te	190.450 †	¹⁷⁰ I	101.860		
¹³⁹ In	-25.260	¹²⁷ Sn	-83.060	¹¹⁵ Sb	-86.960	¹⁰⁴ Te	-49.570 ‡	¹⁸⁰ Te	199.670 †	¹⁷¹ I	108.080		
¹⁴⁰ In	-19.070	¹²⁸ Sn	-83.020	¹¹⁶ Sb	-86.900	¹⁰⁵ Te	-52.940 ‡	¹⁸¹ Te	210.470 †	¹⁷² I	115.760		
¹⁴¹ In	-14.080	¹²⁹ Sn	-80.410	¹¹⁷ Sb	-88.720	¹⁰⁶ Te	-58.230	¹⁸² Te	219.700 †	¹⁷³ I	122.260		
¹⁴² In	-7.410	¹³⁰ Sn	-80.250	¹¹⁸ Sb	-88.180	¹⁰⁷ Te	-61.060			¹⁷⁴ I	130.030		
¹⁴³ In	-2.390	¹³¹ Sn	-77.780	¹¹⁹ Sb	-89.650	¹⁰⁸ Te	-65.830	⁹⁹ I	10.610 †	¹⁷⁵ I	136.730		
¹⁴⁴ In	4.280	¹³² Sn	-77.230	¹²⁰ Sb	-88.750	¹⁰⁹ Te	-67.820	¹⁰⁰ I	2.090 †	¹⁷⁶ I	144.700		
¹⁴⁵ In	9.620	¹³³ Sn	-71.320	¹²¹ Sb	-89.850	¹¹⁰ Te	-72.020	¹⁰¹ I	-8.530 †	¹⁷⁷ I	151.590		
¹⁴⁶ In	16.590	¹³⁴ Sn	-66.820	¹²² Sb	-88.600	¹¹¹ Te	-73.370	¹⁰² I	-16.680 †	¹⁷⁸ I	159.560		
¹⁴⁷ In	21.940	¹³⁵ Sn	-60.540	¹²³ Sb	-89.320	¹¹² Te	-77.180	¹⁰³ I	-26.870 †	¹⁷⁹ I	167.070		
¹⁴⁸ In	29.100	¹³⁶ Sn	-55.910	¹²⁴ Sb	-87.750	¹¹³ Te	-78.230	¹⁰⁴ I	-32.790 †	¹⁸⁰ I	177.290 †		
¹⁴⁹ In	34.740	¹³⁷ Sn	-49.430	¹²⁵ Sb	-88.220	¹¹⁴ Te	-81.670	¹⁰⁵ I	-39.220 †	¹⁸¹ I	186.290 †		
¹⁵⁰ In	42.170	¹³⁸ Sn	-45.340	¹²⁶ Sb	-86.490	¹¹⁵ Te	-82.300	¹⁰⁶ I	-44.030 †	¹⁸² I	196.510 †		
¹⁵¹ In	48.050	¹³⁹ Sn	-39.050	¹²⁷ Sb	-86.510	¹¹⁶ Te	-85.280	¹⁰⁷ I	-49.580 †	¹⁸³ I	205.530 †		
¹⁵² In	55.740	¹⁴⁰ Sn	-34.930	¹²⁸ Sb	-84.480	¹¹⁷ Te	-85.370	¹⁰⁸ I	-53.150 †	¹⁸⁴ I	215.860 †		
¹⁵³ In	61.780	¹⁴¹ Sn	-28.820	¹²⁹ Sb	-84.350	¹¹⁸ Te	-87.810	¹⁰⁹ I	-58.080 †	¹⁸⁵ I	224.860 †		
¹⁵⁴ In	69.660	¹⁴² Sn	-24.340	¹³⁰ Sb	-82.190	¹¹⁹ Te	-87.410	¹¹⁰ I	-60.770			¹⁰⁰ Xe	21.420 †
¹⁵⁵ In	75.620	¹⁴³ Sn	-17.720	¹³¹ Sb	-81.940	¹²⁰ Te	-89.460	¹¹¹ I	-65.100			¹⁰¹ Xe	12.780 †
¹⁵⁶ In	84.000 †	¹⁴⁴ Sn	-13.200	¹³² Sb	-79.880	¹²¹ Te	-88.690	¹¹² I	-67.140			¹⁰² Xe	1.550 †
¹⁵⁷ In	89.790	¹⁴⁵ Sn	-6.580	¹³³ Sb	-79.250	¹²² Te	-90.360	¹¹³ I	-71.090			¹⁰³ Xe	-6.580 †
¹⁵⁸ In	97.290	¹⁴⁶ Sn	-1.730	¹³⁴ Sb	-74.040	¹²³ Te	-89.220	¹¹⁴ I	-72.820			¹⁰⁴ Xe	-17.190 †
¹⁵⁹ In	103.230	¹⁴⁷ Sn	5.200	¹³⁵ Sb	-69.830	¹²⁴ Te	-90.520	¹¹⁵ I	-76.390			¹⁰⁵ Xe	-23.320 †
¹⁶⁰ In	111.440 †	¹⁴⁸ Sn	10.050	¹³⁶ Sb	-64.260	¹²⁵ Te	-89.060	¹¹⁶ I	-77.690			¹⁰⁶ Xe	-30.700 †
¹⁶¹ In	118.180	¹⁴⁹ Sn	17.160	¹³⁷ Sb	-59.930	¹²⁶ Te	-90.120	¹¹⁷ I	-80.780			¹⁰⁷ Xe	-35.760 †
¹⁶² In	126.480 †	¹⁵⁰ Sn	22.300	¹³⁸ Sb	-54.140	¹²⁷ Te	-88.480	¹¹⁸ I	-81.520			¹⁰⁸ Xe	-42.700 ‡
¹⁶³ In	133.390	¹⁵¹ Sn	29.690	¹³⁹ Sb	-50.160	¹²⁸ Te	-89.050	¹¹⁹ I	-84.060			¹⁰⁹ Xe	-46.450 ‡
¹⁶⁴ In	141.770 †	¹⁵² Sn	35.090	¹⁴⁰ Sb	-44.400	¹²⁹ Te	-87.060	¹²⁰ I	-84.310			¹¹⁰ Xe	-52.090 †
¹⁶⁵ In	148.630	¹⁵³ Sn	42.730	¹⁴¹ Sb	-40.370	¹³⁰ Te	-86.310	¹²¹ I	-86.450			¹¹¹ Xe	-54.930
¹⁶⁶ In	156.940 †	¹⁵⁴ Sn	48.280	¹⁴² Sb	-34.780	¹³¹ Te	-85.070	¹²² I	-86.290			¹¹² Xe	-59.940
¹⁶⁷ In	163.930	¹⁵⁵ Sn	56.120	¹⁴³ Sb	-30.380	¹³² Te	-85.130	¹²³ I	-88.030			¹¹³ Xe	-62.160
¹⁶⁸ In	172.360 †	¹⁵⁶ Sn	61.590	¹⁴⁴ Sb	-24.290	¹³³ Te	-82.940	¹²⁴ I	-87.490			¹¹⁴ Xe	-66.800
¹⁶⁹ In	179.610	¹⁵⁷ Sn	69.930 †	¹⁴⁵ Sb	-19.850	¹³⁴ Te	-82.650	¹²⁵ I	-88.870			¹¹⁵ Xe	-68.700
¹⁷⁰ In	188.070 †	¹⁵⁸ Sn	75.210	¹⁴⁶ Sb	-13.740	¹³⁵ Te	-77.740	¹²⁶ I	-87.990			¹¹⁶ Xe	-72.920
¹⁷¹ In	195.510	¹⁵⁹ Sn	82.630	¹⁴⁷ Sb	-8.980	¹³⁶ Te	-74.340	¹²⁷ I	-89.140			¹¹⁷ Xe	-74.370
¹⁷² In	204.200 †	¹⁶⁰ Sn	88.110	¹⁴⁸ Sb	-2.570	¹³⁷ Te	-69.110	¹²⁸ I	-88.080			¹¹⁸ Xe	-78.080
¹⁷³ In	211.830 ‡	¹⁶¹ Sn	96.270 †	¹⁴⁹ Sb	2.220	¹³⁸ Te	-65.590	¹²⁹ I	-88.730			¹¹⁹ Xe	-78.960
¹⁷⁴ In	220.480 †	¹⁶² Sn	102.570	¹⁵⁰ Sb	8.830	¹³⁹ Te	-60.040	¹³⁰ I	-87.280			¹²⁰ Xe	-82.110
¹⁷⁵ In	228.840 †	¹⁶³ Sn	110.820 †	¹⁵¹ Sb	13.910	¹⁴⁰ Te	-56.630	¹³¹ I	-87.520			¹²¹ Xe	-82.500
¹⁷⁶ In	240.270 †	¹⁶⁴ Sn	117.280	¹⁵² Sb	20.800	¹⁴¹ Te	-50.970	¹³² I	-85.750			¹²² Xe	-85.220
¹⁷⁷ In	250.480 †	¹⁶⁵ Sn	125.590 †	¹⁵³ Sb	26.140	¹⁴² Te	-47.470	¹³³ I	-85.720			¹²³ Xe	-85.180
		¹⁶⁶ Sn	131.950	¹⁵⁴ Sb	33.290	¹⁴³ Te	-41.950	¹³⁴ I	-83.920			¹²⁴ Xe	-87.490
⁹¹ Sn	25.350 †	¹⁶⁷ Sn	140.080 †	¹⁵⁵ Sb	38.790	¹⁴⁴ Te	-38.090	¹³⁵ I	-83.560			¹²⁵ Xe	-87.050
⁹² Sn	13.640 †	¹⁶⁸ Sn	146.440	¹⁵⁶ Sb	46.150	¹⁴⁵ Te	-32.110	¹³⁶ I	-79.350			¹²⁶ Xe	-88.970
⁹³ Sn	5.480 †	¹⁶⁹ Sn	154.650 †	¹⁵⁷ Sb	51.590	¹⁴⁶ Te	-28.190	¹³⁷ I	-76.240			¹²⁷ Xe	-88.190
⁹⁴ Sn	-5.580 †	¹⁷⁰ Sn	161.320	¹⁵⁸ Sb	59.440	¹⁴⁷ Te	-22.180	¹³⁸ I	-71.720			¹²⁸ Xe	-89.890
⁹⁵ Sn	-13.170 †	¹⁷¹ Sn	169.570 †	¹⁵⁹ Sb	64.710	¹⁴⁸ Te	-17.940	¹³⁹ I	-68.440			¹²⁹ Xe	-88.930
⁹⁶ Sn	-23.430 ‡	¹⁷² Sn	176.460	¹⁶⁰ Sb	71.700	¹⁴⁹ Te	-11.620	¹⁴⁰ I	-63.500			¹³⁰ Xe	-90.130
⁹⁷ Sn	-30.470 ‡	¹⁷³ Sn	184.960 †	¹⁶¹ Sb	77.130	¹⁵⁰ Te	-7.310	¹⁴¹ I	-60.190			¹³¹ Xe	-88.750
⁹⁸ Sn	-40.720	¹⁷⁴ Sn	192.050	¹⁶² Sb	84.840	¹⁵¹ Te	-0.800	¹⁴² I	-55.070			¹³² Xe	-89.490
⁹⁹ Sn	-47.910	¹⁷⁵ Sn	200.480 †	¹⁶³ Sb	91.090	¹⁵² Te	3.800	¹⁴³ I	-51.650			¹³³ Xe	-87.730
¹⁰⁰ Sn	-57.900	¹⁷⁶ Sn	208.400 ‡	¹⁶⁴ Sb	98.900	¹⁵³ Te	10.610	¹⁴⁴ I	-46.670			¹³⁴ Xe	-88.090
¹⁰¹ Sn	-61.430	¹⁷⁷ Sn	220.040 †	¹⁶⁵ Sb	105.320	¹⁵⁴ Te	15.480	¹⁴⁵ I	-42.900			¹³⁵ Xe	-86.200
¹⁰² Sn	-65.500	¹⁷⁸ Sn	230.110 †	¹⁶⁶ Sb	113.200	¹⁵⁵ Te	22.540	¹⁴⁶ I	-37.460			¹³⁶ Xe	-86

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹³⁷ Xe	-82.250	¹¹⁶ Cs	-68.590	¹⁹³ Cs	250.670 †	¹⁷⁴ Ba	72.590	¹⁵⁵ La	-39.220	¹³⁶ Ce	-86.640		
¹³⁸ Xe	-79.910	¹¹⁹ Cs	-72.410	¹⁹⁴ Cs	260.310 †	¹⁷⁵ Ba	79.880	¹⁵⁶ La	-34.390	¹³⁷ Ce	-86.110		
¹³⁹ Xe	-75.640	¹²⁰ Cs	-73.950	¹⁹⁵ Cs	268.890 †	¹⁷⁶ Ba	85.640	¹⁵⁷ La	-30.930	¹³⁸ Ce	-87.620		
¹⁴⁰ Xe	-73.020	¹²¹ Cs	-77.190	¹⁹⁶ Cs	278.690 †	¹⁷⁷ Ba	93.090	¹⁵⁸ La	-25.800	¹³⁹ Ce	-86.850		
¹⁴¹ Xe	-68.230	¹²² Cs	-78.210	¹⁹⁷ Cs	287.350 †	¹⁷⁸ Ba	99.090	¹⁵⁹ La	-22.030	¹⁴⁰ Ce	-87.900		
¹⁴² Xe	-65.470	¹²³ Cs	-81.000	¹⁹⁸ Cs	297.260 †	¹⁷⁹ Ba	106.780	¹⁶⁰ La	-16.620	¹⁴¹ Ce	-85.430		
¹⁴³ Xe	-60.450	¹²⁴ Cs	-81.580	¹⁹⁹ Cs	306.050 †	¹⁸⁰ Ba	113.000	¹⁶¹ La	-12.600	¹⁴² Ce	-84.560		
¹⁴⁴ Xe	-57.570	¹²⁵ Cs	-83.940			¹⁸¹ Ba	120.790	¹⁶² La	-6.920	¹⁴³ Ce	-81.670		
¹⁴⁵ Xe	-52.690	¹²⁶ Cs	-84.100	¹⁰⁶ Ba	5.530 †	¹⁸² Ba	127.500	¹⁶³ La	-2.780	¹⁴⁴ Ce	-80.420		
¹⁴⁶ Xe	-49.460	¹²⁷ Cs	-86.060	¹⁰⁷ Ba	-1.500 †	¹⁸³ Ba	136.780 †	¹⁶⁴ La	3.290	¹⁴⁵ Ce	-76.990		
¹⁴⁷ Xe	-44.130	¹²⁸ Cs	-85.850	¹⁰⁸ Ba	-9.920 †	¹⁸⁴ Ba	144.540 ‡	¹⁶⁵ La	7.480	¹⁴⁶ Ce	-75.600		
¹⁴⁸ Xe	-40.820	¹²⁹ Cs	-87.580	¹⁰⁹ Ba	-15.890 †	¹⁸⁵ Ba	153.970 †	¹⁶⁶ La	13.230	¹⁴⁷ Ce	-72.050		
¹⁴⁹ Xe	-35.420	¹³⁰ Cs	-87.170	¹¹⁰ Ba	-23.730 †	¹⁸⁶ Ba	161.900 ‡	¹⁶⁷ La	17.500	¹⁴⁸ Ce	-70.520		
¹⁵⁰ Xe	-31.770	¹³¹ Cs	-88.440	¹¹¹ Ba	-28.930 †	¹⁸⁷ Ba	171.570 †	¹⁶⁸ La	23.760	¹⁴⁹ Ce	-66.970		
¹⁵¹ Xe	-26.050	¹³² Cs	-87.610	¹¹² Ba	-36.000 ‡	¹⁸⁸ Ba	179.640 ‡	¹⁶⁹ La	28.610	¹⁵⁰ Ce	-65.110		
¹⁵² Xe	-22.300	¹³³ Cs	-88.390	¹¹³ Ba	-39.710 ‡	¹⁸⁹ Ba	189.470 †	¹⁷⁰ La	35.000	¹⁵¹ Ce	-61.200		
¹⁵³ Xe	-16.370	¹³⁴ Cs	-87.140	¹¹⁴ Ba	-45.620	¹⁹⁰ Ba	197.770 †	¹⁷¹ La	40.050	¹⁵² Ce	-59.120		
¹⁵⁴ Xe	-12.310	¹³⁵ Cs	-87.500	¹¹⁵ Ba	-48.780	¹⁹¹ Ba	207.330 †	¹⁷² La	46.560	¹⁵³ Ce	-55.010		
¹⁵⁵ Xe	-6.080	¹³⁶ Cs	-86.040	¹¹⁶ Ba	-54.250	¹⁹² Ba	216.160 †	¹⁷³ La	51.660	¹⁵⁴ Ce	-52.600		
¹⁵⁶ Xe	-1.740	¹³⁷ Cs	-85.960	¹¹⁷ Ba	-57.010	¹⁹³ Ba	225.840 †	¹⁷⁴ La	58.260	¹⁵⁵ Ce	-48.180		
¹⁵⁷ Xe	4.760	¹³⁸ Cs	-82.720	¹¹⁸ Ba	-61.990	¹⁹⁴ Ba	233.930 †	¹⁷⁵ La	63.640	¹⁵⁶ Ce	-45.490		
¹⁵⁸ Xe	9.300	¹³⁹ Cs	-80.630	¹¹⁹ Ba	-64.260	¹⁹⁵ Ba	243.540 †	¹⁷⁶ La	70.520	¹⁵⁷ Ce	-40.790		
¹⁵⁹ Xe	16.020	¹⁴⁰ Cs	-76.980	¹²⁰ Ba	-68.690	¹⁹⁶ Ba	251.740 †	¹⁷⁷ La	76.230	¹⁵⁸ Ce	-37.740		
¹⁶⁰ Xe	20.570	¹⁴¹ Cs	-74.520	¹²¹ Ba	-70.370	¹⁹⁷ Ba	261.500 †	¹⁷⁸ La	83.280	¹⁵⁹ Ce	-32.780		
¹⁶¹ Xe	27.760	¹⁴² Cs	-70.300	¹²² Ba	-74.210	¹⁹⁸ Ba	269.790 †	¹⁷⁹ La	89.240	¹⁶⁰ Ce	-29.450		
¹⁶² Xe	32.230	¹⁴³ Cs	-67.660	¹²³ Ba	-75.360	¹⁹⁹ Ba	279.670 †	¹⁸⁰ La	96.520	¹⁶¹ Ce	-24.170		
¹⁶³ Xe	38.750	¹⁴⁴ Cs	-63.190	¹²⁴ Ba	-78.730	²⁰⁰ Ba	288.090 †	¹⁸¹ La	102.710	¹⁶² Ce	-20.560		
¹⁶⁴ Xe	43.340	¹⁴⁵ Cs	-60.430	¹²⁵ Ba	-79.420	²⁰¹ Ba	298.190 †	¹⁸² La	110.090	¹⁶³ Ce	-14.990		
¹⁶⁵ Xe	50.500	¹⁴⁶ Cs	-56.100	¹²⁶ Ba	-82.330	²⁰² Ba	306.710 †	¹⁸³ La	116.760	¹⁶⁴ Ce	-11.160		
¹⁶⁶ Xe	55.810	¹⁴⁷ Cs	-52.990	¹²⁷ Ba	-82.590	²⁰³ Ba	316.900 †	¹⁸⁴ La	125.630 †	¹⁶⁵ Ce	-5.270		
¹⁶⁷ Xe	63.080	¹⁴⁸ Cs	-48.210	¹²⁸ Ba	-85.090	²⁰⁴ Ba	325.620 †	¹⁸⁵ La	133.330 ‡	¹⁶⁶ Ce	-1.300		
¹⁶⁸ Xe	68.600	¹⁴⁹ Cs	-44.990	¹²⁹ Ba	-84.960			¹⁸⁶ La	142.350 †	¹⁶⁷ Ce	4.500		
¹⁶⁹ Xe	75.980	¹⁵⁰ Cs	-40.100	¹³⁰ Ba	-87.200	¹¹¹ La	-12.140 †	¹⁸⁷ La	150.220 ‡	¹⁶⁸ Ce	8.440		
¹⁷⁰ Xe	81.550	¹⁵¹ Cs	-36.540	¹³¹ Ba	-86.860	¹¹² La	-18.020 †	¹⁸⁸ La	159.470 †	¹⁶⁹ Ce	14.650		
¹⁷¹ Xe	89.000	¹⁵² Cs	-31.340	¹³² Ba	-88.680	¹¹³ La	-25.280 †	¹⁸⁹ La	167.480 ‡	¹⁷⁰ Ce	19.100		
¹⁷² Xe	94.850	¹⁵³ Cs	-27.660	¹³³ Ba	-87.930	¹¹⁴ La	-30.330 †	¹⁹⁰ La	176.890 †	¹⁷¹ Ce	25.460		
¹⁷³ Xe	102.550	¹⁵⁴ Cs	-22.220	¹³⁴ Ba	-89.260	¹¹⁵ La	-36.450 †	¹⁹¹ La	185.080 †	¹⁷² Ce	30.100		
¹⁷⁴ Xe	108.720	¹⁵⁵ Cs	-18.230	¹³⁵ Ba	-88.090	¹¹⁶ La	-40.380 †	¹⁹² La	194.230 †	¹⁷³ Ce	36.580		
¹⁷⁵ Xe	116.550	¹⁵⁶ Cs	-12.490	¹³⁶ Ba	-88.970	¹¹⁷ La	-46.030 †	¹⁹³ La	202.880 †	¹⁷⁴ Ce	41.270		
¹⁷⁶ Xe	122.930	¹⁵⁷ Cs	-8.220	¹³⁷ Ba	-87.580	¹¹⁸ La	-49.520 †	¹⁹⁴ La	212.140 †	¹⁷⁵ Ce	47.830		
¹⁷⁷ Xe	130.980	¹⁵⁸ Cs	-2.210	¹³⁸ Ba	-88.010	¹¹⁹ La	-54.620 †	¹⁹⁵ La	220.170 ‡	¹⁷⁶ Ce	52.800		
¹⁷⁸ Xe	137.570	¹⁵⁹ Cs	2.280	¹³⁹ Ba	-84.890	¹²⁰ La	-57.570	¹⁹⁶ La	229.400 †	¹⁷⁷ Ce	59.620		
¹⁷⁹ Xe	145.650 †	¹⁶⁰ Cs	8.540	¹⁴⁰ Ba	-83.370	¹²¹ La	-62.090	¹⁹⁷ La	237.550 †	¹⁷⁸ Ce	64.920		
¹⁸⁰ Xe	152.780	¹⁶¹ Cs	13.060	¹⁴¹ Ba	-79.840	¹²² La	-64.440	¹⁹⁸ La	246.940 †	¹⁷⁹ Ce	71.910		
¹⁸¹ Xe	162.740 †	¹⁶² Cs	19.760	¹⁴² Ba	-77.940	¹²³ La	-68.360	¹⁹⁹ La	255.190 †	¹⁸⁰ Ce	77.460		
¹⁸² Xe	171.120 †	¹⁶³ Cs	24.240	¹⁴³ Ba	-73.840	¹²⁴ La	-70.160	²⁰⁰ La	264.700 †	¹⁸¹ Ce	84.700		
¹⁸³ Xe	181.120 †	¹⁶⁴ Cs	30.360	¹⁴⁴ Ba	-71.740	¹²⁵ La	-73.560	²⁰¹ La	273.100 †	¹⁸² Ce	90.480		
¹⁸⁴ Xe	189.600 †	¹⁶⁵ Cs	34.960	¹⁴⁵ Ba	-67.420	¹²⁶ La	-74.860	²⁰² La	282.820 †	¹⁸³ Ce	97.820		
¹⁸⁵ Xe	199.790 †	¹⁶⁶ Cs	41.680	¹⁴⁶ Ba	-65.200	¹²⁷ La	-77.790	²⁰³ La	291.320 †	¹⁸⁴ Ce	104.080		
¹⁸⁶ Xe	208.350 †	¹⁶⁷ Cs	46.970	¹⁴⁷ Ba	-60.970	¹²⁸ La	-78.620	²⁰⁴ La	301.150 †	¹⁸⁵ Ce	112.900 †		
¹⁸⁷ Xe	218.670 †	¹⁶⁸ Cs	53.810	¹⁴⁸ Ba	-58.410	¹²⁹ La	-81.120	²⁰⁵ La	309.850 †	¹⁸⁶ Ce	120.200		
¹⁸⁸ Xe	227.460 †	¹⁶⁹ Cs	59.290	¹⁴⁹ Ba	-53.740	¹³⁰ La	-81.540			¹⁸⁷ Ce	129.160 †		
¹⁸⁹ Xe	237.490 †	¹⁷⁰ Cs	66.250	¹⁵⁰ Ba	-51.030	¹³¹ La	-83.770	¹¹² Ce	-2.590 †	¹⁸⁸ Ce	136.630 ‡		
¹⁹⁰ Xe	246.880 †	¹⁷¹ Cs	71.790	¹⁵¹ Ba	-46.250	¹³² La	-83.930	¹¹³ Ce	-8.630 †	¹⁸⁹ Ce	145.830 †		
¹⁹¹ Xe	257.020 †	¹⁷² Cs	78.840	¹⁵² Ba	-43.200	¹³³ La	-85.770	¹¹⁴ Ce	-16.610 †	¹⁹⁰ Ce	153.440 ‡		
¹⁹² Xe	265.550 †	¹⁷³ Cs	84.680	¹⁵³ Ba	-38.100	¹³⁴ La	-85.570	¹¹⁵ Ce	-21.870 †	¹⁹¹ Ce	162.770 †		
¹⁹³ Xe	275.570 †	¹⁷⁴ Cs	92.000	¹⁵⁴ Ba	-34.890	¹³⁵ La	-86.970	¹¹⁶ Ce	-29.280 ‡	¹⁹² Ce	170.520 ‡		
¹⁹⁴ Xe	284.190 †	¹⁷⁵ Cs	98.160	¹⁵⁵ Ba	-29.540	¹³⁶ La	-86.350	¹¹⁷ Ce	-33.450 ‡	¹⁹³ Ce	179.600 †		
¹⁹⁵ Xe	294.360 †	¹⁷⁶ Cs	105.650	¹⁵⁶ Ba	-26.020	¹³⁷ La	-87.310	¹¹⁸ Ce	-39.790	¹⁹⁴ Ce	187.740 †		
¹⁹⁶ Xe	303.050 †	¹⁷⁷ Cs	112.040	¹⁵⁷ Ba	-20.370	¹³⁸ La	-86.450	¹¹⁹ Ce	-43.500	¹⁹⁵ Ce	196.910 †		
¹⁹⁷ Xe	313.330 †	¹⁷⁸ Cs	119.760	¹⁵⁸ Ba	-16.560	¹³⁹ La	-86.960	¹²⁰ Ce	-49.230	¹⁹⁶ Ce	204.540 ‡		
¹⁹⁸ Xe	322.150 †	¹⁷⁹ Cs	126.380	¹⁵⁹ Ba	-10.640	¹⁴⁰ La	-84.400	¹²¹ Ce	-52.370	¹⁹⁷ Ce	213.720 †		
		¹⁸⁰ Cs	134.190	¹⁶⁰ Ba	-6.600	¹⁴¹ La	-82.990	¹²² Ce	-57.460	¹⁹⁸ Ce	221.480 ‡		
¹⁰⁵ Cs	-4.680 †	¹⁸¹ Cs	141.300	¹⁶¹ Ba	-0.420	¹⁴² La	-80.000	¹²³ Ce	-60.010	¹⁹⁹ Ce	230.830 †		
¹⁰⁶ Cs	-11.570 †	¹⁸² Cs	150.670 †	¹⁶² Ba	3.680	¹⁴³ La	-78.210	¹²⁴ Ce	-64.480	²⁰⁰ Ce	238.710 ‡		
¹⁰⁷ Cs	-19.250 †	¹⁸³ Cs	158.860 †	¹⁶³ Ba	10.290	¹⁴⁴ La	-74.670	¹²⁵ Ce	-66.460	²⁰¹ Ce	248.190 †		
¹⁰⁸ Cs	-25.070 †	¹⁸⁴ Cs	168.360 †	¹⁶⁴ Ba	14.380	¹⁴⁵ La	-72.710	¹²⁶ Ce	-70.350	²⁰² Ce	256.230 ‡		
¹⁰⁹ Cs	-32.210 †	¹⁸⁵ Cs	176.720 †	¹⁶⁵ Ba	20.480	¹⁴⁶ La	-69.000	¹²⁷ Ce	-71.780	²⁰³ Ce	265.900 †		
¹¹⁰ Cs	-37.250 †	¹⁸⁶ Cs	186.450 †	¹⁶⁶ Ba	24.700	¹⁴⁷ La	-66.920	¹²⁸ Ce	-75.180	²⁰⁴ Ce	274.060 †		
¹¹¹ Cs	-43.060 †	¹⁸⁷ Cs	194.930 †	¹⁶⁷ Ba	31.370	¹⁴⁸ La	-63.240	¹²⁹ Ce	-76.110	²⁰⁵ Ce	283.860 †		
¹¹² Cs	-46.590 †	¹⁸⁸ Cs	204.830 †	¹⁶⁸ Ba	36.240	¹⁴⁹ La	-60.810	¹³⁰ Ce	-79.080	²⁰⁶ Ce	292.200 †		
¹¹³ Cs	-51.780 †	¹⁸⁹ Cs	213.550 †	¹⁶⁹ Ba	43.050	¹⁵⁰ La	-56.730	¹³¹ Ce	-79.570	²⁰⁷ Ce	302.200 †		
¹¹⁴ Cs	-54.740 †	¹⁹⁰ Cs	223.170 †	¹⁷⁰ Ba	48.110	¹⁵¹ La	-54.130	¹³² Ce	-82.270	²⁰⁸ Ce	310.680 †		
¹¹⁵ Cs	-59.540												

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹¹⁵ Pr	-5.010 †	¹⁹⁰ Pr	134.920 †	¹⁶⁷ Nd	-19.060	¹⁴⁴ Pm	-81.300	¹²¹ Sm	4.120 †	¹⁹⁶ Sm	122.620
¹¹⁶ Pr	-11.030 †	¹⁹¹ Pr	142.460 ‡	¹⁶⁸ Nd	-15.050	¹⁴⁵ Pm	-81.160	¹²² Sm	-4.510 †	¹⁹⁷ Sm	130.730 †
¹¹⁷ Pr	-18.680 †	¹⁹² Pr	151.340 †	¹⁶⁹ Nd	-9.440	¹⁴⁶ Pm	-79.420	¹²³ Sm	-10.700 †	¹⁹⁸ Sm	137.300
¹¹⁸ Pr	-24.270 †	¹⁹³ Pr	158.980 ‡	¹⁷⁰ Nd	-5.670	¹⁴⁷ Pm	-78.940	¹²⁴ Sm	-18.430 †	¹⁹⁹ Sm	145.360
¹¹⁹ Pr	-30.840 †	¹⁹⁴ Pr	167.630 †	¹⁷¹ Nd	0.080	¹⁴⁸ Pm	-76.820	¹²⁵ Sm	-23.320 †	²⁰⁰ Sm	151.990
¹²⁰ Pr	-35.380 †	¹⁹⁵ Pr	175.470 ‡	¹⁷² Nd	4.120	¹⁴⁹ Pm	-76.260	¹²⁶ Sm	-29.700 ‡	²⁰¹ Sm	160.300 †
¹²¹ Pr	-41.230 †	¹⁹⁶ Pr	184.150 †	¹⁷³ Nd	10.030	¹⁵⁰ Pm	-74.090	¹²⁷ Sm	-33.960	²⁰² Sm	167.150
¹²² Pr	-45.120	¹⁹⁷ Pr	191.680 ‡	¹⁷⁴ Nd	14.240	¹⁵¹ Pm	-73.430	¹²⁸ Sm	-39.650	²⁰³ Sm	175.630 †
¹²³ Pr	-50.260	¹⁹⁸ Pr	200.470 †	¹⁷⁵ Nd	20.280	¹⁵² Pm	-71.180	¹²⁹ Sm	-43.250	²⁰⁴ Sm	182.710
¹²⁴ Pr	-53.550	¹⁹⁹ Pr	208.150 ‡	¹⁷⁶ Nd	24.550	¹⁵³ Pm	-70.300	¹³⁰ Sm	-48.160	²⁰⁵ Sm	191.380 †
¹²⁵ Pr	-58.040	²⁰⁰ Pr	217.110 †	¹⁷⁷ Nd	30.660	¹⁵⁴ Pm	-67.920	¹³¹ Sm	-51.040	²⁰⁶ Sm	198.650
¹²⁶ Pr	-60.710	²⁰¹ Pr	224.950 ‡	¹⁷⁸ Nd	35.160	¹⁵⁵ Pm	-66.650	¹³² Sm	-55.280	²⁰⁷ Sm	207.450 †
¹²⁷ Pr	-64.550	²⁰² Pr	234.070 †	¹⁷⁹ Nd	41.510	¹⁵⁶ Pm	-63.840	¹³³ Sm	-57.510	²⁰⁸ Sm	214.920 ‡
¹²⁸ Pr	-66.590	²⁰³ Pr	242.080 ‡	¹⁸⁰ Nd	46.340	¹⁵⁷ Pm	-62.250	¹³⁴ Sm	-61.260	²⁰⁹ Sm	223.910 †
¹²⁹ Pr	-69.870	²⁰⁴ Pr	251.350 †	¹⁸¹ Nd	52.880	¹⁵⁸ Pm	-59.160	¹³⁵ Sm	-62.940	²¹⁰ Sm	231.520 ‡
¹³⁰ Pr	-71.350	²⁰⁵ Pr	259.520 †	¹⁸² Nd	57.960	¹⁵⁹ Pm	-57.010	¹³⁶ Sm	-66.460	²¹¹ Sm	240.610 †
¹³¹ Pr	-74.200	²⁰⁶ Pr	268.950 †	¹⁸³ Nd	64.740	¹⁶⁰ Pm	-53.530	¹³⁷ Sm	-67.820	²¹² Sm	248.400 ‡
¹³² Pr	-75.200	²⁰⁷ Pr	277.280 †	¹⁸⁴ Nd	70.070	¹⁶¹ Pm	-51.050	¹³⁸ Sm	-71.230	²¹³ Sm	257.600 †
¹³³ Pr	-77.810	²⁰⁸ Pr	286.870 †	¹⁸⁵ Nd	76.960	¹⁶² Pm	-47.280	¹³⁹ Sm	-72.280	²¹⁴ Sm	265.600 ‡
¹³⁴ Pr	-78.530	²⁰⁹ Pr	295.350 †	¹⁸⁶ Nd	82.770	¹⁶³ Pm	-44.460	¹⁴⁰ Sm	-75.370	²¹⁵ Sm	275.040 †
¹³⁵ Pr	-80.860	²¹⁰ Pr	305.070 †	¹⁸⁷ Nd	91.140 †	¹⁶⁴ Pm	-40.390	¹⁴¹ Sm	-76.080	²¹⁶ Sm	283.180 †
¹³⁶ Pr	-81.240	²¹¹ Pr	313.710 †	¹⁸⁸ Nd	97.980	¹⁶⁵ Pm	-37.160	¹⁴² Sm	-78.840	²¹⁷ Sm	292.840 †
¹³⁷ Pr	-83.240	²¹² Pr	323.580 †	¹⁸⁹ Nd	106.500 †	¹⁶⁶ Pm	-32.760	¹⁴³ Sm	-79.330	²¹⁸ Sm	301.060 †
¹³⁸ Pr	-83.250	²¹³ Pr	332.350 †	¹⁹⁰ Nd	113.530	¹⁶⁷ Pm	-28.970	¹⁴⁴ Sm	-81.620	¹²⁴ Eu	0.020 †
¹³⁹ Pr	-84.850	¹¹⁶ Nd	4.440 †	¹⁹¹ Nd	122.280 †	¹⁶⁸ Pm	-24.470	¹⁴⁵ Sm	-80.410	¹²⁵ Eu	-7.820 †
¹⁴⁰ Pr	-84.620	¹¹⁷ Nd	-1.750 †	¹⁹² Nd	129.420	¹⁶⁹ Pm	-20.150	¹⁴⁶ Sm	-80.790	¹²⁶ Eu	-13.880 †
¹⁴¹ Pr	-85.760	¹¹⁸ Nd	-10.080 †	¹⁹³ Nd	138.240 †	¹⁷⁰ Pm	-14.730	¹⁴⁷ Sm	-79.140	¹²⁷ Eu	-20.340 †
¹⁴² Pr	-83.830	¹¹⁹ Nd	-15.870 †	¹⁹⁴ Nd	145.470	¹⁷¹ Pm	-10.720	¹⁴⁸ Sm	-79.190	¹²⁸ Eu	-25.250 †
¹⁴³ Pr	-83.060	¹²⁰ Nd	-23.640 †	¹⁹⁵ Nd	154.060 †	¹⁷² Pm	-5.370	¹⁴⁹ Sm	-77.160	¹²⁹ Eu	-31.010 †
¹⁴⁴ Pr	-80.700	¹²¹ Nd	-28.360 ‡	¹⁹⁶ Nd	161.420	¹⁷³ Pm	-1.310	¹⁵⁰ Sm	-77.130	¹³⁰ Eu	-35.240 †
¹⁴⁵ Pr	-79.550	¹²² Nd	-34.830	¹⁹⁷ Nd	170.030 †	¹⁷⁴ Pm	4.200	¹⁵¹ Sm	-75.050	¹³¹ Eu	-40.180 †
¹⁴⁶ Pr	-76.720	¹²³ Nd	-38.880	¹⁹⁸ Nd	177.160	¹⁷⁵ Pm	8.410	¹⁵² Sm	-74.910	¹³² Eu	-43.650 †
¹⁴⁷ Pr	-75.480	¹²⁴ Nd	-44.610	¹⁹⁹ Nd	185.910 †	¹⁷⁶ Pm	14.050	¹⁵³ Sm	-72.750	¹³³ Eu	-47.900 †
¹⁴⁸ Pr	-72.550	¹²⁵ Nd	-48.040	²⁰⁰ Nd	193.200	¹⁷⁷ Pm	18.310	¹⁵⁴ Sm	-72.380	¹³⁴ Eu	-50.680
¹⁴⁹ Pr	-71.190	¹²⁶ Nd	-53.110	²⁰¹ Nd	202.120 †	¹⁷⁸ Pm	24.020	¹⁵⁵ Sm	-70.100	¹³⁵ Eu	-54.420
¹⁵⁰ Pr	-68.220	¹²⁷ Nd	-55.920	²⁰² Nd	209.600 ‡	¹⁷⁹ Pm	28.490	¹⁵⁶ Sm	-69.320	¹³⁶ Eu	-56.610
¹⁵¹ Pr	-66.570	¹²⁸ Nd	-60.300	²⁰³ Nd	218.670 †	¹⁸⁰ Pm	34.420	¹⁵⁷ Sm	-66.600	¹³⁷ Eu	-60.110
¹⁵² Pr	-63.340	¹²⁹ Nd	-62.460	²⁰⁴ Nd	226.330 ‡	¹⁸¹ Pm	39.200	¹⁵⁸ Sm	-65.490	¹³⁸ Eu	-61.980
¹⁵³ Pr	-61.410	¹³⁰ Nd	-66.250	²⁰⁵ Nd	235.560 †	¹⁸² Pm	45.320	¹⁵⁹ Sm	-62.490	¹³⁹ Eu	-65.450
¹⁵⁴ Pr	-57.900	¹³¹ Nd	-67.830	²⁰⁶ Nd	243.380 ‡	¹⁸³ Pm	50.360	¹⁶⁰ Sm	-60.820	¹⁴⁰ Eu	-67.010
¹⁵⁵ Pr	-55.650	¹³² Nd	-71.180	²⁰⁷ Nd	252.770 †	¹⁸⁴ Pm	56.730	¹⁶¹ Sm	-57.420	¹⁴¹ Eu	-70.170
¹⁵⁶ Pr	-51.850	¹³³ Nd	-72.260	²⁰⁸ Nd	260.750 ‡	¹⁸⁵ Pm	62.000	¹⁶² Sm	-55.410	¹⁴² Eu	-71.390
¹⁵⁷ Pr	-49.200	¹³⁴ Nd	-75.370	²⁰⁹ Nd	270.290 †	¹⁸⁶ Pm	68.490	¹⁶³ Sm	-51.720	¹⁴³ Eu	-74.230
¹⁵⁸ Pr	-45.060	¹³⁵ Nd	-76.160	²¹⁰ Nd	278.430 †	¹⁸⁷ Pm	74.250	¹⁶⁴ Sm	-49.360	¹⁴⁴ Eu	-75.240
¹⁵⁹ Pr	-42.080	¹³⁶ Nd	-79.030	²¹¹ Nd	288.110 †	¹⁸⁸ Pm	82.220	¹⁶⁵ Sm	-45.360	¹⁴⁵ Eu	-77.630
¹⁶⁰ Pr	-37.660	¹³⁷ Nd	-79.480	²¹² Nd	296.410 †	¹⁸⁹ Pm	89.020	¹⁶⁶ Sm	-42.580	¹⁴⁶ Eu	-76.940
¹⁶¹ Pr	-34.360	¹³⁸ Nd	-82.010	²¹³ Nd	306.240 †	¹⁹⁰ Pm	97.140 †	¹⁶⁷ Sm	-38.250	¹⁴⁷ Eu	-77.420
¹⁶² Pr	-29.640	¹³⁹ Nd	-82.120	²¹⁴ Nd	314.690 †	¹⁹¹ Pm	104.120	¹⁶⁸ Sm	-34.890	¹⁴⁸ Eu	-76.300
¹⁶³ Pr	-25.990	¹⁴⁰ Nd	-84.260	²¹⁵ Nd	324.660 †	¹⁹² Pm	112.470 †	¹⁶⁹ Sm	-30.480	¹⁴⁹ Eu	-76.470
¹⁶⁴ Pr	-20.970	¹⁴¹ Nd	-84.120	²¹⁶ Nd	333.250 †	¹⁹³ Pm	119.520	¹⁷⁰ Sm	-26.570	¹⁵⁰ Eu	-74.990
¹⁶⁵ Pr	-16.950	¹⁴² Nd	-85.790	¹¹⁹ Pm	1.360 †	¹⁹⁴ Pm	127.900 †	¹⁷¹ Sm	-21.190	¹⁵¹ Eu	-75.070
¹⁶⁶ Pr	-11.710	¹⁴³ Nd	-83.960	¹²⁰ Pm	-5.330 †	¹⁹⁵ Pm	135.010	¹⁷² Sm	-17.590	¹⁵² Eu	-73.560
¹⁶⁷ Pr	-7.370	¹⁴⁴ Nd	-83.710	¹²¹ Pm	-13.330 †	¹⁹⁶ Pm	143.170 †	¹⁷³ Sm	-12.300	¹⁵³ Eu	-73.550
¹⁶⁸ Pr	-1.780	¹⁴⁵ Nd	-81.450	¹²² Pm	-19.390 †	¹⁹⁷ Pm	150.150	¹⁷⁴ Sm	-8.680	¹⁵⁴ Eu	-71.950
¹⁶⁹ Pr	2.340	¹⁴⁶ Nd	-80.830	¹²³ Pm	-25.980 †	¹⁹⁸ Pm	158.260 †	¹⁷⁵ Sm	-3.220	¹⁵⁵ Eu	-71.730
¹⁷⁰ Pr	8.140	¹⁴⁷ Nd	-78.120	¹²⁴ Pm	-30.750 †	¹⁹⁹ Pm	165.270 †	¹⁷⁶ Sm	0.570	¹⁵⁶ Eu	-70.030
¹⁷¹ Pr	12.590	¹⁴⁸ Nd	-77.410	¹²⁵ Pm	-36.530 †	²⁰⁰ Pm	173.620 †	¹⁷⁷ Sm	6.160	¹⁵⁷ Eu	-69.370
¹⁷² Pr	18.550	¹⁴⁹ Nd	-74.610	¹²⁶ Pm	-40.680 †	²⁰¹ Pm	180.840	¹⁷⁸ Sm	10.000	¹⁵⁸ Eu	-67.170
¹⁷³ Pr	23.180	¹⁵⁰ Nd	-73.780	¹²⁷ Pm	-45.780 †	²⁰² Pm	189.370 †	¹⁷⁹ Sm	15.660	¹⁵⁹ Eu	-66.180
¹⁷⁴ Pr	29.270	¹⁵¹ Nd	-70.930	¹²⁸ Pm	-49.260	²⁰³ Pm	196.810	¹⁸⁰ Sm	19.710	¹⁶⁰ Eu	-63.700
¹⁷⁵ Pr	33.950	¹⁵² Nd	-69.810	¹²⁹ Pm	-53.600	²⁰⁴ Pm	205.520 †	¹⁸¹ Sm	25.590	¹⁶¹ Eu	-62.090
¹⁷⁶ Pr	40.100	¹⁵³ Nd	-66.730	¹³⁰ Pm	-56.370	²⁰⁵ Pm	213.140 ‡	¹⁸² Sm	29.960	¹⁶² Eu	-59.200
¹⁷⁷ Pr	45.020	¹⁵⁴ Nd	-65.310	¹³¹ Pm	-60.060	²⁰⁶ Pm	221.980 †	¹⁸³ Sm	36.020	¹⁶³ Eu	-57.240
¹⁷⁸ Pr	51.430	¹⁵⁵ Nd	-61.920	¹³² Pm	-62.180	²⁰⁷ Pm	229.810 ‡	¹⁸⁴ Sm	40.650	¹⁶⁴ Eu	-54.060
¹⁷⁹ Pr	56.670	¹⁵⁶ Nd	-60.170	¹³³ Pm	-65.380	²⁰⁸ Pm	238.830 †	¹⁸⁵ Sm	46.970	¹⁶⁵ Eu	-51.750
¹⁸⁰ Pr	63.260	¹⁵⁷ Nd	-56.490	¹³⁴ Pm	-66.960	²⁰⁹ Pm	246.800 ‡	¹⁸⁶ Sm	51.840	¹⁶⁶ Eu	-48.250
¹⁸¹ Pr	68.750	¹⁵⁸ Nd	-54.300	¹³⁵ Pm	-69.940	²¹⁰ Pm	255.920 †	¹⁸⁷ Sm	58.280	¹⁶⁷ Eu	-45.500
¹⁸² Pr	75.590	¹⁵⁹ Nd	-50.270	¹³⁶ Pm	-71.210	²¹¹ Pm	264.060 †	¹⁸⁸ Sm	63.640	¹⁶⁸ Eu	-41.660
¹⁸³ Pr	81.310	¹⁶⁰ Nd	-47.750	¹³⁷ Pm	-74.090	²¹² Pm	273.360 †	¹⁸⁹ Sm	71.560	¹⁶⁹ Eu	-38.260
¹⁸⁴ Pr	88.250	¹⁶¹ Nd	-43.430	¹³⁸ Pm	-75.040	²¹³ Pm	281.640 †	¹⁹⁰ Sm	77.960	¹⁷⁰ Eu	-34.380
¹⁸⁵ Pr	94.460	¹⁶² Nd	-40.580	¹³⁹ Pm	-77.600	²¹⁴ Pm	291.120 †	¹⁹¹ Sm	86.030	¹⁷¹ Eu	-30.360
¹⁸⁶ Pr	102.880 †	¹⁶³ Nd	-35.960	¹⁴⁰ Pm	-78.220	²¹⁵ Pm	299.590 †	¹⁹² Sm	92.610	¹⁷² Eu	-25.310
¹⁸⁷ Pr	110.130	¹⁶⁴ Nd	-32.750	¹⁴¹ Pm	-80.450	²¹⁶ Pm	309.270 †	¹⁹³ Sm	100.910 †	¹⁷³ Eu	-21.610
¹⁸⁸ Pr	118.700 †	¹⁶⁵ Nd	-27.820	¹⁴² Pm	-80.840	²¹⁷ Pm	317.840 †	¹⁹⁴ Sm	107.580	¹⁷⁴ Eu	-16.730
¹⁸⁹ Pr	126.120	¹⁶⁶ Nd	-24.170	¹⁴³ Pm	-82.610	¹²⁰ Sm	10.950 †	¹⁹⁵ Sm	115.910 †	¹⁷⁵ Eu	-13.130

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁷⁶ Eu	-8.070	¹⁵⁶ Gd	-72.580	¹³⁵ Tb	-33.500 †	²¹⁰ Tb	170.910	¹⁸⁹ Dy	17.460	¹⁷¹ Ho	-54.630		
¹⁷⁷ Eu	-4.330	¹⁵⁷ Gd	-70.890	¹³⁶ Tb	-36.940 †	²¹¹ Tb	177.970	¹⁹⁰ Dy	21.420	¹⁷² Ho	-51.830		
¹⁷⁸ Eu	0.860	¹⁵⁸ Gd	-70.690	¹³⁷ Tb	-41.290 †	²¹² Tb	186.210 †	¹⁹¹ Dy	26.970	¹⁷³ Ho	-49.440		
¹⁷⁹ Eu	4.660	¹⁵⁹ Gd	-68.540	¹³⁸ Tb	-44.130 †	²¹³ Tb	193.410	¹⁹² Dy	31.430	¹⁷⁴ Ho	-46.600		
¹⁸⁰ Eu	9.920	¹⁶⁰ Gd	-68.000	¹³⁹ Tb	-48.220 †	²¹⁴ Tb	201.720 †	¹⁹³ Dy	38.450	¹⁷⁵ Ho	-43.540		
¹⁸¹ Eu	13.930	¹⁶¹ Gd	-65.570	¹⁴⁰ Tb	-50.720	²¹⁵ Tb	209.120	¹⁹⁴ Dy	43.950	¹⁷⁶ Ho	-39.460		
¹⁸² Eu	19.400	¹⁶² Gd	-64.440	¹⁴¹ Tb	-54.790	²¹⁶ Tb	217.640 †	¹⁹⁵ Dy	51.140	¹⁷⁷ Ho	-36.740		
¹⁸³ Eu	23.710	¹⁶³ Gd	-61.600	¹⁴² Tb	-56.980	²¹⁷ Tb	225.160	¹⁹⁶ Dy	56.840	¹⁷⁸ Ho	-32.850		
¹⁸⁴ Eu	29.370	¹⁶⁴ Gd	-60.120	¹⁴³ Tb	-60.750	²¹⁸ Tb	233.890 †	¹⁹⁷ Dy	64.250	¹⁷⁹ Ho	-30.220		
¹⁸⁵ Eu	33.940	¹⁶⁵ Gd	-56.980	¹⁴⁴ Tb	-62.580	²¹⁹ Tb	241.660 ‡	¹⁹⁸ Dy	70.030	¹⁸⁰ Ho	-26.130		
¹⁸⁶ Eu	39.870	¹⁶⁶ Gd	-55.140	¹⁴⁵ Tb	-66.040	²²⁰ Tb	250.640 †	¹⁹⁹ Dy	77.480	¹⁸¹ Ho	-23.350		
¹⁸⁷ Eu	44.680	¹⁶⁷ Gd	-51.700	¹⁴⁶ Tb	-67.660	²²¹ Tb	258.470 ‡	²⁰⁰ Dy	83.300	¹⁸² Ho	-19.110		
¹⁸⁸ Eu	50.720	¹⁶⁸ Gd	-49.430	¹⁴⁷ Tb	-70.650	²²² Tb	267.380 †	²⁰¹ Dy	90.550	¹⁸³ Ho	-16.260		
¹⁸⁹ Eu	56.030	¹⁶⁹ Gd	-45.630	¹⁴⁸ Tb	-70.580	²²³ Tb	275.490 †	²⁰² Dy	96.170	¹⁸⁴ Ho	-11.940		
¹⁹⁰ Eu	63.550	¹⁷⁰ Gd	-42.750	¹⁴⁹ Tb	-71.670	²²⁴ Tb	284.600 †	²⁰³ Dy	103.350	¹⁸⁵ Ho	-8.870		
¹⁹¹ Eu	69.900	¹⁷¹ Gd	-38.880	¹⁵⁰ Tb	-71.170	²²⁵ Tb	292.810 †	²⁰⁴ Dy	109.130	¹⁸⁶ Ho	-4.320		
¹⁹² Eu	77.580	¹⁷² Gd	-35.420	¹⁵¹ Tb	-71.960	¹³⁰ Dy	8.320 †	²⁰⁵ Dy	116.620	¹⁸⁷ Ho	-0.940		
¹⁹³ Eu	84.110	¹⁷³ Gd	-30.510	¹⁵² Tb	-71.090	¹³¹ Dy	2.120 †	²⁰⁶ Dy	122.640	¹⁸⁸ Ho	3.810		
¹⁹⁴ Eu	92.010	¹⁷⁴ Gd	-27.370	¹⁵³ Tb	-71.790	¹³² Dy	-5.410 †	²⁰⁷ Dy	130.310	¹⁸⁹ Ho	7.460		
¹⁹⁵ Eu	98.600	¹⁷⁵ Gd	-22.570	¹⁵⁴ Tb	-70.890	¹³³ Dy	-10.420 †	²⁰⁸ Dy	136.580	¹⁹⁰ Ho	12.480		
¹⁹⁶ Eu	106.520	¹⁷⁶ Gd	-19.430	¹⁵⁵ Tb	-71.480	¹³⁴ Dy	-16.630 †	²⁰⁹ Dy	144.450	¹⁹¹ Ho	16.390		
¹⁹⁷ Eu	113.150	¹⁷⁷ Gd	-14.450	¹⁵⁶ Tb	-70.480	¹³⁵ Dy	-20.870 †	²¹⁰ Dy	150.920	¹⁹² Ho	21.540		
¹⁹⁸ Eu	120.860	¹⁷⁸ Gd	-11.140	¹⁵⁷ Tb	-70.870	¹³⁶ Dy	-26.400 ‡	²¹¹ Dy	158.920	¹⁹³ Ho	25.950		
¹⁹⁹ Eu	127.200	¹⁷⁹ Gd	-6.030	¹⁵⁸ Tb	-69.780	¹³⁷ Dy	-29.950 ‡	²¹² Dy	165.620	¹⁹⁴ Ho	32.570		
²⁰⁰ Eu	134.820	¹⁸⁰ Gd	-2.660	¹⁵⁹ Tb	-69.680	¹³⁸ Dy	-34.950	²¹³ Dy	173.830 †	¹⁹⁵ Ho	38.020		
²⁰¹ Eu	141.370	¹⁸¹ Gd	2.530	¹⁶⁰ Tb	-68.070	¹³⁹ Dy	-37.920	²¹⁴ Dy	180.670	¹⁹⁶ Ho	44.810		
²⁰² Eu	149.310	¹⁸² Gd	6.120	¹⁶¹ Tb	-67.650	¹⁴⁰ Dy	-42.670	²¹⁵ Dy	188.970 †	¹⁹⁷ Ho	50.460		
²⁰³ Eu	156.100	¹⁸³ Gd	11.530	¹⁶² Tb	-65.740	¹⁴¹ Dy	-45.290	²¹⁶ Dy	196.010	¹⁹⁸ Ho	57.480		
²⁰⁴ Eu	164.210 †	¹⁸⁴ Gd	15.440	¹⁶³ Tb	-64.670	¹⁴² Dy	-49.940	²¹⁷ Dy	204.500 †	¹⁹⁹ Ho	63.200		
²⁰⁵ Eu	171.240	¹⁸⁵ Gd	21.040	¹⁶⁴ Tb	-62.340	¹⁴³ Dy	-52.230	²¹⁸ Dy	211.680	²⁰⁰ Ho	70.250		
²⁰⁶ Eu	179.550 †	¹⁸⁶ Gd	25.210	¹⁶⁵ Tb	-60.910	¹⁴⁴ Dy	-56.560	²¹⁹ Dy	220.370 †	²⁰¹ Ho	76.000		
²⁰⁷ Eu	186.780	¹⁸⁷ Gd	31.080	¹⁶⁶ Tb	-58.280	¹⁴⁵ Dy	-58.500	²²⁰ Dy	227.790	²⁰² Ho	82.850		
²⁰⁸ Eu	195.210 †	¹⁸⁸ Gd	35.490	¹⁶⁷ Tb	-56.500	¹⁴⁶ Dy	-62.490	²²¹ Dy	236.710 †	²⁰³ Ho	88.320		
²⁰⁹ Eu	202.670	¹⁸⁹ Gd	41.490	¹⁶⁸ Tb	-53.550	¹⁴⁷ Dy	-64.200	²²² Dy	244.200 ‡	²⁰⁴ Ho	95.100		
²¹⁰ Eu	211.300 †	¹⁹⁰ Gd	46.400	¹⁶⁹ Tb	-51.300	¹⁴⁸ Dy	-67.710	²²³ Dy	253.110 †	²⁰⁵ Ho	100.820		
²¹¹ Eu	218.880 ‡	¹⁹¹ Gd	53.870	¹⁷⁰ Tb	-47.990	¹⁴⁹ Dy	-67.730	²²⁴ Dy	260.860 ‡	²⁰⁶ Ho	107.930		
²¹² Eu	227.590 †	¹⁹² Gd	59.820	¹⁷¹ Tb	-45.070	¹⁵⁰ Dy	-69.340	²²⁵ Dy	269.960 †	²⁰⁷ Ho	113.900		
²¹³ Eu	235.360 ‡	¹⁹³ Gd	67.440	¹⁷² Tb	-41.730	¹⁵¹ Dy	-68.910	²²⁶ Dy	277.820 ‡	²⁰⁸ Ho	121.200		
²¹⁴ Eu	244.270 †	¹⁹⁴ Gd	73.590	¹⁷³ Tb	-38.140	¹⁵² Dy	-70.190	¹³⁴ Ho	-0.250 †	²⁰⁹ Ho	127.420		
²¹⁵ Eu	252.170 ‡	¹⁹⁵ Gd	81.450	¹⁷⁴ Tb	-33.540	¹⁵³ Dy	-69.390	¹³⁵ Ho	-6.530 †	²¹⁰ Ho	134.940		
²¹⁶ Eu	261.270 †	¹⁹⁶ Gd	87.670	¹⁷⁵ Tb	-30.270	¹⁵⁴ Dy	-70.560	¹³⁶ Ho	-11.340 †	²¹¹ Ho	141.370		
²¹⁷ Eu	269.400 †	¹⁹⁷ Gd	95.550	¹⁷⁶ Tb	-25.880	¹⁵⁵ Dy	-69.700	¹³⁷ Ho	-16.910 †	²¹² Ho	149.010		
²¹⁸ Eu	278.740 †	¹⁹⁸ Gd	101.830	¹⁷⁷ Tb	-22.750	¹⁵⁶ Dy	-70.750	¹³⁸ Ho	-21.010 †	²¹³ Ho	155.680		
²¹⁹ Eu	286.940 †	¹⁹⁹ Gd	109.510	¹⁷⁸ Tb	-18.180	¹⁵⁷ Dy	-69.780	¹³⁹ Ho	-26.050 †	²¹⁴ Ho	163.530		
		²⁰⁰ Gd	115.610	¹⁷⁹ Tb	-14.900	¹⁵⁸ Dy	-70.590	¹⁴⁰ Ho	-29.540 †	²¹⁵ Ho	170.340		
¹²⁵ Gd	9.980 †	²⁰¹ Gd	123.230	¹⁸⁰ Tb	-10.190	¹⁵⁹ Dy	-69.500	¹⁴¹ Ho	-34.310 †	²¹⁶ Ho	178.270		
¹²⁶ Gd	1.530 †	²⁰² Gd	129.440	¹⁸¹ Tb	-6.850	¹⁶⁰ Dy	-69.870	¹⁴² Ho	-37.450 †	²¹⁷ Ho	185.280		
¹²⁷ Gd	-4.610 †	²⁰³ Gd	137.340	¹⁸² Tb	-2.060	¹⁶¹ Dy	-68.300	¹⁴³ Ho	-42.160 †	²¹⁸ Ho	193.420 †		
¹²⁸ Gd	-12.190 †	²⁰⁴ Gd	143.770	¹⁸³ Tb	1.480	¹⁶² Dy	-68.320	¹⁴⁴ Ho	-44.970	²¹⁹ Ho	200.570		
¹²⁹ Gd	-17.170 †	²⁰⁵ Gd	151.850 †	¹⁸⁴ Tb	6.500	¹⁶³ Dy	-66.460	¹⁴⁵ Ho	-49.370	²²⁰ Ho	208.920 †		
¹³⁰ Gd	-23.540 †	²⁰⁶ Gd	158.520	¹⁸⁵ Tb	10.340	¹⁶⁴ Dy	-65.870	¹⁴⁶ Ho	-51.820	²²¹ Ho	216.310		
¹³¹ Gd	-27.850 †	²⁰⁷ Gd	166.790 †	¹⁸⁶ Tb	15.540	¹⁶⁵ Dy	-63.580	¹⁴⁷ Ho	-55.900	²²² Ho	224.910 †		
¹³² Gd	-33.410 ‡	²⁰⁸ Gd	173.660	¹⁸⁷ Tb	19.650	¹⁶⁶ Dy	-62.630	¹⁴⁸ Ho	-58.120	²²³ Ho	232.370		
¹³³ Gd	-36.980	²⁰⁹ Gd	182.060 †	¹⁸⁸ Tb	25.120	¹⁶⁷ Dy	-60.040	¹⁴⁹ Ho	-61.720	²²⁴ Ho	240.930 †		
¹³⁴ Gd	-41.870	²¹⁰ Gd	189.150	¹⁸⁹ Tb	29.480	¹⁶⁸ Dy	-58.730	¹⁵⁰ Ho	-62.260	²²⁵ Ho	248.670 ‡		
¹³⁵ Gd	-44.760	²¹¹ Gd	197.750 †	¹⁹⁰ Tb	35.080	¹⁶⁹ Dy	-55.820	¹⁵¹ Ho	-63.960	²²⁶ Ho	257.420 †		
¹³⁶ Gd	-49.150	²¹² Gd	204.970	¹⁹¹ Tb	39.940	¹⁷⁰ Dy	-54.060	¹⁵² Ho	-64.050	²²⁷ Ho	265.260 ‡		
¹³⁷ Gd	-51.470	²¹³ Gd	213.660 †	¹⁹² Tb	47.010	¹⁷¹ Dy	-50.790	¹⁵³ Ho	-65.430	¹³⁵ Er	9.710 †		
¹³⁸ Gd	-55.610	²¹⁴ Gd	221.080	¹⁹³ Tb	52.910	¹⁷² Dy	-48.380	¹⁵⁴ Ho	-65.150	¹³⁶ Er	2.330 †		
¹³⁹ Gd	-57.610	²¹⁵ Gd	229.960 †	¹⁹⁴ Tb	60.140	¹⁷³ Dy	-45.060	¹⁵⁵ Ho	-66.440	¹³⁷ Er	-2.570 †		
¹⁴⁰ Gd	-61.640	²¹⁶ Gd	237.520 ‡	¹⁹⁵ Tb	66.240	¹⁷⁴ Dy	-42.040	¹⁵⁶ Ho	-66.110	¹³⁸ Er	-8.780 †		
¹⁴¹ Gd	-63.320	²¹⁷ Gd	246.590 †	¹⁹⁶ Tb	73.690	¹⁷⁵ Dy	-37.590	¹⁵⁷ Ho	-67.270	¹³⁹ Er	-12.990 †		
¹⁴² Gd	-67.040	²¹⁸ Gd	254.360 ‡	¹⁹⁷ Tb	79.840	¹⁷⁶ Dy	-34.900	¹⁵⁸ Ho	-66.820	¹⁴⁰ Er	-18.680 †		
¹⁴³ Gd	-68.360	²¹⁹ Gd	263.650 †	¹⁹⁸ Tb	87.310	¹⁷⁷ Dy	-30.590	¹⁵⁹ Ho	-67.760	¹⁴¹ Er	-22.310 ‡		
¹⁴⁴ Gd	-71.740	²²⁰ Gd	271.510 ‡	¹⁹⁹ Tb	93.490	¹⁷⁸ Dy	-27.920	¹⁶⁰ Ho	-67.200	¹⁴² Er	-27.730 ‡		
¹⁴⁵ Gd	-72.850	²²¹ Gd	280.800 †	²⁰⁰ Tb	100.760	¹⁷⁹ Dy	-23.420	¹⁶¹ Ho	-67.670	¹⁴³ Er	-30.990		
¹⁴⁶ Gd	-75.750	²²² Gd	288.900 †	²⁰¹ Tb	106.600	¹⁸⁰ Dy	-20.590	¹⁶² Ho	-66.600	¹⁴⁴ Er	-36.270		
¹⁴⁷ Gd	-75.160	²²³ Gd	298.370 †	²⁰² Tb	113.780	¹⁸¹ Dy	-15.950	¹⁶³ Ho	-66.720	¹⁴⁵ Er	-39.200		
¹⁴⁸ Gd	-76.150	²²⁴ Gd	306.580 †	²⁰³ Tb	119.910	¹⁸² Dy	-13.050	¹⁶⁴ Ho	-65.350	¹⁴⁶ Er	-44.150		
¹⁴⁹ Gd	-75.120			²⁰⁴ Tb	127.430	¹⁸³ Dy	-8.320	¹⁶⁵ Ho	-64.830	¹⁴⁷ Er	-46.710		
¹⁵⁰ Gd	-75.780	¹²⁹ Tb	-1.390 †	²⁰⁵ Tb	133.800	¹⁸⁴ Dy	-5.200	¹⁶⁶ Ho	-63.030	¹⁴⁸ Er	-51.320		
¹⁵¹ Gd	-74.370	¹³⁰ Tb	-7.510 †	²⁰⁶ Tb	141.500	¹⁸⁵ Dy	-0.250	¹⁶⁷ Ho	-62.140	¹⁴⁹ Er	-53.630		
¹⁵² Gd	-74.940	¹³¹ Tb	-13.950 †	²⁰⁷ Tb	148.130	¹⁸⁶ Dy	3.190	¹⁶⁸ Ho	-60.030	¹⁵⁰ Er	-57.740		
¹⁵³ Gd	-73.470	¹³² Tb	-18.880 †	²⁰⁸ Tb	156.040								

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁵³ Er	-60.750	²²⁸ Er	251.390 ‡	²¹² Tm	116.070	¹⁹⁶ Yb	7.810	¹⁸³ Lu	-38.820	¹⁷⁰ Hf	-56.350
¹⁵⁴ Er	-62.610			²¹³ Tm	122.100	¹⁹⁷ Yb	13.930	¹⁸⁴ Lu	-35.730	¹⁷¹ Hf	-55.600
¹⁵⁵ Er	-62.390	¹³⁸ Tm	7.970 †	²¹⁴ Tm	129.350	¹⁹⁸ Yb	18.550	¹⁸⁵ Lu	-33.940	¹⁷² Hf	-56.270
¹⁵⁶ Er	-64.150	¹³⁹ Tm	1.700 †	²¹⁵ Tm	135.620	¹⁹⁹ Yb	24.840	¹⁸⁶ Lu	-30.680	¹⁷³ Hf	-55.190
¹⁵⁷ Er	-63.860	¹⁴⁰ Tm	-3.050 †	²¹⁶ Tm	143.080	²⁰⁰ Yb	29.660	¹⁸⁷ Lu	-28.800	¹⁷⁴ Hf	-55.480
¹⁵⁸ Er	-65.460	¹⁴¹ Tm	-8.790 †	²¹⁷ Tm	149.500	²⁰¹ Yb	36.210	¹⁸⁸ Lu	-25.440	¹⁷⁵ Hf	-54.050
¹⁵⁹ Er	-65.050	¹⁴² Tm	-12.930 †	²¹⁸ Tm	157.060	²⁰² Yb	41.140	¹⁸⁹ Lu	-23.330	¹⁷⁶ Hf	-53.910
¹⁶⁰ Er	-66.400	¹⁴³ Tm	-18.400 †	²¹⁹ Tm	163.680	²⁰³ Yb	47.720	¹⁹⁰ Lu	-19.720	¹⁷⁷ Hf	-52.120
¹⁶¹ Er	-65.840	¹⁴⁴ Tm	-22.180 †	²²⁰ Tm	171.450	²⁰⁴ Yb	52.710	¹⁹¹ Lu	-17.260	¹⁷⁸ Hf	-51.440
¹⁶² Er	-66.760	¹⁴⁵ Tm	-27.530 †	²²¹ Tm	178.210	²⁰⁵ Yb	59.120	¹⁹² Lu	-13.430	¹⁷⁹ Hf	-49.480
¹⁶³ Er	-65.730	¹⁴⁶ Tm	-30.970 †	²²² Tm	186.190	²⁰⁶ Yb	64.010	¹⁹³ Lu	-10.680	¹⁸⁰ Hf	-48.310
¹⁶⁴ Er	-66.290	¹⁴⁷ Tm	-35.990 †	²²³ Tm	193.190	²⁰⁷ Yb	70.390	¹⁹⁴ Lu	-6.570	¹⁸¹ Hf	-45.620
¹⁶⁵ Er	-64.960	¹⁴⁸ Tm	-39.060 †	²²⁴ Tm	201.420 †	²⁰⁸ Yb	75.370	¹⁹⁵ Lu	-3.560	¹⁸² Hf	-44.720
¹⁶⁶ Er	-64.920	¹⁴⁹ Tm	-43.750 †	²²⁵ Tm	208.510	²⁰⁹ Yb	82.040	¹⁹⁶ Lu	0.710	¹⁸³ Hf	-41.920
¹⁶⁷ Er	-63.160	¹⁵⁰ Tm	-46.570	²²⁶ Tm	216.710 †	²¹⁰ Yb	87.250	¹⁹⁷ Lu	4.230	¹⁸⁴ Hf	-40.780
¹⁶⁸ Er	-62.750	¹⁵¹ Tm	-50.770	²²⁷ Tm	224.070	²¹¹ Yb	94.120	¹⁹⁸ Lu	9.950	¹⁸⁵ Hf	-37.770
¹⁶⁹ Er	-60.680	¹⁵² Tm	-51.910	²²⁸ Tm	232.470 †	²¹² Yb	99.580	¹⁹⁹ Lu	14.510	¹⁸⁶ Hf	-36.420
¹⁷⁰ Er	-59.900	¹⁵³ Tm	-54.210	²²⁹ Tm	239.940	²¹³ Yb	106.660	²⁰⁰ Lu	20.420	¹⁸⁷ Hf	-33.240
¹⁷¹ Er	-57.510	¹⁵⁴ Tm	-54.890			²¹⁴ Yb	112.330	²⁰¹ Lu	25.190	¹⁸⁸ Hf	-31.790
¹⁷² Er	-56.270	¹⁵⁵ Tm	-56.860	¹³⁹ Yb	18.140 †	²¹⁵ Yb	119.550	²⁰² Lu	31.370	¹⁸⁹ Hf	-28.510
¹⁷³ Er	-53.510	¹⁵⁶ Tm	-57.160	¹⁴⁰ Yb	10.780 †	²¹⁶ Yb	125.450	²⁰³ Lu	36.240	¹⁹⁰ Hf	-26.820
¹⁷⁴ Er	-51.640	¹⁵⁷ Tm	-59.010	¹⁴¹ Yb	5.930 †	²¹⁷ Yb	132.880	²⁰⁴ Lu	42.470	¹⁹¹ Hf	-23.260
¹⁷⁵ Er	-48.800	¹⁵⁸ Tm	-59.240	¹⁴² Yb	-0.450 †	²¹⁸ Yb	138.940	²⁰⁵ Lu	47.420	¹⁹² Hf	-21.200
¹⁷⁶ Er	-46.330	¹⁵⁹ Tm	-60.960	¹⁴³ Yb	-4.720 †	²¹⁹ Yb	146.480	²⁰⁶ Lu	53.470	¹⁹³ Hf	-17.430
¹⁷⁷ Er	-42.420	¹⁶⁰ Tm	-61.050	¹⁴⁴ Yb	-10.810 †	²²⁰ Yb	152.750	²⁰⁷ Lu	58.390	¹⁹⁴ Hf	-15.080
¹⁷⁸ Er	-40.270	¹⁶¹ Tm	-62.520	¹⁴⁵ Yb	-14.710 †	²²¹ Yb	160.490	²⁰⁸ Lu	64.440	¹⁹⁵ Hf	-11.020
¹⁷⁹ Er	-36.460	¹⁶² Tm	-62.480	¹⁴⁶ Yb	-20.620 ‡	²²² Yb	166.910	²⁰⁹ Lu	69.380	¹⁹⁶ Hf	-8.400
¹⁸⁰ Er	-34.290	¹⁶³ Tm	-63.490	¹⁴⁷ Yb	-24.160 ‡	²²³ Yb	174.850	²¹⁰ Lu	75.700	¹⁹⁷ Hf	-4.190
¹⁸¹ Er	-30.280	¹⁶⁴ Tm	-62.950	¹⁴⁸ Yb	-29.730	²²⁴ Yb	181.500	²¹¹ Lu	80.870	¹⁹⁸ Hf	-1.060
¹⁸² Er	-27.940	¹⁶⁵ Tm	-63.610	¹⁴⁹ Yb	-32.910	²²⁵ Yb	189.680 †	²¹² Lu	87.380	¹⁹⁹ Hf	4.610
¹⁸³ Er	-23.780	¹⁶⁶ Tm	-62.770	¹⁵⁰ Yb	-38.120	²²⁶ Yb	196.430	²¹³ Lu	92.800	²⁰⁰ Hf	8.780
¹⁸⁴ Er	-21.350	¹⁶⁷ Tm	-62.790	¹⁵¹ Yb	-41.030	²²⁷ Yb	204.620 †	²¹⁴ Lu	99.520	²⁰¹ Hf	14.630
¹⁸⁵ Er	-17.100	¹⁶⁸ Tm	-61.510	¹⁵² Yb	-45.730	²²⁸ Yb	211.620	²¹⁵ Lu	105.150	²⁰² Hf	19.020
¹⁸⁶ Er	-14.450	¹⁶⁹ Tm	-61.170	¹⁵³ Yb	-46.970	²²⁹ Yb	220.000 †	²¹⁶ Lu	112.020	²⁰³ Hf	25.150
¹⁸⁷ Er	-9.970	¹⁷⁰ Tm	-59.570	¹⁵⁴ Yb	-49.770	²³⁰ Yb	227.130	²¹⁷ Lu	117.880	²⁰⁴ Hf	29.670
¹⁸⁸ Er	-6.990	¹⁷¹ Tm	-58.850	¹⁵⁵ Yb	-50.530			²¹⁸ Lu	124.960	²⁰⁵ Hf	35.870
¹⁸⁹ Er	-2.300	¹⁷² Tm	-56.930	¹⁵⁶ Yb	-52.980	¹⁴³ Lu	10.470 †	²¹⁹ Lu	130.980	²⁰⁶ Hf	40.480
¹⁹⁰ Er	0.950	¹⁷³ Tm	-55.740	¹⁵⁷ Yb	-53.340	¹⁴⁴ Lu	5.650 †	²²⁰ Lu	138.190	²⁰⁷ Hf	46.510
¹⁹¹ Er	5.910	¹⁷⁴ Tm	-53.440	¹⁵⁸ Yb	-55.670	¹⁴⁵ Lu	-0.590 †	²²¹ Lu	144.410	²⁰⁸ Hf	51.210
¹⁹² Er	9.420	¹⁷⁵ Tm	-51.590	¹⁵⁹ Yb	-55.940	¹⁴⁶ Lu	-5.030 †	²²² Lu	151.820	²⁰⁹ Hf	57.270
¹⁹³ Er	14.520	¹⁷⁶ Tm	-49.230	¹⁶⁰ Yb	-58.100	¹⁴⁷ Lu	-11.060 †	²²³ Lu	158.190	²¹⁰ Hf	61.890
¹⁹⁴ Er	18.540	¹⁷⁷ Tm	-46.740	¹⁶¹ Yb	-58.240	¹⁴⁸ Lu	-15.130 †	²²⁴ Lu	165.800	²¹¹ Hf	68.160
¹⁹⁵ Er	25.110	¹⁷⁸ Tm	-43.210	¹⁶² Yb	-60.130	¹⁴⁹ Lu	-20.810 †	²²⁵ Lu	172.400	²¹² Hf	73.000
¹⁹⁶ Er	30.170	¹⁷⁹ Tm	-41.050	¹⁶³ Yb	-60.100	¹⁵⁰ Lu	-24.510 †	²²⁶ Lu	180.230	²¹³ Hf	79.470
¹⁹⁷ Er	36.910	¹⁸⁰ Tm	-37.660	¹⁶⁴ Yb	-61.560	¹⁵¹ Lu	-29.810 †	²²⁷ Lu	186.940	²¹⁴ Hf	84.530
¹⁹⁸ Er	42.170	¹⁸¹ Tm	-35.540	¹⁶⁵ Yb	-61.060	¹⁵² Lu	-33.230 †	²²⁸ Lu	194.820	²¹⁵ Hf	91.210
¹⁹⁹ Er	49.150	¹⁸² Tm	-31.940	¹⁶⁶ Yb	-62.170	¹⁵³ Lu	-38.020 †	²²⁹ Lu	201.770	²¹⁶ Hf	96.480
²⁰⁰ Er	54.500	¹⁸³ Tm	-29.650	¹⁶⁷ Yb	-61.370	¹⁵⁴ Lu	-39.750	²³⁰ Lu	209.840	²¹⁷ Hf	103.330
²⁰¹ Er	61.520	¹⁸⁴ Tm	-25.890	¹⁶⁸ Yb	-61.860	¹⁵⁵ Lu	-42.650	²³¹ Lu	216.920	²¹⁸ Hf	108.810
²⁰² Er	66.920	¹⁸⁵ Tm	-23.510	¹⁶⁹ Yb	-60.630	¹⁵⁶ Lu	-43.910			²¹⁹ Hf	115.860
²⁰³ Er	73.750	¹⁸⁶ Tm	-19.670	¹⁷⁰ Yb	-60.750	¹⁵⁷ Lu	-46.420	¹⁴⁴ Hf	19.760 †	²²⁰ Hf	121.520
²⁰⁴ Er	79.010	¹⁸⁷ Tm	-17.070	¹⁷¹ Yb	-59.200	¹⁵⁸ Lu	-47.260	¹⁴⁵ Hf	14.800 †	²²¹ Hf	128.720
²⁰⁵ Er	85.790	¹⁸⁸ Tm	-12.990	¹⁷² Yb	-58.950	¹⁵⁹ Lu	-49.660	¹⁴⁶ Hf	7.940 †	²²² Hf	134.580
²⁰⁶ Er	91.170	¹⁸⁹ Tm	-10.080	¹⁷³ Yb	-57.070	¹⁶⁰ Lu	-50.400	¹⁴⁷ Hf	3.360 †	²²³ Hf	141.970
²⁰⁷ Er	98.250	¹⁹⁰ Tm	-5.790	¹⁷⁴ Yb	-56.360	¹⁶¹ Lu	-52.620	¹⁴⁸ Hf	-3.230 †	²²⁴ Hf	148.000
²⁰⁸ Er	103.860	¹⁹¹ Tm	-2.590	¹⁷⁵ Yb	-54.100	¹⁶² Lu	-53.200	¹⁴⁹ Hf	-7.420 †	²²⁵ Hf	155.570
²⁰⁹ Er	111.130	¹⁹² Tm	1.970	¹⁷⁶ Yb	-52.760	¹⁶³ Lu	-55.140	¹⁵⁰ Hf	-13.640 ‡	²²⁶ Hf	161.810
²¹⁰ Er	117.000	¹⁹³ Tm	5.430	¹⁷⁷ Yb	-50.420	¹⁶⁴ Lu	-55.540	¹⁵¹ Hf	-17.450 ‡	²²⁷ Hf	169.580
²¹¹ Er	124.470	¹⁹⁴ Tm	10.140	¹⁷⁸ Yb	-48.480	¹⁶⁵ Lu	-57.060	¹⁵² Hf	-23.260 ‡	²²⁸ Hf	175.960
²¹² Er	130.540	¹⁹⁵ Tm	14.110	¹⁷⁹ Yb	-45.110	¹⁶⁶ Lu	-57.010	¹⁵³ Hf	-26.760	²²⁹ Hf	183.830
²¹³ Er	138.150	¹⁹⁶ Tm	20.280	¹⁸⁰ Yb	-43.500	¹⁶⁷ Lu	-58.180	¹⁵⁴ Hf	-32.050	²³⁰ Hf	190.420
²¹⁴ Er	144.460	¹⁹⁷ Tm	25.280	¹⁸¹ Yb	-40.190	¹⁶⁸ Lu	-57.810	¹⁵⁵ Hf	-33.880	²³¹ Hf	198.470
²¹⁵ Er	152.270	¹⁹⁸ Tm	31.630	¹⁸² Yb	-38.520	¹⁶⁹ Lu	-58.390	¹⁵⁶ Hf	-37.280	²³² Hf	205.200
²¹⁶ Er	158.720	¹⁹⁹ Tm	36.840	¹⁸³ Yb	-35.000	¹⁷⁰ Lu	-57.600	¹⁵⁷ Hf	-38.630		
²¹⁷ Er	166.640	²⁰⁰ Tm	43.440	¹⁸⁴ Yb	-33.140	¹⁷¹ Lu	-57.800	¹⁵⁸ Hf	-41.610	¹⁴⁷ Ta	18.950 †
²¹⁸ Er	173.300	²⁰¹ Tm	48.720	¹⁸⁵ Yb	-29.450	¹⁷² Lu	-56.680	¹⁵⁹ Hf	-42.490	¹⁴⁸ Ta	13.810 †
²¹⁹ Er	181.410 †	²⁰² Tm	55.350	¹⁸⁶ Yb	-27.500	¹⁷³ Lu	-56.510	¹⁶⁰ Hf	-45.350	¹⁴⁹ Ta	7.050 †
²²⁰ Er	188.210	²⁰³ Tm	60.680	¹⁸⁷ Yb	-23.730	¹⁷⁴ Lu	-55.060	¹⁶¹ Hf	-46.120	¹⁵⁰ Ta	2.310 †
²²¹ Er	196.530 †	²⁰⁴ Tm	67.120	¹⁸⁸ Yb	-21.550	¹⁷⁵ Lu	-54.430	¹⁶² Hf	-48.780	¹⁵¹ Ta	-0.060 †
²²² Er	203.560	²⁰⁵ Tm	72.250	¹⁸⁹ Yb	-17.530	¹⁷⁶ Lu	-52.600	¹⁶³ Hf	-49.400	¹⁵² Ta	-8.380 †
²²³ Er	212.110 †	²⁰⁶ Tm	78.640	¹⁹⁰ Yb	-15.020	¹⁷⁷ Lu	-51.380	¹⁶⁴ Hf	-51.740	¹⁵³ Ta	-14.270 †
²²⁴ Er	219.230	²⁰⁷ Tm	83.950	¹⁹¹ Yb	-10.790	¹⁷⁸ Lu	-49.430	¹⁶⁵ Hf	-52.110	¹⁵⁴ Ta	-18.280 †
²²⁵ Er	227.790 †	²⁰⁸ Tm	90.670	¹⁹² Yb	-7.990	¹⁷⁹ Lu	-47.650	¹⁶⁶ Hf	-54.070	¹⁵⁵ Ta	-23.650 †
²²⁶ Er	235.160	²⁰⁹ Tm	96.230	¹⁹³ Yb	-3.480	¹⁸⁰ Lu	-44.760	¹⁶⁷ Hf	-54.050	¹⁵⁶ Ta	-25.970 †
²²⁷ Er	243.900 †	²¹⁰ Tm	103.130	¹⁹⁴ Yb	-0.410	¹⁸¹ Lu	-43.290	¹⁶⁸ Hf	-55.640	¹⁵⁷ Ta	-29.470 †
		²¹¹ Tm	108.950	¹⁹⁵ Yb	4.240	¹⁸² Lu	-40.410	¹⁶⁹ Hf	-55.300	¹⁵⁸ Ta	-31.300 †

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
159Ta	-34.350	148W	28.050 †	223W	113.160	214Re	51.810	205Os	-1.190	198Ir	-26.390
160Ta	-35.660	149W	22.710 †	224W	118.590	215Re	56.280	206Os	2.400	199Ir	-25.110
161Ta	-38.550	150W	15.280 †	225W	125.650	216Re	62.040	207Os	7.740	200Ir	-22.460
162Ta	-39.710	151W	10.370 †	226W	131.290	217Re	66.650	208Os	11.500	201Ir	-20.920
163Ta	-42.410	152W	3.460 †	227W	138.500	218Re	72.590	209Os	17.060	202Ir	-18.170
164Ta	-43.430	153W	-0.950 †	228W	144.270	219Re	77.400	210Os	21.120	203Ir	-16.010
165Ta	-45.770	154W	-7.350 ‡	229W	151.590	220Re	83.570	211Os	26.480	204Ir	-11.330
166Ta	-46.470	155W	-11.440 ‡	230W	157.590	221Re	88.540	212Os	31.080	205Ir	-7.860
167Ta	-48.460	156W	-17.310 ‡	231W	165.220	222Re	94.880	213Os	36.580	206Ir	-3.060
168Ta	-48.820	157W	-19.720	232W	171.310	223Re	100.080	214Os	40.530	207Ir	0.550
169Ta	-50.440	158W	-23.700	233W	179.070	224Re	106.680	215Os	46.030	208Ir	5.570
170Ta	-50.460	159W	-25.620	234W	185.360	225Re	112.050	216Os	50.140	209Ir	9.320
171Ta	-51.610	160W	-29.140	151Re	26.030 †	226Re	118.790	217Os	55.860	210Ir	14.530
172Ta	-51.250	161W	-30.440	152Re	20.590 †	227Re	124.380	218Os	60.120	211Ir	18.560
173Ta	-52.020	162W	-33.710	153Re	13.570 †	228Re	131.260	219Os	66.010	212Ir	23.580
174Ta	-51.310	163W	-34.790	154Re	8.640 †	229Re	136.970	220Os	70.470	213Ir	28.210
175Ta	-51.710	164W	-37.860	155Re	2.130 †	230Re	143.940	221Os	76.600	214Ir	33.360
176Ta	-50.660	165W	-38.880	156Re	-2.470 †	231Re	149.900	222Os	81.220	215Ir	37.280
177Ta	-50.660	166W	-41.550	157Re	-8.440 †	232Re	157.220	223Os	87.510	216Ir	42.420
178Ta	-49.250	167W	-42.140	158Re	-11.320 †	233Re	163.250	224Os	92.370	217Ir	46.500
179Ta	-48.810	168W	-44.530	159Re	-15.370 †	234Re	170.700	225Os	98.930	218Ir	51.860
180Ta	-47.140	169W	-44.840	160Re	-17.750 †	235Re	176.940	226Os	103.950	219Ir	56.070
181Ta	-46.330	170W	-46.830	161Re	-21.330 †	152Os	35.500 †	227Os	110.660	220Ir	61.610
182Ta	-44.240	171W	-46.780	162Re	-23.070 †	153Os	29.970 †	228Os	115.910	221Ir	66.020
183Ta	-43.590	172W	-48.440	163Re	-26.360 †	154Os	22.410 †	229Os	122.760	222Ir	71.820
184Ta	-41.240	173W	-48.040	164Re	-27.780	155Os	17.380 †	230Os	128.120	223Ir	76.380
185Ta	-40.210	174W	-49.310	165Re	-30.870	156Os	10.340 †	231Os	135.040	224Ir	82.340
186Ta	-37.640	175W	-48.550	166Re	-32.290	157Os	5.600 †	232Os	140.670	225Ir	87.150
187Ta	-36.390	176W	-49.450	167Re	-34.970	158Os	-0.920 †	233Os	147.970	226Ir	93.370
188Ta	-33.640	177W	-48.350	168Re	-35.920	159Os	-3.840 †	234Os	153.660	227Ir	98.350
189Ta	-32.300	178W	-48.910	169Re	-38.360	160Os	-8.310 ‡	235Os	161.080	228Ir	104.730
190Ta	-29.450	179W	-47.470	170Re	-39.080	161Os	-10.740 ‡	236Os	166.990	229Ir	109.930
191Ta	-27.820	180W	-47.760	171Re	-41.110	162Os	-14.780	155Ir	33.670 †	230Ir	116.450
192Ta	-24.660	181W	-45.930	172Re	-41.450	163Os	-16.580	156Ir	28.100 †	231Ir	121.760
193Ta	-22.660	182W	-46.020	173Re	-43.200	164Os	-20.330	157Ir	20.880 †	232Ir	128.350
194Ta	-19.280	183W	-44.240	174Re	-43.210	165Os	-21.780	158Ir	15.540 †	233Ir	133.940
195Ta	-16.990	184W	-44.270	175Re	-44.580	166Os	-25.300	159Ir	8.770 †	234Ir	140.920
196Ta	-13.320	185W	-42.020	176Re	-44.210	167Os	-26.780	160Ir	5.520 †	235Ir	146.560
197Ta	-10.760	186W	-41.500	177Re	-45.210	168Os	-29.890	161Ir	1.090 †	236Ir	153.660
198Ta	-6.930	187W	-39.040	178Re	-44.500	169Os	-30.870	162Ir	-1.730 †	237Ir	159.530
199Ta	-3.860	188W	-38.280	179Re	-45.170	170Os	-33.760	163Ir	-5.790 †	156Pt	43.490 †
200Ta	1.430	189W	-35.650	180Re	-44.130	171Os	-34.540	164Ir	-8.030 †	157Pt	37.790 †
201Ta	5.540	190W	-34.780	181Re	-44.600	172Os	-37.010	165Ir	-11.840 †	158Pt	29.970 †
202Ta	11.010	191W	-32.000	182Re	-43.110	173Os	-37.410	166Ir	-13.740 †	159Pt	24.430 †
203Ta	15.340	192W	-30.780	183Re	-43.460	174Os	-39.620	167Ir	-17.310 †	160Pt	17.040 †
204Ta	21.090	193W	-27.690	184Re	-42.210	175Os	-39.690	168Ir	-19.220 †	161Pt	13.820 †
205Ta	25.590	194W	-26.090	185Re	-42.460	176Os	-41.500	169Ir	-22.370 †	162Pt	9.060 †
206Ta	31.460	195W	-22.770	186Re	-40.650	177Os	-41.200	170Ir	-23.770	163Pt	6.240 †
207Ta	36.080	196W	-20.870	187Re	-40.250	178Os	-42.640	171Ir	-26.720	164Pt	1.770 †
208Ta	41.770	197W	-17.260	188Re	-38.250	179Os	-41.990	172Ir	-27.930	165Pt	-0.510 †
209Ta	46.620	198W	-15.090	189Re	-37.600	180Os	-43.110	173Ir	-30.470	166Pt	-4.790 ‡
210Ta	52.400	199W	-11.320	190Re	-35.410	181Os	-42.130	174Ir	-31.290	167Pt	-6.770 ‡
211Ta	57.020	200W	-8.630	191Re	-34.630	182Os	-43.070	175Ir	-33.580	168Pt	-10.800
212Ta	62.950	201W	-3.400	192Re	-32.280	183Os	-41.620	176Ir	-34.070	169Pt	-12.770
213Ta	67.760	202W	0.330	193Re	-31.130	184Os	-42.460	177Ir	-35.970	170Pt	-16.350
214Ta	73.890	203W	5.760	194Re	-28.450	185Os	-41.320	178Ir	-36.090	171Pt	-17.800
215Ta	78.910	204W	9.710	195Re	-26.930	186Os	-42.050	179Ir	-37.610	172Pt	-21.200
216Ta	85.240	205W	15.420	196Re	-24.010	187Os	-40.320	180Ir	-37.380	173Pt	-22.470
217Ta	90.460	206W	19.570	197Re	-22.190	188Os	-40.370	181Ir	-38.590	174Pt	-25.450
218Ta	96.980	207W	25.480	198Re	-18.980	189Os	-38.450	182Ir	-38.020	175Pt	-26.330
219Ta	102.390	208W	29.840	199Re	-16.870	190Os	-38.240	183Ir	-39.070	176Pt	-29.070
220Ta	109.100	209W	35.550	200Re	-13.500	191Os	-36.120	184Ir	-38.010	177Pt	-29.630
221Ta	114.710	210W	40.310	201Re	-10.870	192Os	-35.750	185Ir	-38.990	178Pt	-31.970
222Ta	121.610	211W	46.150	202Re	-6.000	193Os	-33.480	186Ir	-38.320	179Pt	-32.150
223Ta	127.410	212W	50.480	203Re	-2.300	194Os	-32.760	187Ir	-39.190	180Pt	-34.120
224Ta	134.480	213W	56.370	204Re	2.770	195Os	-30.150	188Ir	-37.890	181Pt	-33.940
225Ta	140.460	214W	60.870	205Re	6.700	196Os	-29.040	189Ir	-38.030	182Pt	-35.590
226Ta	147.710	215W	66.980	206Re	12.060	197Os	-26.220	190Ir	-36.530	183Pt	-35.090
227Ta	153.860	216W	71.640	207Re	16.180	198Os	-24.810	191Ir	-36.380	184Pt	-36.590
228Ta	161.270	217W	77.920	208Re	21.760	199Os	-21.690	192Ir	-34.680	185Pt	-35.580
229Ta	167.600	218W	82.780	209Re	26.160	200Os	-20.000	193Ir	-34.400	186Pt	-37.030
230Ta	175.200	219W	89.290	210Re	31.550	201Os	-16.740	194Ir	-32.550	187Pt	-36.460
231Ta	181.690	220W	94.320	211Re	36.440	202Os	-14.500	195Ir	-31.930	188Pt	-37.800
232Ta	189.450	221W	101.000	212Re	41.960	203Os	-9.620	196Ir	-29.760	189Pt	-36.570
233Ta	196.110	222W	106.250	213Re	46.270	204Os	-6.240	197Ir	-28.760	190Pt	-37.120

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁹¹ Pt	-35.690	¹⁸⁶ Au	-31.070	¹⁸¹ Hg	-21.290	¹⁷⁸ Tl	-5.570 †	¹⁷⁵ Pb	13.790 †	¹⁷⁹ Bi	12.880 †		
¹⁹² Pt	-35.960	¹⁸⁷ Au	-32.640	¹⁸² Hg	-23.770	¹⁷⁹ Tl	-8.920 †	¹⁷⁶ Pb	9.380 †	¹⁸⁰ Bi	10.560 †		
¹⁹³ Pt	-34.320	¹⁸⁸ Au	-32.530	¹⁸³ Hg	-24.070	¹⁸⁰ Tl	-10.390 †	¹⁷⁷ Pb	7.120 †	¹⁸¹ Bi	6.700 †		
¹⁹⁴ Pt	-34.460	¹⁸⁹ Au	-33.980	¹⁸⁴ Hg	-26.250	¹⁸¹ Tl	-13.330 †	¹⁷⁸ Pb	3.140 ‡	¹⁸² Bi	4.710 †		
¹⁹⁵ Pt	-32.700	¹⁹⁰ Au	-33.160	¹⁸⁵ Hg	-26.220	¹⁸² Tl	-14.410	¹⁷⁹ Pb	1.290 ‡	¹⁸³ Bi	1.260 †		
¹⁹⁶ Pt	-32.510	¹⁹¹ Au	-33.780	¹⁸⁶ Hg	-28.280	¹⁸³ Tl	-16.970	¹⁸⁰ Pb	-2.500	¹⁸⁴ Bi	-0.330 †		
¹⁹⁷ Pt	-30.450	¹⁹² Au	-32.760	¹⁸⁷ Hg	-27.710	¹⁸⁴ Tl	-17.680	¹⁸¹ Pb	-4.040	¹⁸⁵ Bi	-3.390 †		
¹⁹⁸ Pt	-29.900	¹⁹³ Au	-33.100	¹⁸⁸ Hg	-29.750	¹⁸⁵ Tl	-19.940	¹⁸² Pb	-7.410	¹⁸⁶ Bi	-4.610 †		
¹⁹⁹ Pt	-27.670	¹⁹⁴ Au	-31.870	¹⁸⁹ Hg	-29.740	¹⁸⁶ Tl	-20.320	¹⁸³ Pb	-8.560	¹⁸⁷ Bi	-7.360 †		
²⁰⁰ Pt	-26.850	¹⁹⁵ Au	-32.100	¹⁹⁰ Hg	-31.620	¹⁸⁷ Tl	-22.490	¹⁸⁴ Pb	-11.550	¹⁸⁸ Bi	-8.240		
²⁰¹ Pt	-24.340	¹⁹⁶ Au	-30.780	¹⁹¹ Hg	-30.870	¹⁸⁸ Tl	-22.300	¹⁸⁵ Pb	-12.330	¹⁸⁹ Bi	-10.860		
²⁰² Pt	-23.250	¹⁹⁷ Au	-30.710	¹⁹² Hg	-31.900	¹⁸⁹ Tl	-24.470	¹⁸⁶ Pb	-15.020	¹⁹⁰ Bi	-11.200		
²⁰³ Pt	-20.660	¹⁹⁸ Au	-29.130	¹⁹³ Hg	-30.940	¹⁹⁰ Tl	-24.910	¹⁸⁷ Pb	-15.470	¹⁹¹ Bi	-13.800		
²⁰⁴ Pt	-18.910	¹⁹⁹ Au	-28.720	¹⁹⁴ Hg	-31.690	¹⁹¹ Tl	-26.860	¹⁸⁸ Pb	-18.060	¹⁹² Bi	-14.690		
²⁰⁵ Pt	-14.140	²⁰⁰ Au	-26.990	¹⁹⁵ Hg	-30.530	¹⁹² Tl	-26.520	¹⁸⁹ Pb	-17.940	¹⁹³ Bi	-17.110		
²⁰⁶ Pt	-10.910	²⁰¹ Au	-26.320	¹⁹⁶ Hg	-31.190	¹⁹³ Tl	-27.620	¹⁹⁰ Pb	-20.540	¹⁹⁴ Bi	-17.240		
²⁰⁷ Pt	-6.050	²⁰² Au	-24.300	¹⁹⁷ Hg	-29.960	¹⁹⁴ Tl	-27.060	¹⁹¹ Pb	-21.060	¹⁹⁵ Bi	-18.810		
²⁰⁸ Pt	-2.720	²⁰³ Au	-23.360	¹⁹⁸ Hg	-30.360	¹⁹⁵ Tl	-27.880	¹⁹² Pb	-23.420	¹⁹⁶ Bi	-18.720		
²⁰⁹ Pt	2.310	²⁰⁴ Au	-21.270	¹⁹⁹ Hg	-28.900	¹⁹⁶ Tl	-27.130	¹⁹³ Pb	-23.140	¹⁹⁷ Bi	-20.000		
²¹⁰ Pt	5.720	²⁰⁵ Au	-19.600	²⁰⁰ Hg	-28.960	¹⁹⁷ Tl	-27.880	¹⁹⁴ Pb	-24.650	¹⁹⁸ Bi	-19.710		
²¹¹ Pt	10.900	²⁰⁶ Au	-15.030	²⁰¹ Hg	-27.370	¹⁹⁸ Tl	-27.110	¹⁹⁵ Pb	-24.160	¹⁹⁹ Bi	-20.900		
²¹² Pt	14.570	²⁰⁷ Au	-11.690	²⁰² Hg	-27.160	¹⁹⁹ Tl	-27.660	¹⁹⁶ Pb	-25.380	²⁰⁰ Bi	-20.540		
²¹³ Pt	19.530	²⁰⁸ Au	-7.040	²⁰³ Hg	-25.270	²⁰⁰ Tl	-26.690	¹⁹⁷ Pb	-24.700	²⁰¹ Bi	-21.480		
²¹⁴ Pt	23.850	²⁰⁹ Au	-3.610	²⁰⁴ Hg	-24.780	²⁰¹ Tl	-26.910	¹⁹⁸ Pb	-25.860	²⁰² Bi	-20.890		
²¹⁵ Pt	28.970	²¹⁰ Au	1.150	²⁰⁵ Hg	-22.830	²⁰² Tl	-25.810	¹⁹⁹ Pb	-25.170	²⁰³ Bi	-21.490		
²¹⁶ Pt	32.530	²¹¹ Au	4.560	²⁰⁶ Hg	-21.560	²⁰³ Tl	-25.740	²⁰⁰ Pb	-26.150	²⁰⁴ Bi	-20.770		
²¹⁷ Pt	37.630	²¹² Au	9.390	²⁰⁷ Hg	-16.930	²⁰⁴ Tl	-24.320	²⁰¹ Pb	-25.270	²⁰⁵ Bi	-21.090		
²¹⁸ Pt	41.360	²¹³ Au	13.020	²⁰⁸ Hg	-13.840	²⁰⁵ Tl	-23.960	²⁰² Pb	-25.910	²⁰⁶ Bi	-20.050		
²¹⁹ Pt	46.670	²¹⁴ Au	17.630	²⁰⁹ Hg	-9.120	²⁰⁶ Tl	-22.490	²⁰³ Pb	-24.910	²⁰⁷ Bi	-20.080		
²²⁰ Pt	50.540	²¹⁵ Au	21.940	²¹⁰ Hg	-5.940	²⁰⁷ Tl	-21.290	²⁰⁴ Pb	-25.250	²⁰⁸ Bi	-18.980		
²²¹ Pt	56.030	²¹⁶ Au	26.720	²¹¹ Hg	-1.130	²⁰⁸ Tl	-16.900	²⁰⁵ Pb	-23.920	²⁰⁹ Bi	-18.210		
²²² Pt	60.090	²¹⁷ Au	30.240	²¹² Hg	1.950	²⁰⁹ Tl	-13.720	²⁰⁶ Pb	-23.960	²¹⁰ Bi	-14.350		
²²³ Pt	65.840	²¹⁸ Au	34.990	²¹³ Hg	6.750	²¹⁰ Tl	-9.230	²⁰⁷ Pb	-22.590	²¹¹ Bi	-11.710		
²²⁴ Pt	70.050	²¹⁹ Au	38.670	²¹⁴ Hg	10.020	²¹¹ Tl	-5.950	²⁰⁸ Pb	-21.770	²¹² Bi	-7.750		
²²⁵ Pt	75.960	²²⁰ Au	43.630	²¹⁵ Hg	14.580	²¹² Tl	-1.350	²⁰⁹ Pb	-17.400	²¹³ Bi	-5.010		
²²⁶ Pt	80.430	²²¹ Au	47.450	²¹⁶ Hg	18.560	²¹³ Tl	1.750	²¹⁰ Pb	-14.550	²¹⁴ Bi	-0.950		
²²⁷ Pt	86.620	²²² Au	52.590	²¹⁷ Hg	23.300	²¹⁴ Tl	6.210	²¹¹ Pb	-10.060	²¹⁵ Bi	1.660		
²²⁸ Pt	91.260	²²³ Au	56.610	²¹⁸ Hg	26.470	²¹⁵ Tl	9.440	²¹² Pb	-7.100	²¹⁶ Bi	5.690		
²²⁹ Pt	97.590	²²⁴ Au	62.020	²¹⁹ Hg	31.170	²¹⁶ Tl	13.630	²¹³ Pb	-2.500	²¹⁷ Bi	8.480		
²³⁰ Pt	102.460	²²⁵ Au	66.180	²²⁰ Hg	34.500	²¹⁷ Tl	17.580	²¹⁴ Pb	0.250	²¹⁸ Bi	12.260		
²³¹ Pt	108.930	²²⁶ Au	71.750	²²¹ Hg	39.420	²¹⁸ Tl	21.980	²¹⁵ Pb	4.680	²¹⁹ Bi	15.770		
²³² Pt	113.910	²²⁷ Au	76.170	²²² Hg	42.880	²¹⁹ Tl	25.110	²¹⁶ Pb	7.540	²²⁰ Bi	19.750		
²³³ Pt	120.450	²²⁸ Au	82.030	²²³ Hg	47.980	²²⁰ Tl	29.450	²¹⁷ Pb	11.680	²²¹ Bi	22.460		
²³⁴ Pt	125.710	²²⁹ Au	86.620	²²⁴ Hg	51.640	²²¹ Tl	32.740	²¹⁸ Pb	15.260	²²² Bi	26.400		
²³⁵ Pt	132.660	²³⁰ Au	92.620	²²⁵ Hg	57.010	²²² Tl	37.310	²¹⁹ Pb	19.620	²²³ Bi	29.280		
²³⁶ Pt	137.970	²³¹ Au	97.450	²²⁶ Hg	60.830	²²³ Tl	40.730	²²⁰ Pb	22.390	²²⁴ Bi	33.450		
²³⁷ Pt	145.030	²³² Au	103.590	²²⁷ Hg	66.350	²²⁴ Tl	45.480	²²¹ Pb	26.690	²²⁵ Bi	36.460		
²³⁸ Pt	150.570	²³³ Au	108.520	²²⁸ Hg	70.430	²²⁵ Tl	49.100	²²² Pb	29.620	²²⁶ Bi	40.810		
		²³⁴ Au	114.730	²²⁹ Hg	76.250	²²⁶ Tl	54.120	²²³ Pb	34.150	²²⁷ Bi	44.040		
¹⁵⁹ Au	41.330 †	²³⁵ Au	119.950	²³⁰ Hg	80.500	²²⁷ Tl	57.890	²²⁴ Pb	37.210	²²⁸ Bi	48.670		
¹⁶⁰ Au	35.150 †	²³⁶ Au	126.580	²³¹ Hg	86.460	²²⁸ Tl	63.080	²²⁵ Pb	41.910	²²⁹ Bi	52.050		
¹⁶¹ Au	27.520 †	²³⁷ Au	131.840	²³² Hg	90.950	²²⁹ Tl	67.110	²²⁶ Pb	45.190	²³⁰ Bi	56.850		
¹⁶² Au	23.960 †	²³⁸ Au	138.590	²³³ Hg	97.050	²³⁰ Tl	72.600	²²⁷ Pb	50.170	²³¹ Bi	60.490		
¹⁶³ Au	19.290 †	²³⁹ Au	144.080	²³⁴ Hg	101.640	²³¹ Tl	76.800	²²⁸ Pb	53.590	²³² Bi	65.590		
¹⁶⁴ Au	16.140 †			²³⁵ Hg	107.810	²³² Tl	82.430	²²⁹ Pb	58.730	²³³ Bi	69.410		
¹⁶⁵ Au	11.700 †	¹⁶⁰ Hg	51.250 †	²³⁶ Hg	112.700	²³³ Tl	86.880	²³⁰ Pb	62.420	²³⁴ Bi	74.660		
¹⁶⁶ Au	9.010 †	¹⁶¹ Hg	44.880 †	²³⁷ Hg	119.290	²³⁴ Tl	92.650	²³¹ Pb	67.870	²³⁵ Bi	78.730		
¹⁶⁷ Au	4.660 †	¹⁶² Hg	36.660 †	²³⁸ Hg	124.220	²³⁵ Tl	97.190	²³² Pb	71.730	²³⁶ Bi	84.130		
¹⁶⁸ Au	2.230 †	¹⁶³ Hg	33.110 †	²³⁹ Hg	130.940	²³⁶ Tl	103.020	²³³ Pb	77.320	²³⁷ Bi	88.300		
¹⁶⁹ Au	-1.880 †	¹⁶⁴ Hg	28.100 †	²⁴⁰ Hg	136.110	²³⁷ Tl	107.880	²³⁴ Pb	81.440	²³⁸ Bi	93.770		
¹⁷⁰ Au	-4.310 †	¹⁶⁵ Hg	24.980 †			²³⁸ Tl	114.150	²³⁵ Pb	87.160	²³⁹ Bi	98.250		
¹⁷¹ Au	-7.940 †	¹⁶⁶ Hg	20.180 †	¹⁶³ Tl	48.010 †	²³⁹ Tl	119.030	²³⁶ Pb	91.370	²⁴⁰ Bi	104.150		
¹⁷² Au	-9.810 †	¹⁶⁷ Hg	17.450 †	¹⁶⁴ Tl	44.100 †	²⁴⁰ Tl	125.430	²³⁷ Pb	97.160	²⁴¹ Bi	108.670		
¹⁷³ Au	-13.270 †	¹⁶⁸ Hg	12.650 †	¹⁶⁵ Tl	39.170 †	²⁴¹ Tl	130.560	²³⁸ Pb	101.690	²⁴² Bi	114.700		
¹⁷⁴ Au	-14.970 †	¹⁶⁹ Hg	10.140 †	¹⁶⁶ Tl	35.720 †			²³⁹ Pb	107.920	²⁴³ Bi	119.470		
¹⁷⁵ Au	-18.010 †	¹⁷⁰ Hg	5.560 †	¹⁶⁷ Tl	30.980 †	¹⁶⁴ Pb	58.490 †	²⁴⁰ Pb	112.480	¹⁷³ Po	50.910 †		
¹⁷⁶ Au	-19.320	¹⁷¹ Hg	3.060 †	¹⁶⁸ Tl	27.870 †	¹⁶⁵ Pb	54.530 †	²⁴¹ Pb	118.830	¹⁷⁴ Po	45.250 †		
¹⁷⁷ Au	-22.140	¹⁷² Hg	-1.030 ‡	¹⁶⁹ Tl	23.000 †	¹⁶⁶ Pb	49.180 †	²⁴² Pb	123.640	¹⁷⁵ Po	41.680 †		
¹⁷⁸ Au	-23.120	¹⁷³ Hg	-2.940 ‡	¹⁷⁰ Tl	20.040 †	¹⁶⁷ Pb	45.690 †			¹⁷⁶ Po	36.510 †		
¹⁷⁹ Au	-25.540	¹⁷⁴ Hg	-6.850	¹⁷¹ Tl	15.380 †	¹⁶⁸ Pb	40.540 †	¹⁷² Bi	40.460 †	¹⁷⁷ Po	33.490 †		
¹⁸⁰ Au	-26.140	¹⁷⁵ Hg	-8.610	¹⁷² Tl	12.420 †	¹⁶⁹ Pb	37.370 †	¹⁷³ Bi	35.270 †	¹⁷⁸ Po	28.510 †		
¹⁸¹ Au	-28.190	¹⁷⁶ Hg	-12.090	¹⁷³ Tl	8.250 †	¹⁷⁰ Pb	32.050 †	¹⁷⁴ Bi	31.770 †	¹⁷⁹ Po	25.680 †		
¹⁸² Au	-28.430	¹⁷⁷ Hg	-13.450	¹⁷⁴ Tl	5.910 †	¹⁷¹ Pb	29.000 †	¹⁷⁵ Bi	27.070 †	¹⁸⁰ Po	21.140 †		
¹⁸³ Au	-30.170	¹⁷⁸ Hg	-16.720	¹⁷⁵ Tl	1.940 †	¹⁷² Pb	23.880 †	¹⁷⁶ Bi	24.180 †	¹⁸¹ Po	18.710 †		
¹⁸⁴ Au	-30.080	¹⁷⁹ Hg	-17.770	¹⁷⁶ Tl	-0.250 †	¹⁷³ Pb	20.850 †	¹⁷⁷ Bi	19.670 †	¹⁸² Po	14.430 †		
¹⁸⁵ Au	-31.680	¹⁸⁰ Hg	-20.630	¹⁷⁷ Tl	-3.790 †	¹⁷⁴ Pb	16.220 †	¹⁷⁸ Bi	16.950 †				

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁸³ Po	12.340 †	¹⁹⁰ At	5.890 †	¹⁹⁷ Rn	0.200	²⁰⁵ Fr	-1.880	²¹³ Ra	0.670	²²² Ac	17.150
¹⁸⁴ Po	8.470 ‡	¹⁹¹ At	2.890 †	¹⁹⁸ Rn	-2.220	²⁰⁶ Fr	-1.900	²¹⁴ Ra	0.310	²²³ Ac	18.370
¹⁸⁵ Po	6.770 ‡	¹⁹² At	1.980 †	¹⁹⁹ Rn	-2.650	²⁰⁷ Fr	-3.080	²¹⁵ Ra	2.460	²²⁴ Ac	20.720
¹⁸⁶ Po	3.300 ‡	¹⁹³ At	-0.920 †	²⁰⁰ Rn	-4.760	²⁰⁸ Fr	-2.830	²¹⁶ Ra	3.140	²²⁵ Ac	22.150
¹⁸⁷ Po	1.970	¹⁹⁴ At	-2.170	²⁰¹ Rn	-4.960	²⁰⁹ Fr	-3.680	²¹⁷ Ra	5.520	²²⁶ Ac	24.630
¹⁸⁸ Po	-1.170	¹⁹⁵ At	-4.970	²⁰² Rn	-6.900	²¹⁰ Fr	-3.110	²¹⁸ Ra	6.460	²²⁷ Ac	25.960
¹⁸⁹ Po	-2.150	¹⁹⁶ At	-5.570	²⁰³ Rn	-6.920	²¹¹ Fr	-3.640	²¹⁹ Ra	9.170	²²⁸ Ac	28.650
¹⁹⁰ Po	-5.130	¹⁹⁷ At	-7.600	²⁰⁴ Rn	-8.470	²¹² Fr	-2.880	²²⁰ Ra	10.330	²²⁹ Ac	30.220
¹⁹¹ Po	-5.580	¹⁹⁸ At	-7.970	²⁰⁵ Rn	-8.140	²¹³ Fr	-2.870	²²¹ Ra	13.280	²³⁰ Ac	33.150
¹⁹² Po	-8.490	¹⁹⁹ At	-9.700	²⁰⁶ Rn	-9.290	²¹⁴ Fr	-0.640	²²² Ra	14.680	²³¹ Ac	34.960
¹⁹³ Po	-9.390	²⁰⁰ At	-9.850	²⁰⁷ Rn	-8.700	²¹⁵ Fr	0.420	²²³ Ra	17.450	²³² Ac	38.130
¹⁹⁴ Po	-12.190	²⁰¹ At	-11.430	²⁰⁸ Rn	-9.530	²¹⁶ Fr	2.880	²²⁴ Ra	19.210	²³³ Ac	40.180
¹⁹⁵ Po	-12.390	²⁰² At	-11.420	²⁰⁹ Rn	-8.620	²¹⁷ Fr	4.200	²²⁵ Ra	22.130	²³⁴ Ac	43.570
¹⁹⁶ Po	-14.360	²⁰³ At	-12.640	²¹⁰ Rn	-9.150	²¹⁸ Fr	6.980	²²⁶ Ra	23.570	²³⁵ Ac	45.870
¹⁹⁷ Po	-14.330	²⁰⁴ At	-12.300	²¹¹ Rn	-8.080	²¹⁹ Fr	8.530	²²⁷ Ra	26.620	²³⁶ Ac	49.480
¹⁹⁸ Po	-16.010	²⁰⁵ At	-13.130	²¹² Rn	-8.030	²²⁰ Fr	11.570	²²⁸ Ra	28.280	²³⁷ Ac	52.000
¹⁹⁹ Po	-15.770	²⁰⁶ At	-12.580	²¹³ Rn	-5.320	²²¹ Fr	13.400	²²⁹ Ra	31.570	²³⁸ Ac	55.820
²⁰⁰ Po	-17.310	²⁰⁷ At	-13.130	²¹⁴ Rn	-4.110	²²² Fr	16.270	²³⁰ Ra	33.440	²³⁹ Ac	58.570
²⁰¹ Po	-16.940	²⁰⁸ At	-12.290	²¹⁵ Rn	-1.220	²²³ Fr	18.530	²³¹ Ra	36.950	²⁴⁰ Ac	62.610
²⁰² Po	-18.160	²⁰⁹ At	-12.550	²¹⁶ Rn	0.220	²²⁴ Fr	21.550	²³² Ra	39.050	²⁴¹ Ac	65.570
²⁰³ Po	-17.510	²¹⁰ At	-11.600	²¹⁷ Rn	3.420	²²⁵ Fr	23.370	²³³ Ra	42.800	²⁴² Ac	69.820
²⁰⁴ Po	-18.370	²¹¹ At	-11.200	²¹⁸ Rn	5.060	²²⁶ Fr	26.480	²³⁴ Ra	45.110	²⁴³ Ac	72.990
²⁰⁵ Po	-17.560	²¹² At	-8.190	²¹⁹ Rn	8.500	²²⁷ Fr	28.500	²³⁵ Ra	49.070	²⁴⁴ Ac	77.450
²⁰⁶ Po	-18.140	²¹³ At	-6.390	²²⁰ Rn	10.460	²²⁸ Fr	31.850	²³⁶ Ra	51.630	²⁴⁵ Ac	80.820
²⁰⁷ Po	-17.030	²¹⁴ At	-3.270	²²¹ Rn	13.730	²²⁹ Fr	34.070	²³⁷ Ra	55.830	²⁴⁶ Ac	85.480
²⁰⁸ Po	-17.330	²¹⁵ At	-1.340	²²² Rn	16.220	²³⁰ Fr	37.620	²³⁸ Ra	58.600	²⁴⁷ Ac	89.060
²⁰⁹ Po	-16.140	²¹⁶ At	2.000	²²³ Rn	19.650	²³¹ Fr	40.060	²³⁹ Ra	63.000	²⁴⁸ Ac	93.910
²¹⁰ Po	-15.710	²¹⁷ At	4.060	²²⁴ Rn	21.550	²³² Fr	43.880	²⁴⁰ Ra	65.990	²⁴⁹ Ac	97.690
²¹¹ Po	-12.130	²¹⁸ At	7.590	²²⁵ Rn	25.010	²³³ Fr	46.510	²⁴¹ Ra	70.580	¹⁸⁴ Th	94.240 †
²¹² Po	-10.080	²¹⁹ At	9.930	²²⁶ Rn	27.100	²³⁴ Fr	50.520	²⁴² Ra	73.750	¹⁸⁵ Th	89.540 †
²¹³ Po	-6.410	²²⁰ At	13.290	²²⁷ Rn	30.810	²³⁵ Fr	53.410	²⁴³ Ra	78.490	¹⁸⁶ Th	83.240 †
²¹⁴ Po	-4.270	²²¹ At	16.260	²²⁸ Rn	33.070	²³⁶ Fr	57.690	²⁴⁴ Ra	81.910	¹⁸⁷ Th	78.900 †
²¹⁵ Po	-0.450	²²² At	19.780	²²⁹ Rn	36.980	²³⁷ Fr	60.770	²⁴⁵ Ra	86.940	¹⁸⁸ Th	73.220 †
²¹⁶ Po	1.710	²²³ At	22.050	²³⁰ Rn	39.460	²³⁸ Fr	65.230	²⁴⁶ Ra	90.510	¹⁸⁹ Th	69.350 †
²¹⁷ Po	5.630	²²⁴ At	25.580	²³¹ Rn	43.630	²³⁹ Fr	68.550	²⁴⁷ Ra	95.710	¹⁹⁰ Th	64.110 †
²¹⁸ Po	8.050	²²⁵ At	28.030	²³² Rn	46.300	²⁴⁰ Fr	73.190	²⁴⁸ Ra	99.490	¹⁹¹ Th	60.620 †
²¹⁹ Po	11.770	²²⁶ At	31.790	²³³ Rn	50.660	²⁴¹ Fr	76.670	¹⁸³ Ac	83.520 †	¹⁹² Th	55.810 †
²²⁰ Po	14.870	²²⁷ At	34.400	²³⁴ Rn	53.580	²⁴² Fr	81.440	¹⁸⁴ Ac	78.970 †	¹⁹³ Th	52.710 †
²²¹ Po	18.760	²²⁸ At	38.360	²³⁵ Rn	58.210	²⁴³ Fr	85.180	¹⁸⁵ Ac	73.160 †	¹⁹⁴ Th	48.400 †
²²² Po	21.100	²²⁹ At	41.190	²³⁶ Rn	61.340	²⁴⁴ Fr	90.280	¹⁸⁶ Ac	68.980 †	¹⁹⁵ Th	45.720 †
²²³ Po	24.980	²³⁰ At	45.410	²³⁷ Rn	66.140	²⁴⁵ Fr	94.140	¹⁸⁷ Ac	63.700 †	¹⁹⁶ Th	42.050 †
²²⁴ Po	27.490	²³¹ At	48.420	²³⁸ Rn	69.500	²⁴⁶ Fr	99.400	¹⁸⁸ Ac	59.970 †	¹⁹⁷ Th	39.570 †
²²⁵ Po	31.610	²³² At	52.820	²³⁹ Rn	74.470	²⁴⁷ Fr	103.490	¹⁸⁹ Ac	55.120 †	¹⁹⁸ Th	36.460 †
²²⁶ Po	34.270	²³³ At	56.080	²⁴⁰ Rn	77.980	¹⁸¹ Ra	77.350 †	¹⁹⁰ Ac	51.770 †	¹⁹⁹ Th	34.850 †
²²⁷ Po	38.580	²³⁴ At	60.780	²⁴¹ Rn	83.050	¹⁸² Ra	71.250 †	¹⁹¹ Ac	47.350 †	²⁰⁰ Th	31.500 ‡
²²⁸ Po	41.450	²³⁵ At	64.230	²⁴² Rn	86.840	¹⁸³ Ra	67.220 †	¹⁹² Ac	44.390 †	²⁰¹ Th	30.020 ‡
²²⁹ Po	46.030	²³⁶ At	69.080	²⁴³ Rn	92.290	¹⁸⁴ Ra	61.560 †	¹⁹³ Ac	40.420 †	²⁰² Th	26.930 ‡
²³⁰ Po	49.070	²³⁷ At	72.780	²⁴⁴ Rn	96.160	¹⁸⁵ Ra	57.940 †	¹⁹⁴ Ac	37.870 †	²⁰³ Th	25.720 ‡
²³¹ Po	53.820	²³⁸ At	77.790	²⁴⁵ Rn	101.760	¹⁸⁶ Ra	52.690 †	¹⁹⁵ Ac	34.430 †	²⁰⁴ Th	22.900 †
²³² Po	57.130	²³⁹ At	81.610	²⁴⁶ Rn	105.870	¹⁸⁷ Ra	49.480 †	¹⁹⁶ Ac	32.160 †	²⁰⁵ Th	21.920
²³³ Po	62.170	²⁴⁰ At	86.730	¹⁸⁰ Fr	66.710 †	¹⁸⁸ Ra	44.660 †	¹⁹⁷ Ac	29.150 †	²⁰⁶ Th	19.240
²³⁴ Po	65.660	²⁴¹ At	90.840	¹⁸¹ Fr	61.070 †	¹⁸⁹ Ra	41.830 †	¹⁹⁸ Ac	27.440 †	²⁰⁷ Th	18.410
²³⁵ Po	70.860	²⁴² At	96.340	¹⁸² Fr	57.160 †	¹⁹⁰ Ra	37.430 †	¹⁹⁹ Ac	24.330 †	²⁰⁸ Th	16.010
²³⁶ Po	74.590	²⁴³ At	100.530	¹⁸³ Fr	51.960 †	¹⁹¹ Ra	34.990 †	²⁰⁰ Ac	22.890 †	²⁰⁹ Th	15.500
²³⁷ Po	79.940	²⁴⁴ At	106.180	¹⁸⁴ Fr	48.470 †	¹⁹² Ra	30.990 †	²⁰¹ Ac	20.150 †	²¹⁰ Th	13.510
²³⁸ Po	83.800	²⁴⁵ At	110.600	¹⁸⁵ Fr	43.630 †	¹⁹³ Ra	28.940 †	²⁰² Ac	18.980 †	²¹¹ Th	13.260
²³⁹ Po	89.230	¹⁷⁸ Rn	58.400 †	¹⁸⁶ Fr	40.520 †	¹⁹⁴ Ra	25.310 ‡	²⁰³ Ac	16.500 †	²¹² Th	11.600
²⁴⁰ Po	93.380	¹⁷⁹ Rn	54.730 †	¹⁸⁷ Fr	36.110 †	¹⁹⁵ Ra	23.640 ‡	²⁰⁴ Ac	15.550 †	²¹³ Th	11.690
²⁴¹ Po	99.220	¹⁸⁰ Rn	49.200 †	¹⁸⁸ Fr	33.400 †	¹⁹⁶ Ra	20.300 ‡	²⁰⁵ Ac	13.210 †	²¹⁴ Th	10.350
²⁴² Po	103.440	¹⁸¹ Rn	45.780 †	¹⁸⁹ Fr	29.400 †	¹⁹⁷ Ra	18.790 ‡	²⁰⁶ Ac	12.410 †	²¹⁵ Th	10.640
²⁴³ Po	109.410	¹⁸² Rn	40.690 †	¹⁹⁰ Fr	27.070 †	¹⁹⁸ Ra	15.500 ‡	²⁰⁷ Ac	10.390 †	²¹⁶ Th	9.840
²⁴⁴ Po	113.870	¹⁸³ Rn	37.680 †	¹⁹¹ Fr	23.450 †	¹⁹⁹ Ra	14.430	²⁰⁸ Ac	9.940	²¹⁷ Th	11.560
¹⁷⁷ At	48.190 †	¹⁸⁴ Rn	32.910 †	¹⁹² Fr	21.500 †	²⁰⁰ Ra	11.670	²⁰⁹ Ac	8.330	²¹⁸ Th	11.800
¹⁷⁸ At	44.670 †	¹⁸⁵ Rn	30.260 †	¹⁹³ Fr	18.180 †	²⁰¹ Ra	10.840	²¹⁰ Ac	8.150	²¹⁹ Th	13.760
¹⁷⁹ At	39.600 †	¹⁸⁶ Rn	25.910 †	¹⁹⁴ Fr	16.660 †	²⁰² Ra	8.350	²¹¹ Ac	6.870	²²⁰ Th	14.260
¹⁸⁰ At	36.300 †	¹⁸⁷ Rn	23.660 †	¹⁹⁵ Fr	13.570 †	²⁰³ Ra	7.740	²¹² Ac	7.020	²²¹ Th	16.530
¹⁸¹ At	31.670 †	¹⁸⁸ Rn	19.710 †	¹⁹⁶ Fr	12.030 †	²⁰⁴ Ra	5.390	²¹³ Ac	6.050	²²² Th	17.220
¹⁸² At	28.780 †	¹⁸⁹ Rn	17.840 †	¹⁹⁷ Fr	9.020 †	²⁰⁵ Ra	4.960	²¹⁴ Ac	6.390	²²³ Th	19.590
¹⁸³ At	24.420 †	¹⁹⁰ Rn	14.250 ‡	¹⁹⁸ Fr	7.990 †	²⁰⁶ Ra	3.000	²¹⁵ Ac	5.970	²²⁴ Th	20.380
¹⁸⁴ At	21.880 †	¹⁹¹ Rn	12.740 ‡	¹⁹⁹ Fr	5.580 †	²⁰⁷ Ra	2.920	²¹⁶ Ac	7.750	²²⁵ Th	22.640
¹⁸⁵ At	17.940 †	¹⁹² Rn	9.400	²⁰⁰ Fr	4.790 †	²⁰⁸ Ra	1.370	²¹⁷ Ac	8.360	²²⁶ Th	23.530
¹⁸⁶ At	15.800 †	¹⁹³ Rn	8.370	²⁰¹ Fr	2.640 †	²⁰⁹ Ra	1.560	²¹⁸ Ac	10.380	²²⁷ Th	25.880
¹⁸⁷ At	12.260 †	¹⁹⁴ Rn	5.180	²⁰² Fr	2.060	²¹⁰ Ra	0.340	²¹⁹ Ac	11.250	²²⁸ Th	26.810
¹⁸⁸ At	10.500 †	¹⁹⁵ Rn	3.940	²⁰³ Fr	0.090	²¹¹ Ra	0.860	²²⁰ Ac	13.570	²²⁹ Th	29.440
¹⁸⁹ At	7.300 †	¹⁹⁶ Rn	0.850	²⁰⁴ Fr	-0.290	²¹² Ra	-0.050	²²¹ Ac	14.660	²³⁰ Th	30.630

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
²²⁵ Cf	62.290 ‡	²⁵² Es	77.060	²⁴⁰ Md	75.290	²⁴¹ Lr	89.030 †	²⁵¹ Ha	99.240	²⁴¹ Hs	144.500 †		
²²⁶ Cf	60.840 ‡	²⁵³ Es	78.660	²⁴¹ Md	74.300	²⁴² Lr	88.870 †	²⁵² Ha	99.760	²⁴² Hs	141.180 †		
²²⁷ Cf	61.110	²⁵⁴ Es	81.500	²⁴² Md	74.780	²⁴³ Lr	87.480 †	²⁵³ Ha	99.350	²⁴³ Hs	139.530 †		
²²⁸ Cf	59.890	²⁵⁵ Es	83.070	²⁴³ Md	74.260	²⁴⁴ Lr	87.570	²⁵⁴ Ha	99.850	²⁴⁴ Hs	135.110 †		
²²⁹ Cf	60.310	²⁵⁶ Es	85.590	²⁴⁴ Md	75.080	²⁴⁵ Lr	86.660	²⁵⁵ Ha	99.780	²⁴⁵ Hs	133.320 †		
²³⁰ Cf	59.130	²⁵⁷ Es	87.720	²⁴⁵ Md	74.860	²⁴⁶ Lr	87.100	²⁵⁶ Ha	100.660	²⁴⁶ Hs	130.390 †		
²³¹ Cf	59.570	²⁵⁸ Es	90.570	²⁴⁶ Md	75.790	²⁴⁷ Lr	86.510	²⁵⁷ Ha	100.730	²⁴⁷ Hs	129.400 †		
²³² Cf	58.380	²⁵⁹ Es	92.770	²⁴⁷ Md	75.980	²⁴⁸ Lr	87.040	²⁵⁸ Ha	101.990	²⁴⁸ Hs	126.910 †		
²³³ Cf	58.780			²⁴⁸ Md	77.250	²⁴⁹ Lr	86.870	²⁵⁹ Ha	102.550	²⁴⁹ Hs	126.180 †		
²³⁴ Cf	56.710	²¹² Fm	125.250 †	²⁴⁹ Md	77.570	²⁵⁰ Lr	87.770	²⁶⁰ Ha	104.360	²⁵⁰ Hs	124.180 †		
²³⁵ Cf	56.990	²¹³ Fm	121.990 †	²⁵⁰ Md	78.870	²⁵¹ Lr	87.720	²⁶¹ Ha	104.860	²⁵¹ Hs	123.820 †		
²³⁶ Cf	56.070	²¹⁴ Fm	117.180 †	²⁵¹ Md	79.510	²⁵² Lr	88.620	²⁶² Ha	106.240	²⁵² Hs	122.140 †		
²³⁷ Cf	57.040	²¹⁵ Fm	114.170 †	²⁵² Md	81.150	²⁵³ Lr	88.900	²⁶³ Ha	107.360	²⁵³ Hs	121.870 †		
²³⁸ Cf	56.510	²¹⁶ Fm	109.540 †	²⁵³ Md	81.940	²⁵⁴ Lr	90.160	²⁶⁴ Ha	109.120	²⁵⁴ Hs	120.630 †		
²³⁹ Cf	57.720	²¹⁷ Fm	106.710 †	²⁵⁴ Md	83.930	²⁵⁵ Lr	90.590	²⁶⁵ Ha	110.310	²⁵⁵ Hs	120.740 †		
²⁴⁰ Cf	57.630	²¹⁸ Fm	102.300 †	²⁵⁵ Md	85.170	²⁵⁶ Lr	92.210	²³⁶ Sg	129.970 †	²⁵⁶ Hs	119.630 †		
²⁴¹ Cf	59.180	²¹⁹ Fm	99.720 †	²⁵⁶ Md	87.660	²⁵⁷ Lr	93.110	²³⁷ Sg	128.680 †	²⁵⁷ Hs	119.740 †		
²⁴² Cf	59.390	²²⁰ Fm	95.620 †	²⁵⁷ Md	88.870	²⁵⁸ Lr	95.260	²³⁸ Sg	125.800 †	²⁵⁸ Hs	118.980 †		
²⁴³ Cf	61.040	²²¹ Fm	93.230 †	²⁵⁸ Md	91.030	²⁵⁹ Lr	96.110	²³⁹ Sg	124.510 †	²⁵⁹ Hs	119.450 †		
²⁴⁴ Cf	61.640	²²² Fm	89.430 †	²⁵⁹ Md	92.800	²⁶⁰ Lr	97.880	²⁴⁰ Sg	121.570 †	²⁶⁰ Hs	118.840 †		
²⁴⁵ Cf	63.620	²²³ Fm	87.380 †	²⁶⁰ Md	95.300	²⁶¹ Lr	99.330	²⁴¹ Sg	120.290 †	²⁶¹ Hs	119.690 †		
²⁴⁶ Cf	64.360	²²⁴ Fm	83.920 †	²⁶¹ Md	97.150	²⁶² Lr	101.450	²⁴² Sg	116.150 †	²⁶² Hs	119.570 †		
²⁴⁷ Cf	66.370	²²⁵ Fm	82.090 †			²⁶³ Lr	102.980	²⁴³ Sg	114.710 †	²⁶³ Hs	120.950 †		
²⁴⁸ Cf	67.420	²²⁶ Fm	79.180 †	²²³ No	113.710 †			²⁴⁴ Sg	112.150 †	²⁶⁴ Hs	120.780 †		
²⁴⁹ Cf	69.770	²²⁷ Fm	78.780 †	²²⁴ No	109.480 †	²³⁰ Rf	117.620 †	²⁴⁵ Sg	111.540 †	²⁶⁵ Hs	121.790 †		
²⁵⁰ Cf	70.970	²²⁸ Fm	76.910 ‡	²²⁵ No	107.020 †	²³¹ Rf	116.380 †	²⁴⁶ Sg	109.420 †	²⁶⁶ Hs	122.230 †		
²⁵¹ Cf	73.640	²²⁹ Fm	76.770 ‡	²²⁶ No	103.130 †	²³² Rf	113.690 †	²⁴⁷ Sg	109.070 ‡	²⁶⁷ Hs	123.600 †		
²⁵² Cf	75.270	²³⁰ Fm	75.110 ‡	²²⁷ No	100.890 †	²³³ Rf	112.700 †	²⁴⁸ Sg	107.450 ‡	²⁶⁸ Hs	124.120 †		
²⁵³ Cf	78.420	²³¹ Fm	75.100 ‡	²²⁸ No	97.570 †	²³⁴ Rf	110.190 †	²⁴⁹ Sg	107.460	²⁴⁶ Mt	144.620 †		
²⁵⁴ Cf	80.040	²³² Fm	73.490	²²⁹ No	96.760 †	²³⁵ Rf	109.320 †	²⁵⁰ Sg	106.160	²⁴⁷ Mt	141.720 †		
²⁵⁵ Cf	82.890	²³³ Fm	73.490	²³⁰ No	94.470 †	²³⁶ Rf	106.850 †	²⁵¹ Sg	106.260	²⁴⁸ Mt	140.420 †		
²⁵⁶ Cf	85.040	²³⁴ Fm	71.850	²³¹ No	93.910 †	²³⁷ Rf	105.990 †	²⁵² Sg	105.400	²⁴⁹ Mt	137.920 †		
²⁵⁷ Cf	88.220	²³⁵ Fm	71.820	²³² No	91.830 †	²³⁸ Rf	103.470 †	²⁵³ Sg	105.870	²⁵⁰ Mt	136.890 †		
²⁵⁸ Cf	90.450	²³⁶ Fm	69.210	²³³ No	91.400 †	²³⁹ Rf	102.600 †	²⁵⁴ Sg	105.140	²⁵¹ Mt	134.840 †		
		²³⁷ Fm	69.060	²³⁴ No	89.370 ‡	²⁴⁰ Rf	98.930 ‡	²⁵⁵ Sg	105.600	²⁵² Mt	134.160 †		
²¹¹ Es	114.580 †	²³⁸ Fm	67.720	²³⁵ No	88.950 ‡	²⁴¹ Rf	97.910 ‡	²⁵⁶ Sg	105.210	²⁵³ Mt	132.420 †		
²¹² Es	111.390 †	²³⁹ Fm	68.290	²³⁶ No	86.890 ‡	²⁴² Rf	95.750 ‡	²⁵⁷ Sg	106.050	²⁵⁴ Mt	131.870 †		
²¹³ Es	106.950 †	²⁴⁰ Fm	67.360	²³⁷ No	86.450 ‡	²⁴³ Rf	95.530	²⁵⁸ Sg	105.790	²⁵⁵ Mt	130.530 †		
²¹⁴ Es	104.000 †	²⁴¹ Fm	68.180	²³⁸ No	83.380	²⁴⁴ Rf	93.800	²⁵⁹ Sg	107.000	²⁵⁶ Mt	130.330 †		
²¹⁵ Es	99.740 †	²⁴² Fm	67.700	²³⁹ No	82.810	²⁴⁵ Rf	93.840	²⁶⁰ Sg	107.250	²⁵⁷ Mt	129.160 †		
²¹⁶ Es	96.970 †	²⁴³ Fm	68.860	²⁴⁰ No	81.070	²⁴⁶ Rf	92.590	²⁶¹ Sg	109.000	²⁵⁸ Mt	129.020 †		
²¹⁷ Es	92.930 †	²⁴⁴ Fm	68.690	²⁴¹ No	81.250	²⁴⁷ Rf	92.990	²⁶² Sg	109.190	²⁵⁹ Mt	128.170 †		
²¹⁸ Es	90.400 †	²⁴⁵ Fm	69.950	²⁴² No	79.920	²⁴⁸ Rf	92.060	²⁶³ Sg	110.540	²⁶⁰ Mt	128.370 †		
²¹⁹ Es	86.670 †	²⁴⁶ Fm	70.180	²⁴³ No	80.350	²⁴⁹ Rf	92.550	²⁶⁴ Sg	111.350	²⁶¹ Mt	127.690 †		
²²⁰ Es	84.350 †	²⁴⁷ Fm	71.780	²⁴⁴ No	79.490	²⁵⁰ Rf	92.050	²⁶⁵ Sg	113.060	²⁶² Mt	128.250 †		
²²¹ Es	80.910 †	²⁴⁸ Fm	72.150	²⁴⁵ No	80.260	²⁵¹ Rf	92.900	²⁶⁶ Sg	113.940	²⁶³ Mt	128.010 †		
²²² Es	78.920 †	²⁴⁹ Fm	73.770	²⁴⁶ No	79.720	²⁵² Rf	92.530			²⁶⁴ Mt	129.030 †		
²²³ Es	75.810 †	²⁵⁰ Fm	74.460	²⁴⁷ No	80.590	²⁵³ Rf	93.370	²⁴⁰ Ns	135.100 †	²⁶⁵ Mt	128.810 †		
²²⁴ Es	74.040 †	²⁵¹ Fm	76.430	²⁴⁸ No	80.450	²⁵⁴ Rf	93.340	²⁴¹ Ns	132.010 †	²⁶⁶ Mt	129.590 †		
²²⁵ Es	71.490 †	²⁵² Fm	77.260	²⁴⁹ No	81.680	²⁵⁵ Rf	94.550	²⁴² Ns	130.320 †	²⁶⁷ Mt	129.900 †		
²²⁶ Es	71.150 †	²⁵³ Fm	79.570	²⁵⁰ No	81.680	²⁵⁶ Rf	94.660	²⁴³ Ns	125.770 †	²⁶⁸ Mt	131.010 †		
²²⁷ Es	69.640 †	²⁵⁴ Fm	80.850	²⁵¹ No	82.920	²⁵⁷ Rf	96.230	²⁴⁴ Ns	123.910 †	²⁶⁹ Mt	131.430 †		
²²⁸ Es	69.550 †	²⁵⁵ Fm	83.650	²⁵² No	83.240	²⁵⁸ Rf	96.830	²⁴⁵ Ns	121.240 †				
²²⁹ Es	68.250 †	²⁵⁶ Fm	84.910	²⁵³ No	84.830	²⁵⁹ Rf	98.930	²⁴⁶ Ns	120.290 †	²⁴⁷ 110	155.180 †		
²³⁰ Es	68.300 †	²⁵⁷ Fm	87.380	²⁵⁴ No	85.300	²⁶⁰ Rf	99.480	²⁴⁷ Ns	118.080 †	²⁴⁸ 110	152.120 †		
²³¹ Es	67.040 †	²⁵⁸ Fm	89.200	²⁵⁵ No	87.240	²⁶¹ Rf	101.190	²⁴⁸ Ns	117.390 †	²⁴⁹ 110	150.820 †		
²³² Es	67.110 †	²⁵⁹ Fm	92.000	²⁵⁶ No	88.170	²⁶² Rf	102.340	²⁴⁹ Ns	115.720 †	²⁵⁰ 110	148.090 †		
²³³ Es	65.820 †	²⁶⁰ Fm	93.900	²⁵⁷ No	90.620	²⁶³ Rf	104.410	²⁵⁰ Ns	115.400 †	²⁵¹ 110	147.060 †		
²³⁴ Es	65.850			²⁵⁸ No	91.520	²⁶⁴ Rf	105.630	²⁵¹ Ns	114.060 †	²⁵² 110	144.680 †		
²³⁵ Es	63.590	²²³ Md	100.180 †	²⁵⁹ No	93.620	²³⁵ Ha	120.830 †	²⁵² Ns	113.820 †	²⁵³ 110	143.960 †		
²³⁶ Es	63.490	²²⁴ Md	97.770 †	²⁶⁰ No	95.090	²³⁶ Ha	119.590 †	²⁵³ Ns	112.930 †	²⁵⁴ 110	141.880 †		
²³⁷ Es	62.500	²²⁵ Md	94.240 †	²⁶¹ No	97.530	²³⁷ Ha	117.050 †	²⁵⁴ Ns	113.080	²⁵⁵ 110	141.360 †		
²³⁸ Es	63.120	²²⁶ Md	92.060 †	²⁶² No	99.080	²³⁸ Ha	115.810 †	²⁵⁵ Ns	112.300	²⁵⁶ 110	139.610 †		
²³⁹ Es	62.530	²²⁷ Md	89.100 †			²³⁹ Ha	115.810 †	²⁵⁶ Ns	112.410	²⁵⁷ 110	139.390 †		
²⁴⁰ Es	63.400	²²⁸ Md	88.340 †	²²⁹ Lr	108.330 †	²⁴⁰ Ha	113.200 †	²⁵⁷ Ns	111.990	²⁵⁸ 110	137.860 †		
²⁴¹ Es	63.260	²²⁹ Md	86.410 †	²³⁰ Lr	107.160 †	²⁴¹ Ha	111.960 †	²⁵⁸ Ns	112.490	²⁵⁹ 110	137.800 †		
²⁴² Es	64.470	²³⁰ Md	85.910 †	²³¹ Lr	104.820 †	²⁴² Ha	108.110 †	²⁵⁹ Ns	112.190	²⁶⁰ 110	136.570 †		
²⁴³ Es	64.630	²³¹ Md	84.180 †	²³² Lr	103.890 †	²⁴³ Ha	106.710 †	²⁶⁰ Ns	113.090	²⁶¹ 110	136.810 †		
²⁴⁴ Es	65.940	²³² Md	83.810 †	²³³ Lr	101.730 †	²⁴⁴ Ha	104.470 †	²⁶¹ Ns	113.330	²⁶² 110	135.790 †		
²⁴⁵ Es	66.500	²³³ Md	82.140 †	²³⁴ Lr	100.930 †	²⁴⁵ Ha	103.920 †	²⁶² Ns	114.800	²⁶³ 110	136.320 †		
²⁴⁶ Es	68.150	²³⁴ Md	81.780 †	²³⁵ Lr	98.830 †	²⁴⁶ Ha	102.120 †	²⁶³ Ns	114.950	²⁶⁴ 110	135.630 †		
²⁴⁷ Es	68.850	²³⁵ Md	80.070 †	²³⁶ Lr	98.030 †	²⁴⁷ Ha	101.830 †	²⁶⁴ Ns	115.940	²⁶⁵ 110	136.500 †		
²⁴⁸ Es	70.520	²³⁶ Md	79.690 †	²³⁷ Lr	95.870 †	²⁴⁸ Ha	100.530 †	²⁶⁵ Ns	116.750	²⁶⁶ 110	135.960 ‡		
²⁴⁹ Es	71.530	²³⁷ Md	76.970 †	²³⁸ Lr	95.070 †	²⁴⁹ Ha	100.590 †	²⁶⁶ Ns	118.130	²⁶⁷ 110	136.860 ‡		
²⁵⁰ Es	73.540	²³⁸ Md	76.460 †	²³⁹ Lr	91.800 †	²⁵⁰ Ha	99.620 †	²⁶⁷ Ns	118.990	²⁶⁸ 110	136.680 †		
²⁵¹ Es	74.700	²³⁹ Md	75.060 †	²⁴⁰ Lr	90.850 †								

Isotope Mass Excess

²⁶⁹110 137.860

²⁷⁰110 137.860

²⁵²111 158.010 †

²⁵³111 155.580 †

²⁵⁴111 154.530 †

²⁵⁵111 152.390 †

²⁵⁶111 151.590 †

²⁵⁷111 149.750 †

²⁵⁸111 149.230 †

²⁵⁹111 147.630 †

²⁶⁰111 147.330 †

²⁶¹111 146.010 †

²⁶²111 145.970 †

²⁶³111 144.890 †

²⁶⁴111 145.130 †

²⁶⁵111 144.330 †

²⁶⁶111 144.840 †

²⁶⁷111 144.250 †

²⁶⁸111 144.920 †

²⁶⁹111 144.610 †

²⁷⁰111 145.540 †

²⁷¹111 145.450 †

²⁵³112 167.620 †

²⁵⁴112 164.870 †

²⁵⁵112 163.770 †

²⁵⁶112 161.310 †

²⁵⁷112 160.470 †

²⁵⁸112 158.290 †

²⁵⁹112 157.720 †

²⁶⁰112 155.800 †

²⁶¹112 155.490 †

²⁶²112 153.830 †

²⁶³112 153.770 †

²⁶⁴112 152.380 †

²⁶⁵112 152.570 †

²⁶⁶112 151.430 ‡

²⁶⁷112 151.860 ‡

²⁶⁸112 150.960 ‡

²⁶⁹112 151.630 ‡

²⁷⁰112 150.980

²⁷¹112 151.880

²⁷²112 151.460