

E. Comay, I. Kelson, and A. Zidon 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
⁷ He	26.100±0.200	²⁶ C	91.980±2.170 †	³⁵ F	99.960±2.720 †	¹⁸ Mg	43.800±0.660 †	⁵⁵ Al	172.000±3.920 †	⁵¹ P	60.570±2.170 ‡
⁸ He	30.610±0.920	²⁷ C	107.130±2.520 †	³⁶ F	110.910±2.970 †	¹⁹ Mg	32.560±0.580 ‡	¹⁹ Si	87.890±1.060 †	⁵² P	71.120±2.340 †
⁹ He	41.470±0.840 †	²⁸ C	118.910±2.770 †	³⁷ F	119.720±3.110 †	²⁰ Mg	17.520±0.500	²⁰ Si	63.590±0.970 †	⁵³ P	79.290±2.540 †
¹⁰ He	50.230±0.880 †			³⁸ F	131.450±3.340 †	²¹ Mg	10.950±0.430	²¹ Si	49.440±0.880 †	⁵⁴ P	90.180±2.680 †
¹¹ He	64.820±0.970 †	¹⁰ N	39.890±1.050 †	³⁹ F	142.260±3.520 †	²² Mg	-0.060±0.360	²² Si	32.180±0.790 ‡	⁵⁵ P	99.010±2.880 †
¹² He	75.090±0.990 †	¹¹ N	25.390±0.730 †			²³ Mg	-5.390±0.300	²³ Si	23.510±0.690	⁵⁶ P	110.510±3.080 †
¹³ He	88.870±1.030 †	¹² N	17.460±0.350	¹³ Ne	76.950±0.850 †	²⁴ Mg	-14.190±0.370	²⁴ Si	10.660±0.590	⁵⁷ P	119.670±3.300 †
¹⁴ He	98.060±1.090 †	¹³ N	5.290±0.200	¹⁴ Ne	54.940±0.680 †	²⁵ Mg	-13.310±0.320	²⁵ Si	3.680±0.590	⁵⁸ P	131.470±3.380 †
⁷ Li	14.920±0.200	¹⁵ N	0.170±0.200	¹⁵ Ne	41.900±0.500 †	²⁶ Mg	-16.060±0.270	²⁶ Si	-7.050±0.390	⁵⁹ P	140.960±3.520 †
⁸ Li	21.020±0.200	¹⁶ N	5.660±0.200	¹⁶ Ne	24.870±0.440 ‡	²⁷ Mg	-14.560±0.200	²⁷ Si	-12.510±0.330	⁶⁰ P	152.840±3.600 †
⁹ Li	24.940±0.200	¹⁷ N	7.870±0.200	¹⁷ Ne	16.920±0.360	²⁸ Mg	-14.910±0.390	²⁸ Si	-21.370±0.380	⁶¹ P	162.700±3.840 †
¹⁰ Li	33.750±0.200 †	¹⁸ N	13.110±0.200	¹⁸ Ne	5.470±0.290	²⁹ Mg	-10.730±0.430	²⁹ Si	-21.890±0.280	²³ S	71.590±1.230 †
¹¹ Li	41.160±0.260 ‡	¹⁹ N	15.860±0.200	¹⁹ Ne	1.800±0.220	³⁰ Mg	-9.360±0.440	³⁰ Si	-24.670±0.310	²⁴ S	52.480±1.090 †
¹² Li	53.140±0.320 †	²⁰ N	20.970±0.210	²⁰ Ne	-6.980±0.250	³¹ Mg	-3.330±0.690	³¹ Si	-22.950±0.200	²⁵ S	42.160±0.950 †
¹³ Li	61.770±0.420 †	²¹ N	23.740±0.430	²¹ Ne	-5.810±0.230	³² Mg	-0.390±0.750	³² Si	-23.940±0.300	²⁶ S	27.390±0.810 †
¹⁴ Li	72.290±0.500 †	²² N	29.980±0.610	²² Ne	-7.720±0.320	³³ Mg	7.670±0.950	³³ Si	-20.530±0.250	²⁷ S	17.650±0.690
¹⁵ Li	81.260±0.540 †	²³ N	35.560±0.860	²³ Ne	-5.180±0.200	³⁴ Mg	12.250±1.070	³⁴ Si	-19.990±0.280	²⁸ S	4.420±0.560
¹⁶ Li	93.640±0.580 †	²⁴ N	44.670±1.020 †	²⁴ Ne	-6.010±0.270	³⁵ Mg	20.170±1.180	³⁵ Si	-14.260±0.360	²⁹ S	-3.060±0.460
¹⁷ Li	102.600±0.740 †	²⁵ N	52.750±1.340 †	²⁵ Ne	-1.760±0.350	³⁶ Mg	24.900±1.390	³⁶ Si	-11.820±0.510	³⁰ S	-14.350±0.360
		²⁶ N	64.240±1.600 †	²⁶ Ne	0.400±0.270	³⁷ Mg	33.010±1.440 †	³⁷ Si	-6.020±0.630	³¹ S	-19.070±0.300
⁷ Be	15.820±0.200	²⁷ N	73.490±1.900 †	²⁷ Ne	6.600±0.450	³⁸ Mg	38.170±1.680	³⁸ Si	-3.620±0.800	³² S	-25.780±0.340
⁸ Be	5.310±0.720	²⁸ N	87.130±2.170 †	²⁸ Ne	10.400±0.640	³⁹ Mg	46.520±1.840 †	³⁹ Si	2.570±0.870	³³ S	-26.680±0.270
⁹ Be	10.820±0.780	²⁹ N	98.410±2.600 †	²⁹ Ne	18.900±1.000 †	⁴⁰ Mg	51.830±1.930	⁴⁰ Si	5.890±0.990	³⁴ S	-30.070±0.230
¹⁰ Be	12.690±0.200	³⁰ N	111.790±2.880 †	³⁰ Ne	24.190±1.220	⁴¹ Mg	61.370±2.030 †	⁴¹ Si	12.300±1.060	³⁵ S	-28.980±0.280
¹¹ Be	20.160±0.200	³¹ N	122.900±3.280 †	³¹ Ne	34.870±1.520 †	⁴² Mg	68.850±2.190 ‡	⁴² Si	15.870±1.270	³⁶ S	-30.590±0.250
¹² Be	24.950±0.200	¹¹ O	50.120±0.980 †	³² Ne	41.850±1.660 ‡	⁴³ Mg	79.430±2.370 †	⁴³ Si	23.610±1.400	³⁷ S	-26.970±0.330
¹³ Be	35.300±0.220 †	¹² O	33.010±0.720 †	³³ Ne	52.090±1.890 †	⁴⁴ Mg	87.090±2.560 ‡	⁴⁴ Si	28.960±1.520	³⁸ S	-26.870±0.330
¹⁴ Be	40.670±0.340	¹³ O	23.450±0.300	³⁴ Ne	58.960±2.050 ‡	⁴⁵ Mg	98.420±2.710 †	⁴⁵ Si	37.660±1.630 †	³⁹ S	-22.990±0.400
¹⁵ Be	50.970±0.370 †	¹⁴ O	8.020±0.250	³⁵ Ne	69.200±2.150 †	⁴⁶ Mg	106.930±2.880 †	⁴⁶ Si	43.750±1.800	⁴⁰ S	-22.430±0.360
¹⁶ Be	58.560±0.350 ‡	¹⁵ O	3.000±0.200	³⁶ Ne	76.690±2.390 †	⁴⁷ Mg	118.850±2.910 †	⁴⁷ Si	53.340±1.870 †	⁴¹ S	-18.170±0.400
¹⁷ Be	69.380±0.460 †	¹⁶ O	-4.770±0.200	³⁷ Ne	86.960±2.500 †	⁴⁸ Mg	128.050±3.220 †	⁴⁸ Si	60.590±2.150 ‡	⁴² S	-16.590±0.550
¹⁸ Be	76.210±0.630 ‡	¹⁷ O	-0.840±0.200	³⁸ Ne	94.110±2.760 ‡	⁴⁹ Mg	140.760±3.470 †	⁴⁹ Si	71.180±2.360 †	⁴³ S	-11.990±0.670
¹⁹ Be	87.110±0.960 †	¹⁸ O	-0.750±0.200	³⁹ Ne	105.580±2.920 †	⁵⁰ Mg	150.570±3.660 †	⁵⁰ Si	79.070±2.470 ‡	⁴⁴ S	-10.540±0.790
²⁰ Be	95.270±1.180 †	¹⁹ O	3.330±0.200	⁴⁰ Ne	114.810±3.000 †	⁵¹ Mg	164.010±3.800 †	⁵¹ Si	90.710±2.650 †	⁴⁵ S	-4.690±0.860
²¹ Be	107.970±1.550 †	²⁰ O	3.650±0.250	⁴¹ Ne	127.190±3.170 †	⁵² Mg	174.600±3.980 †	⁵² Si	99.240±2.850 †	⁴⁶ S	-0.900±0.990
²² Be	118.050±1.850 †	²¹ O	8.280±0.240	⁴² Ne	136.980±3.380 †	⁵³ Mg	188.510±4.160 †	⁵³ Si	111.230±2.980 †	⁴⁷ S	6.050±1.020
		²² O	9.300±0.280	⁴³ Ne	150.190±3.580 †	⁵⁴ Mg	199.250±4.320 †	⁵⁴ Si	120.380±3.150 †	⁴⁸ S	10.890±1.280
⁸ B	23.100±0.810	²³ O	15.200±0.520	⁴⁴ Ne	160.270±3.760 †			⁵⁵ Si	132.880±3.370 †	⁴⁹ S	19.130±1.510 †
⁹ B	12.000±0.780	²⁴ O	19.280±0.670	¹⁶ Na	54.420±0.630 †	²⁰ Al	41.960±0.720 †	⁵⁶ Si	142.290±3.550 †	⁵⁰ S	25.080±1.620
¹⁰ B	8.550±0.260	²⁵ O	28.240±0.870 †	¹⁷ Na	35.840±0.540 †	²¹ Al	26.440±0.640 †	⁵⁷ Si	155.230±3.750 †	⁵¹ S	34.600±1.740 †
¹¹ B	13.400±0.200	²⁶ O	34.550±1.040	¹⁸ Na	25.760±0.470 †	²² Al	18.120±0.560	⁵⁸ Si	165.020±3.870 †	⁵² S	41.220±1.910
¹² B	16.560±0.200	²⁷ O	45.050±1.340 †	¹⁹ Na	13.150±0.390 †	²³ Al	6.760±0.480	⁵⁹ Si	178.070±3.980 †	⁵³ S	51.410±2.070 †
¹³ B	23.650±0.200	²⁸ O	52.780±1.580 ‡	²⁰ Na	7.060±0.320	²⁴ Al	-0.060±0.390	⁶⁰ Si	188.050±4.070 †	⁵⁴ S	58.490±2.280 ‡
¹⁴ B	28.800±0.210	²⁹ O	65.930±2.020 †	²¹ Na	-2.200±0.250	²⁵ Al	-9.020±0.330			⁵⁵ S	69.070±2.460 †
¹⁵ B	37.720±0.200 †	³⁰ O	75.270±2.280 †	²² Na	-9.440±0.280	²⁶ Al	-17.230±0.320	²² P	60.650±1.050 †	⁵⁶ S	76.890±2.630 ‡
¹⁶ B	43.750±0.200	³¹ O	88.120±2.590 †	²³ Na	-4.400±0.200	²⁷ Al	-17.260±0.380	²³ P	43.030±0.940 †	⁵⁷ S	88.130±2.880 †
¹⁷ B	52.450±0.330 †	³² O	97.400±2.800 †	²⁴ Na	-8.400±0.200	²⁸ Al	-18.100±0.330	²⁴ P	32.870±0.820 †	⁵⁸ S	96.160±2.960 ‡
¹⁸ B	58.120±0.530	³³ O	109.960±3.030 †	²⁵ Na	-9.380±0.200	²⁹ Al	-15.850±0.200	²⁵ P	19.860±0.710 †	⁵⁹ S	107.650±3.070 †
¹⁹ B	66.600±0.770 †	³⁴ O	119.600±3.190 †	²⁶ Na	-6.900±0.200	³⁰ Al	-15.010±0.330	²⁶ P	11.110±0.580 †	⁶⁰ S	115.980±3.170 †
²⁰ B	74.270±1.150 ‡			²⁷ Na	-5.740±0.290	³¹ Al	-10.810±0.350	²⁷ P	-0.600±0.500	⁶¹ S	127.730±3.400 †
²¹ B	85.220±1.350 †	¹² F	64.970±0.930 †	²⁸ Na	-1.050±0.420	³² Al	-8.660±0.500	²⁸ P	-7.590±0.390	⁶² S	136.410±3.540 †
²² B	94.950±1.710 †	¹³ F	46.220±0.630 †	²⁹ Na	2.260±0.640	³³ Al	-2.220±0.590	²⁹ P	-16.930±0.290	⁶³ S	148.180±3.670 †
²³ B	108.370±2.040 †	¹⁴ F	33.400±0.410 †	³⁰ Na	8.810±0.800	³⁴ Al	1.660±0.690	³⁰ P	-24.440±0.280	⁶⁴ S	156.820±3.770 †
²⁴ B	120.380±2.440 †	¹⁵ F	17.750±0.320 †	³¹ Na	13.580±1.070	³⁵ Al	8.140±0.910	³¹ P	-24.550±0.270	⁶⁵ S	168.880±3.910 †
		¹⁶ F	11.350±0.280 †	³² Na	22.420±1.200 †	³⁶ Al	12.190±0.980	³² P	-26.320±0.200	⁶⁶ S	177.830±4.040 †
⁹ C	28.920±1.080	¹⁷ F	2.030±0.200	³³ Na	28.620±1.410	³⁷ Al	18.650±1.140	³³ P	-24.520±0.200	⁶⁷ S	191.400±4.180 †
¹⁰ C	15.760±0.810	¹⁸ F	-1.550±0.200	³⁴ Na	37.240±1.550 †	³⁸ Al	23.540±1.340	³⁴ P	-20.400±0.250	⁶⁸ S	203.170±4.310 †
¹¹ C	10.440±0.280	¹⁹ F	0.110±0.200	³⁵ Na	43.420±1.680	³⁹ Al	30.310±1.390	³⁵ P	-18.640±0.320	²⁶ Cl	54.950±1.070 †
¹² C	-0.090±0.200	²⁰ F	-0.060±0.200	³⁶ Na	52.210±1.860 †	⁴⁰ Al	35.270±1.550	³⁶ P	-14.500±0.520	²⁷ Cl	39.180±0.930 †
¹³ C	3.130±0.200	²¹ F	2.820±0.200	³⁷ Na	59.030±1.980	⁴¹ Al	43.420±1.680 †	³⁷ P	-12.360±0.600	²⁸ Cl	27.930±0.770 †
¹⁴ C	3.020±0.200	²² F	3.490±0.200	³⁸ Na	67.640±2.190 †	⁴² Al	50.490±1.830	³⁸ P	-7.750±0.580	²⁹ Cl	14.200±0.640 †
¹⁵ C	9.890±0.200	²³ F	7.900±0.470	³⁹ Na	74.520±2.380	⁴³ Al	59.350±1.990 †	³⁹ P	-4.780±0.710	³⁰ Cl	4.780±0.540 †
¹⁶ C	13.660±0.200	²⁴ F	11.820±0.570	⁴⁰ Na	84.420±2.430 †	⁴⁴ Al	66.850±2.140 ‡	⁴⁰ P	0.240±0.830	³¹ Cl	-7.030±0.460 †
¹⁷ C	21.030±0.200	²⁵ F	19.010±0.600	⁴¹ Na	93.290±2.560 †	⁴⁵ Al	76.770±2.320 †	⁴¹ P	3.400±1.020	³² Cl	-13.580±0.360
¹⁸ C	24.930±0.200	²⁶ F	24.330±0.830	⁴² Na	104.280±2.750 †	⁴⁶ Al	84.940±2.380 †	⁴² P	9.420±1.110	³³ Cl	-21.080±0.290
¹⁹ C	32.470±0.310	²⁷ F	33.320±1.070 †	⁴³ Na	113.660±2.950 †	⁴⁷					

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⁴¹ Cl	-27.440±0.230	⁷³ Ar	189.250±4.070 †	⁵⁶ Ca	-13.470±1.180	³² Ti	106.590±1.480 †	⁶² V	-24.920±1.170	⁸⁶ Cr	126.650±3.090 †
⁴² Cl	-24.560±0.330	⁷⁴ Ar	200.310±4.180 †	⁵⁷ Ca	-5.950±1.390	³³ Ti	89.760±1.370 †	⁶³ V	-21.430±1.230	⁸⁷ Cr	137.750±3.170 †
⁴³ Cl	-23.400±0.440			⁵⁸ Ca	-1.580±1.500	³⁴ Ti	69.330±1.270 †	⁶⁴ V	-15.620±1.300	⁸⁸ Cr	146.240±3.180 †
⁴⁴ Cl	-20.500±0.540	³⁰ K	50.000±0.970 †	⁵⁹ Ca	6.300±1.570	³⁵ Ti	54.450±1.170 †	⁶⁵ V	-11.790±1.400		
⁴⁵ Cl	-19.230±0.600	³¹ K	33.800±0.850 †	⁶⁰ Ca	11.260±1.580	³⁶ Ti	36.260±1.060 †	⁶⁶ V	-5.550±1.500	⁴¹ Mn	41.770±1.230 †
⁴⁶ Cl	-14.780±0.690	³² K	22.030±0.730 †	⁶¹ Ca	19.770±1.880 †	³⁷ Ti	24.480±1.030 †	⁶⁷ V	-1.290±1.560	⁴² Mn	29.780±1.170 †
⁴⁷ Cl	-11.330±0.720	³³ K	7.600±0.640 †	⁶² Ca	25.020±1.980	³⁸ Ti	10.890±0.990 ‡	⁶⁸ V	5.640±1.630	⁴³ Mn	16.560±1.100 †
⁴⁸ Cl	-5.300±0.910	³⁴ K	-1.360±0.570 †	⁶³ Ca	33.880±2.110 †	³⁹ Ti	2.210±0.880 ‡	⁶⁹ V	10.460±1.660	⁴⁴ Mn	6.310±0.950 †
⁴⁹ Cl	-0.880±1.120	³⁵ K	-11.180±0.490 †	⁶⁴ Ca	39.380±2.210	⁴⁰ Ti	-8.850±0.690	⁷⁰ V	17.520±1.750	⁴⁵ Mn	-5.650±0.860 †
⁵⁰ Cl	6.480±1.210	³⁶ K	-17.250±0.400	⁶⁵ Ca	48.540±2.310 †	⁴¹ Ti	-15.580±0.540	⁷¹ V	22.690±1.850	⁴⁶ Mn	-13.010±0.700
⁵¹ Cl	12.240±1.390	³⁷ K	-24.810±0.350	⁶⁶ Ca	54.440±2.400	⁴² Ti	-25.250±0.480	⁷² V	30.090±2.030	⁴⁷ Mn	-22.860±0.590
⁵² Cl	20.680±1.490 †	³⁸ K	-33.550±0.460	⁶⁷ Ca	63.600±2.470 †	⁴³ Ti	-29.310±0.440	⁷³ V	35.650±2.140	⁴⁸ Mn	-29.070±0.520
⁵³ Cl	26.930±1.660	³⁹ K	-33.430±0.330	⁶⁸ Ca	70.120±2.550	⁴⁴ Ti	-37.260±0.530	⁷⁴ V	44.710±2.210 †	⁴⁹ Mn	-37.740±0.480
⁵⁴ Cl	36.030±1.820 †	⁴⁰ K	-35.530±0.260	⁶⁹ Ca	79.730±2.660 †	⁴⁵ Ti	-38.990±0.460	⁷⁵ V	52.690±2.300 ‡	⁵⁰ Mn	-48.070±0.420
⁵⁵ Cl	42.800±2.090	⁴¹ K	-35.530±0.260	⁷⁰ Ca	86.600±2.770 ‡	⁴⁶ Ti	-43.880±0.470	⁷⁶ V	62.030±2.380 †	⁵¹ Mn	-50.580±0.400
⁵⁶ Cl	52.370±2.230 †	⁴² K	-34.970±0.290	⁷¹ Ca	97.940±2.930 †	⁴⁷ Ti	-45.040±0.510	⁷⁷ V	70.580±2.520 †	⁵² Mn	-54.910±0.420
⁵⁷ Cl	59.940±2.440 ‡	⁴³ K	-36.570±0.320	⁷² Ca	107.280±3.090 †	⁴⁸ Ti	-48.420±0.530	⁷⁸ V	80.600±2.580 †	⁵³ Mn	-55.740±0.450
⁵⁸ Cl	70.040±2.540 †	⁴⁴ K	-35.820±0.350	⁷³ Ca	118.990±3.260 †	⁴⁹ Ti	-48.780±0.410	⁷⁹ V	89.530±2.730 †	⁵⁴ Mn	-57.560±0.340
⁵⁹ Cl	77.770±2.660 ‡	⁴⁵ K	-36.540±0.290	⁷⁴ Ca	128.680±3.320 †	⁵⁰ Ti	-51.470±0.430	⁸⁰ V	100.360±2.870 †	⁵⁵ Mn	-56.880±0.290
⁶⁰ Cl	88.090±2.730 †	⁴⁶ K	-35.220±0.400	⁷⁵ Ca	140.600±3.400 †	⁵¹ Ti	-49.760±0.450	⁸¹ V	109.610±2.980 †	⁵⁶ Mn	-57.650±0.310
⁶¹ Cl	96.290±2.990 †	⁴⁷ K	-32.490±0.480	⁷⁶ Ca	150.400±3.510 †	⁵² Ti	-49.810±0.440	⁸² V	120.870±3.190 †	⁵⁷ Mn	-55.730±0.280
⁶² Cl	106.870±3.110 †	⁴⁸ K	-35.690±0.480	⁷⁷ Ca	163.060±3.650 †	⁵³ Ti	-46.920±0.380	⁸³ V	130.090±3.330 †	⁵⁸ Mn	-55.520±0.370
⁶³ Cl	115.390±3.240 †	⁴⁹ K	-30.380±0.620	⁷⁸ Ca	173.500±3.770 †	⁵⁴ Ti	-45.710±0.450	⁸⁴ V	141.150±3.350 †	⁵⁹ Mn	-52.730±0.380
⁶⁴ Cl	125.790±3.330 †	⁵⁰ K	-25.650±0.620	⁷⁹ Ca	186.600±3.890 †	⁵⁵ Ti	-41.590±0.600	⁸⁵ V	150.570±3.420 †	⁶⁰ Mn	-51.870±0.560
⁶⁵ Cl	134.540±3.450 †	⁵¹ K	-22.300±0.760	⁸⁰ Ca	197.210±4.050 †	⁵⁶ Ti	-39.690±0.820			⁶¹ Mn	-48.260±0.630
⁶⁶ Cl	145.230±3.600 †	⁵² K	-16.220±0.880			⁵⁷ Ti	-34.280±0.950	³⁵ Cr	119.060±1.730 †	⁶² Mn	-46.830±0.770
⁶⁷ Cl	154.200±3.700 †	⁵³ K	-11.910±1.040	³³ Sc	57.890±1.110 †	⁵⁸ Ti	-31.830±0.970	³⁶ Cr	96.490±1.610 †	⁶³ Mn	-42.940±0.800
⁶⁸ Cl	166.890±3.840 †	⁵⁴ K	-4.930±1.110	³⁴ Sc	43.710±1.010 †	⁵⁹ Ti	-25.750±1.040	³⁷ Cr	79.490±1.610 †	⁶⁴ Mn	-40.700±0.850
⁶⁹ Cl	178.440±3.940 †	⁵⁵ K	-0.070±1.330	³⁵ Sc	26.950±0.910 †	⁶⁰ Ti	-22.850±1.120	³⁸ Cr	58.960±1.600 †	⁶⁵ Mn	-36.150±0.910
		⁵⁶ K	7.700±1.510	³⁶ Sc	15.860±0.820 †	⁶¹ Ti	-16.260±1.310	³⁹ Cr	45.270±1.470 †	⁶⁶ Mn	-33.670±0.980
²⁷ Ar	66.270±1.210 †	⁵⁷ K	13.210±1.790	³⁷ Sc	3.920±0.780 †	⁶² Ti	-12.610±1.370	⁴⁰ Cr	29.830±1.190 †	⁶⁷ Mn	-28.290±1.040
²⁸ Ar	48.980±1.010 †	⁵⁸ K	27.520±1.880	³⁸ Sc	-4.490±0.740 †	⁶³ Ti	-5.440±1.510	⁴¹ Cr	19.230±0.980 †	⁶⁸ Mn	-25.130±1.080
²⁹ Ar	37.230±0.860 †	⁵⁹ K	27.520±1.880	³⁹ Sc	-13.970±0.660 †	⁶⁴ Ti	-1.710±1.580	⁴² Cr	6.430±0.920 ‡	⁶⁹ Mn	-19.420±1.160
³⁰ Ar	21.570±0.740 †	⁶⁰ K	36.150±1.970 †	⁴⁰ Sc	-20.350±0.510	⁶⁵ Ti	5.890±1.670	⁴³ Cr	-2.110±0.840	⁷⁰ Mn	-15.730±1.240
³¹ Ar	11.620±0.640 ‡	⁶¹ K	42.580±2.220	⁴¹ Sc	-28.630±0.350	⁶⁶ Ti	10.130±1.780	⁴⁴ Cr	-13.910±0.720	⁷¹ Mn	-9.880±1.350
³² Ar	-2.020±0.530	⁶² K	58.460±2.480	⁴³ Sc	-36.180±0.430	⁶⁷ Ti	17.940±1.840	⁴⁵ Cr	-19.850±0.650	⁷² Mn	-5.890±1.440
³³ Ar	-9.360±0.460	⁶³ K	67.520±2.550 †	⁴⁴ Sc	-37.750±0.340	⁶⁸ Ti	22.980±1.900	⁴⁶ Cr	-29.370±0.510	⁷³ Mn	0.310±1.500
³⁴ Ar	-18.480±0.390	⁶⁴ K	74.780±2.660 ‡	⁴⁵ Sc	-41.230±0.430	⁶⁹ Ti	31.040±1.950	⁴⁷ Cr	-34.660±0.410	⁷⁴ Mn	4.610±1.550
³⁵ Ar	-23.110±0.330	⁶⁵ K	83.930±2.770 †	⁴⁶ Sc	-42.050±0.590	⁷⁰ Ti	36.340±2.040	⁴⁸ Cr	-42.910±0.500	⁷⁵ Mn	12.400±1.630
³⁶ Ar	-29.990±0.460	⁶⁶ K	91.320±2.850 †	⁴⁷ Sc	-44.520±0.640	⁷¹ Ti	44.820±2.200 †	⁴⁹ Cr	-45.400±0.470	⁷⁶ Mn	19.400±1.740
³⁷ Ar	-31.020±0.330	⁶⁷ K	101.150±2.980 †	⁴⁸ Sc	-44.450±0.540	⁷² Ti	50.480±2.340	⁵⁰ Cr	-50.090±0.410	⁷⁷ Mn	27.950±1.840 †
³⁸ Ar	-34.960±0.300	⁶⁸ K	109.030±3.060 ‡	⁴⁹ Sc	-46.250±0.460	⁷³ Ti	60.640±2.500 †	⁵¹ Cr	-51.510±0.410	⁷⁸ Mn	35.500±1.930
³⁹ Ar	-33.260±0.320	⁶⁹ K	120.500±3.200 †	⁵⁰ Sc	-44.370±0.400	⁷⁴ Ti	68.780±2.550 †	⁵² Cr	-55.470±0.440	⁷⁹ Mn	44.600±2.060 †
⁴⁰ Ar	-35.010±0.340	⁷⁰ K	130.920±3.350 †	⁵¹ Sc	-43.320±0.480	⁷⁵ Ti	79.230±2.660 †	⁵³ Cr	-55.220±0.430	⁸⁰ Mn	52.420±2.190 ‡
⁴¹ Ar	-33.060±0.270	⁷¹ K	142.730±3.540 †	⁵² Sc	-39.870±0.490	⁷⁶ Ti	87.650±2.740 †	⁵⁴ Cr	-56.720±0.350	⁸¹ Mn	62.260±2.410 †
⁴² Ar	-34.250±0.300	⁷² K	153.510±3.690 †	⁵³ Sc	-37.970±0.610	⁷⁷ Ti	98.590±2.850 †	⁵⁵ Cr	-55.030±0.320	⁸² Mn	70.380±2.540 †
⁴³ Ar	-31.780±0.390	⁷³ K	165.590±3.720 †	⁵⁴ Sc	-33.330±0.650	⁷⁸ Ti	107.600±2.980 †	⁵⁶ Cr	-55.550±0.410	⁸³ Mn	80.380±2.650 †
⁴⁴ Ar	-32.340±0.430	⁷⁴ K	176.490±3.880 †	⁵⁵ Sc	-30.430±0.860	⁷⁹ Ti	119.270±3.100 †	⁵⁷ Cr	-52.490±0.400	⁸⁴ Mn	88.810±2.670 †
⁴⁵ Ar	-29.610±0.400			⁵⁶ Sc	-24.770±0.960	⁸⁰ Ti	128.780±3.260 †	⁵⁸ Cr	-51.980±0.500	⁸⁵ Mn	98.780±2.640 †
⁴⁶ Ar	-29.740±0.490	²⁹ Ca	95.280±1.390 †	⁵⁷ Sc	-21.180±1.150	⁸¹ Ti	140.780±3.340 †	⁵⁹ Cr	-48.020±0.520	⁸⁶ Mn	106.950±2.810 †
⁴⁷ Ar	-25.620±0.550	³⁰ Ca	75.570±1.230 †	⁵⁸ Sc	-14.800±1.180	⁸² Ti	150.390±3.570 †	⁶⁰ Cr	-47.030±0.570	⁸⁷ Mn	117.240±2.850 †
⁴⁸ Ar	-23.100±0.690	³¹ Ca	61.350±1.100 †	⁵⁹ Sc	-10.730±1.330			⁶¹ Cr	-42.240±0.740	⁸⁸ Mn	125.500±2.810 †
⁴⁹ Ar	-17.480±0.800	³² Ca	43.320±0.960 †	⁶⁰ Sc	-4.020±1.330	³⁷ V	49.130±1.310 †	⁶² Cr	-40.650±0.900	⁸⁹ Mn	136.310±2.970 †
⁵⁰ Ar	-13.950±0.890	³³ Ca	30.760±0.860 †	⁶¹ Sc	0.820±1.530	³⁸ V	35.700±1.280 †	⁶³ Cr	-35.400±0.990	⁹⁰ Mn	145.190±3.050 †
⁵¹ Ar	-6.770±1.050	³⁴ Ca	14.720±0.770 ‡	⁶² Sc	8.150±1.670	³⁹ V	21.830±1.160 †	⁶⁴ Cr	-33.270±0.990		
⁵² Ar	-2.100±1.220	³⁵ Ca	5.060±0.690	⁶³ Sc	13.240±1.780	⁴⁰ V	11.590±0.920 †	⁶⁵ Cr	-27.360±1.100	³⁷ Fe	150.400±2.270 †
⁵³ Ar	5.970±1.320	³⁶ Ca	-6.200±0.590	⁶⁴ Sc	20.740±1.860	⁴¹ V	0.170±0.740 †	⁶⁶ Cr	-24.890±1.180	³⁸ Fe	125.500±2.290 †
⁵⁴ Ar	11.140±1.470	³⁷ Ca	-12.950±0.550	⁶⁵ Sc	26.340±1.990	⁴² V	-7.950±0.690 †	⁶⁷ Cr	-18.630±1.270	³⁹ Fe	106.580±2.150 †
⁵⁵ Ar	19.920±1.670 †	³⁸ Ca	-22.170±0.510	⁶⁶ Sc	34.130±2.060	⁴³ V	-18.030±0.620	⁶⁸ Cr	-15.260±1.300	⁴⁰ Fe	84.210±1.780 †
⁵⁶ Ar	25.680±1.910	³⁹ Ca	-26.970±0.470	⁶⁷ Sc	40.050±2.120	⁴⁴ V	-23.810±0.510	⁶⁹ Cr	-8.540±1.370	⁴¹ Fe	68.580±1.500 †
⁵⁷ Ar	35.000±2.100 †	⁴⁰ Ca	-34.900±0.440	⁶⁸ Sc	48.330±2.200 †	⁴⁵ V	-31.920±0.470	⁷⁰ Cr	-4.730±1.430	⁴² Fe	51.400±1.450 †
⁵⁸ Ar	41.430±2.120	⁴¹ Ca	-35.130±0.340	⁶⁹ Sc	54.630±2.260	⁴⁶ V	-42.100±0.400	⁷¹ Cr	2.210±1.530	⁴³ Fe	38.990±1.380 †
⁵⁹ Ar	51.230±2.280 †	⁴² Ca	-38.620±0.290	⁷⁰ Sc	63.240±2.410 †	⁴⁷ V	-44.180±0.520	⁷² Cr	6.300±1.650	⁴⁴ Fe	24.070±1.210 †
⁶⁰ Ar	57.790±2.340 ‡	⁴³ Ca	-38.470±0.370	⁷¹ Sc	69.980±2.540	⁴⁸ V	-47.980±0.370	⁷³ Cr	13.590±1.820	⁴⁵ Fe	13.650±1.120 †
⁶¹ Ar	67.990±2.580 †	⁴⁴ Ca	-41.790±0.450	⁷² Sc	80.250±2.710 †	⁴⁹ V	-49.220±0.390	⁷⁴ Cr	18.050±1.820	⁴⁶ Fe	0.280±0.920
⁶² Ar	75.010±2.740 ‡	⁴⁵ Ca	-41.200±0.540	⁷³ Sc	89.480±2.850 †	⁵⁰ V	-52.090±0.430	⁷⁵ Cr	26.950±1.920 †	⁴⁷	

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
⁵⁸ Fe	-62.010±0.260	⁷⁶ Co	-25.480±1.030	⁸⁸ Ni	33.400±1.890	⁹⁸ Cu	92.620±2.390 †	¹⁰⁷ Zn	141.880±3.340 †	¹¹⁷ Ga	207.580±3.810 †
⁵⁹ Fe	-60.400±0.340	⁷⁷ Co	-22.170±1.080	⁸⁹ Ni	42.240±1.800 †	⁹⁹ Cu	100.210±2.470 ‡	¹⁰⁸ Zn	149.250±3.400 ‡	¹¹⁸ Ga	219.280±3.950 †
⁶⁰ Fe	-61.360±0.410	⁷⁸ Co	-15.160±1.180	⁹⁰ Ni	48.700±1.920	¹⁰⁰ Cu	109.830±2.570 †	¹⁰⁹ Zn	159.370±3.530 †	¹¹⁹ Ga	229.280±4.000 †
⁶¹ Fe	-58.690±0.420	⁷⁹ Co	-9.160±1.260	⁹¹ Ni	58.010±1.930 †	¹⁰¹ Cu	117.620±2.700 ‡	¹¹⁰ Zn	166.810±3.520 ‡		
⁶² Fe	-59.010±0.420	⁸⁰ Co	-1.530±1.380	⁹² Ni	64.820±2.010	¹⁰² Cu	127.480±2.870 †	¹¹¹ Zn	176.780±3.570 †	⁵¹ Ge	81.520±1.770 †
⁶³ Fe	-55.560±0.490	⁸¹ Co	4.910±1.480	⁹³ Ni	74.580±2.110 †	¹⁰³ Cu	135.260±2.980 ‡	¹¹² Zn	184.740±3.670 ‡	⁵² Ge	64.310±1.650 †
⁶⁴ Fe	-55.490±0.620	⁸² Co	13.020±1.690 †	⁹⁴ Ni	81.870±2.220 ‡	¹⁰⁴ Cu	145.170±3.220 †	¹¹³ Zn	196.740±3.780 †	⁵³ Ge	52.760±1.600 †
⁶⁵ Fe	-51.500±0.700	⁸³ Co	19.710±1.850	⁹⁵ Ni	91.950±2.330 ‡	¹⁰⁵ Cu	153.160±3.320 ‡	¹¹⁴ Zn	206.810±3.900 †	⁵⁴ Ge	37.960±1.340 †
⁶⁶ Fe	-50.620±0.680	⁸⁴ Co	28.290±1.970 †	⁹⁶ Ni	99.520±2.430 ‡	¹⁰⁶ Cu	163.130±3.440 †	¹¹⁵ Zn	218.820±4.010 †	⁵⁵ Ge	27.400±1.150 †
⁶⁷ Fe	-46.060±0.720	⁸⁵ Co	35.620±2.010	⁹⁷ Ni	109.770±2.530 †	¹⁰⁷ Cu	171.330±3.530 †	¹¹⁶ Zn	228.930±4.090 †	⁵⁶ Ge	13.810±0.980 †
⁶⁸ Fe	-44.450±0.760	⁸⁶ Co	44.540±2.060 †	⁹⁸ Ni	117.680±2.650 ‡	¹⁰⁸ Cu	181.320±3.680 †	¹¹⁷ Zn	241.280±4.150 †	⁵⁷ Ge	4.040±0.890 †
⁶⁹ Fe	-39.290±0.860	⁸⁷ Co	51.710±2.150	⁹⁹ Ni	128.240±2.770 †	¹⁰⁹ Cu	189.770±3.780 †	¹¹⁸ Zn	251.460±4.270 †	⁵⁸ Ge	-8.390±0.800 †
⁷⁰ Fe	-37.140±0.920	⁸⁸ Co	60.780±2.120 †	¹⁰⁰ Ni	136.000±2.840 ‡	¹¹⁰ Cu	199.580±3.720 †	⁵⁴ Ga	17.400±1.110 †	⁵⁹ Ge	-16.890±0.750 †
⁷¹ Fe	-31.560±1.020	⁸⁹ Co	67.910±2.180 ‡	¹⁰¹ Ni	146.680±3.010 †	¹¹¹ Cu	208.270±3.860 †	⁵⁵ Ga	4.810±0.940 †	⁶⁰ Ge	-28.070±0.690
⁷² Fe	-28.950±1.100	⁹⁰ Co	77.290±2.240 †	¹⁰² Ni	154.730±3.160 ‡	¹¹² Cu	220.320±3.940 †	⁵⁶ Ga	-4.710±0.790 †	⁶¹ Ge	-34.170±0.650
⁷³ Fe	-23.200±1.180	⁹¹ Co	84.800±2.230 ‡	¹⁰³ Ni	165.170±3.280 †	¹¹³ Cu	231.180±4.020 †	⁵⁷ Ga	-16.000±0.710 †	⁶² Ge	-42.250±0.610
⁷⁴ Fe	-20.310±1.160	⁹² Co	94.840±2.420 †	¹⁰⁴ Ni	173.140±3.510 ‡	¹¹⁴ Cu	243.320±4.180 †	⁵⁸ Ga	-24.190±0.630 †	⁶³ Ge	-46.940±0.570
⁷⁵ Fe	-14.270±1.240	⁹³ Co	102.750±2.510 ‡	¹⁰⁵ Ni	183.710±3.650 †	⁴⁹ Zn	54.630±1.650 †	⁵⁹ Ga	-34.200±0.580 †	⁶⁴ Ge	-54.250±0.590
⁷⁶ Fe	-11.070±1.290	⁹⁴ Co	113.080±2.590 †	¹⁰⁶ Ni	192.020±3.680 †	⁵⁰ Zn	38.700±1.400 †	⁶⁰ Ga	-40.180±0.520	⁶⁵ Ge	-56.520±0.500
⁷⁷ Fe	-3.160±1.400	⁹⁵ Co	121.270±2.690 †	¹⁰⁷ Ni	202.840±3.830 †	⁵¹ Zn	28.610±1.250 †	⁶¹ Ga	-47.080±0.480	⁶⁶ Ge	-61.570±0.430
⁷⁸ Fe	2.930±1.480	⁹⁶ Co	131.790±2.820 †	¹⁰⁸ Ni	211.160±3.970 †	⁵² Zn	15.250±1.150 †	⁶² Ga	-51.600±0.570	⁶⁷ Ge	-62.850±0.430
⁷⁹ Fe	11.400±1.580 †	⁹⁷ Co	140.170±2.890 †	¹⁰⁹ Ni	221.970±4.020 †	⁵³ Zn	6.100±1.090 †	⁶³ Ga	-56.450±0.560	⁶⁸ Ge	-66.810±0.380
⁸⁰ Fe	18.110±1.710	⁹⁸ Co	151.050±3.020 †	¹¹⁰ Ni	230.510±4.050 †	⁵⁴ Zn	-6.170±0.900 †	⁶⁴ Ga	-58.820±0.550	⁶⁹ Ge	-67.060±0.460
⁸¹ Fe	26.950±1.790 †	⁹⁹ Co	159.740±3.120 †	¹¹¹ Ni	243.280±4.160 †	⁵⁵ Zn	-14.680±0.750 ‡	⁶⁵ Ga	-62.510±0.480	⁷⁰ Ge	-70.330±0.510
⁸² Fe	34.030±2.060	¹⁰⁰ Co	170.400±3.230 †	¹¹² Ni	254.180±4.220 †	⁵⁶ Zn	-25.710±0.620	⁶⁶ Ga	-63.800±0.390	⁷¹ Ge	-69.920±0.440
⁸³ Fe	43.470±2.180 †	¹⁰¹ Co	179.260±3.400 †	⁴⁸ Cu	43.480±1.450 †	⁵⁷ Zn	-32.770±0.550	⁶⁷ Ga	-66.890±0.450	⁷² Ge	-72.330±0.460
⁸⁴ Fe	50.730±2.310 ‡	¹⁰² Co	189.980±3.540 †	⁴⁹ Cu	28.430±1.370 †	⁵⁸ Zn	-42.480±0.470	⁶⁸ Ga	-66.920±0.480	⁷³ Ge	-71.190±0.410
⁸⁵ Fe	60.810±2.310 †	¹⁰³ Co	198.480±3.660 †	⁵⁰ Cu	18.520±1.150 †	⁵⁹ Zn	-47.290±0.430	⁶⁹ Ga	-69.190±0.560	⁷⁴ Ge	-73.210±0.510
⁸⁶ Fe	68.080±2.380 ‡	⁴¹ Ni	135.270±2.090 †	⁵¹ Cu	6.260±1.020 †	⁶⁰ Zn	-54.070±0.440	⁷⁰ Ga	-68.640±0.450	⁷⁵ Ge	-71.620±0.530
⁸⁷ Fe	77.950±2.380 †	⁴² Ni	111.150±2.060 †	⁵² Cu	-2.530±0.920 †	⁶¹ Zn	-56.370±0.470	⁷¹ Ga	-69.980±0.420	⁷⁶ Ge	-73.140±0.560
⁸⁸ Fe	85.310±2.520 ‡	⁴³ Ni	93.720±1.990 †	⁵³ Cu	-13.720±0.860 †	⁶² Zn	-61.050±0.430	⁷² Ga	-68.730±0.440	⁷⁷ Ge	-70.980±0.440
⁸⁹ Fe	95.370±2.500 †	⁴⁴ Ni	74.420±1.790 †	⁵⁴ Cu	-21.910±0.700 †	⁶³ Zn	-62.060±0.460	⁷³ Ga	-69.650±0.530	⁷⁸ Ge	-71.630±0.440
⁹⁰ Fe	102.960±2.550 ‡	⁴⁵ Ni	60.130±1.700 †	⁵⁵ Cu	-31.940±0.570 †	⁶⁴ Zn	-65.850±0.540	⁷⁴ Ga	-67.900±0.500	⁷⁹ Ge	-69.110±0.510
⁹¹ Fe	113.690±2.650 †	⁴⁶ Ni	43.630±1.430 †	⁵⁶ Cu	-38.740±0.460	⁶⁵ Zn	-65.780±0.510	⁷⁵ Ga	-68.320±0.510	⁸⁰ Ge	-69.200±0.380
⁹² Fe	121.870±2.820 †	⁴⁷ Ni	31.470±1.260 †	⁵⁷ Cu	-47.310±0.400	⁶⁶ Zn	-68.880±0.420	⁷⁶ Ga	-66.280±0.510	⁸¹ Ge	-66.250±0.420
⁹³ Fe	132.820±2.880 †	⁴⁸ Ni	16.850±1.190 ‡	⁵⁸ Cu	-51.820±0.510	⁶⁷ Zn	-68.040±0.460	⁷⁷ Ga	-66.020±0.400	⁸² Ge	-65.760±0.550
⁹⁴ Fe	141.260±2.960 †	⁴⁹ Ni	7.820±1.110 ‡	⁵⁹ Cu	-56.340±0.420	⁶⁸ Zn	-70.090±0.640	⁷⁸ Ga	-63.420±0.370	⁸³ Ge	-61.070±0.650
⁹⁵ Fe	152.400±3.090 †	⁵⁰ Ni	-4.260±0.920	⁶⁰ Cu	-58.510±0.440	⁶⁹ Zn	-68.540±0.480	⁷⁹ Ga	-62.670±0.390	⁸⁴ Ge	-58.160±0.670
⁹⁶ Fe	161.050±3.170 †	⁵¹ Ni	-11.960±0.800	⁶¹ Cu	-62.020±0.410	⁷⁰ Zn	-69.750±0.450	⁸⁰ Ga	-59.450±0.430	⁸⁵ Ge	-52.720±0.760
⁹⁷ Fe	172.400±3.260 †	⁵² Ni	-22.780±0.710	⁶² Cu	-62.870±0.400	⁷¹ Zn	-67.410±0.410	⁸¹ Ga	-58.230±0.550	⁸⁶ Ge	-49.350±0.820
⁹⁸ Fe	181.420±3.380 †	⁵³ Ni	-29.890±0.650	⁶³ Cu	-65.300±0.530	⁷² Zn	-68.240±0.470	⁸² Ga	-53.150±0.760	⁸⁷ Ge	-43.690±0.900
⁹⁹ Fe	193.010±3.500 †	⁵⁴ Ni	-39.600±0.520	⁶⁴ Cu	-65.330±0.470	⁷³ Zn	-65.390±0.550	⁸³ Ga	-49.380±0.820	⁸⁸ Ge	-39.850±0.960
¹⁰⁰ Fe	201.850±3.630 †	⁵⁵ Ni	-45.390±0.420	⁶⁵ Cu	-67.070±0.450	⁷⁴ Zn	-65.640±0.550	⁸⁴ Ga	-44.000±0.890	⁸⁹ Ge	-33.490±1.030
⁴³ Co	64.300±1.670 †	⁵⁶ Ni	-53.710±0.340	⁶⁶ Cu	-66.240±0.310	⁷⁵ Zn	-62.510±0.510	⁸⁵ Ga	-39.470±1.000	⁹⁰ Ge	-29.120±1.050
⁴⁴ Co	50.180±1.490 †	⁵⁷ Ni	-56.120±0.390	⁶⁷ Cu	-67.410±0.470	⁷⁶ Zn	-62.360±0.530	⁸⁶ Ga	-33.710±1.040	⁹¹ Ge	-22.080±1.040
⁴⁵ Co	35.090±1.400 †	⁵⁸ Ni	-60.340±0.320	⁶⁸ Cu	-65.640±0.470	⁷⁷ Zn	-58.850±0.520	⁸⁷ Ga	-29.070±1.150	⁹² Ge	-17.400±1.130
⁴⁶ Co	23.270±1.170 †	⁵⁹ Ni	-61.350±0.360	⁶⁹ Cu	-65.850±0.380	⁷⁸ Zn	-58.020±0.520	⁸⁸ Ga	-22.480±1.230	⁹³ Ge	-10.280±1.050
⁴⁷ Co	9.560±1.020 †	⁶⁰ Ni	-64.730±0.450	⁷⁰ Cu	-63.390±0.410	⁷⁹ Zn	-53.960±0.630	⁸⁹ Ga	-17.440±1.220	⁹⁴ Ge	-5.490±1.140
⁴⁸ Co	0.950±0.940 †	⁶¹ Ni	-64.400±0.420	⁷¹ Cu	-63.130±0.500	⁸⁰ Zn	-52.480±0.650	⁹⁰ Ga	-10.330±1.250	⁹⁵ Ge	1.990±1.230
⁴⁹ Co	-10.240±0.870 †	⁶² Ni	-66.670±0.420	⁷² Cu	-60.180±0.620	⁸¹ Zn	-46.660±0.780	⁹¹ Ga	-4.940±1.260	⁹⁶ Ge	7.030±1.300
⁵⁰ Co	-17.760±0.700	⁶³ Ni	-65.340±0.420	⁷³ Cu	-59.340±0.690	⁸² Zn	-42.490±0.940	⁹² Ga	2.450±1.280	⁹⁷ Ge	15.050±1.410
⁵¹ Co	-27.490±0.600	⁶⁴ Ni	-67.180±0.350	⁷⁴ Cu	-56.040±0.670	⁸³ Zn	-36.260±1.030	⁹³ Ga	7.850±1.350	⁹⁸ Ge	20.720±1.560
⁵² Co	-34.230±0.520	⁶⁵ Ni	-64.990±0.370	⁷⁵ Cu	-54.790±0.640	⁸⁴ Zn	-31.800±1.150	⁹⁴ Ga	15.580±1.400	⁹⁹ Ge	29.110±1.670 †
⁵³ Co	-42.860±0.480	⁶⁶ Ni	-66.180±0.420	⁷⁶ Cu	-51.400±0.640	⁸⁵ Zn	-24.880±1.190	⁹⁵ Ga	21.250±1.460	¹⁰⁰ Ge	34.690±1.750
⁵⁵ Co	-54.070±0.400	⁶⁷ Ni	-63.530±0.420	⁷⁷ Cu	-49.650±0.660	⁸⁶ Zn	-20.140±1.260	⁹⁶ Ga	29.530±1.600 †	¹⁰¹ Ge	43.230±1.890 †
⁵⁶ Co	-56.220±0.350	⁶⁸ Ni	-63.520±0.400	⁷⁸ Cu	-45.510±0.730	⁸⁷ Zn	-12.740±1.370	⁹⁷ Ga	35.680±1.730	¹⁰² Ge	49.090±2.020
⁵⁷ Co	-59.300±0.310	⁶⁹ Ni	-60.050±0.480	⁷⁹ Cu	-43.190±0.780	⁸⁸ Zn	-7.470±1.430	⁹⁸ Ga	44.390±1.870 †	¹⁰³ Ge	57.650±2.110 †
⁵⁸ Co	-60.010±0.350	⁷⁰ Ni	-59.670±0.580	⁸⁰ Cu	-37.110±0.880	⁸⁹ Zn	0.310±1.420	⁹⁹ Ga	50.900±1.950	¹⁰⁴ Ge	63.810±2.340
⁵⁹ Co	-62.220±0.330	⁷¹ Ni	-55.640±0.680	⁸¹ Cu	-32.210±0.970	⁹⁰ Zn	5.770±1.480	¹⁰⁰ Ga	59.420±2.050 †	¹⁰⁵ Ge	72.890±2.460 †
⁶⁰ Co	-61.770±0.480	⁷² Ni	-54.690±0.760	⁸² Cu	-25.580±1.140	⁹¹ Zn	13.860±1.420 †	¹⁰¹ Ga	66.090±2.190	¹⁰⁶ Ge	79.570±2.550
⁶¹ Co	-62.850±0.310	⁷³ Ni	-50.300±0.800	⁸³ Cu	-20.260±1.270	⁹² Zn	19.540±1.540	¹⁰² Ga	74.930±2.340 †	¹⁰⁷ Ge	88.780±2.710 †
⁶² Co	-61.360±0.310	⁷⁴ Ni	-48.890±0.760	⁸⁴ Cu	-13.410±1.330	⁹³ Zn	27.880±1.560 †	¹⁰³ Ga	81.620±2.400	¹⁰⁸ Ge	95.240±2.830
⁶³ Co	-61.850±0.360	⁷⁵ Ni	-44.390±0.760	⁸⁵ Cu	-7.510±1.410	⁹⁴ Zn	33.800±1.620	¹⁰⁴ Ga	90.680±2.670 †	¹⁰⁹ Ge	104.400±2.960 †
⁶⁴ Co	-59.760±0.380	⁷⁶ Ni	-42.770±0.780	⁸⁶ Cu	-0.020±1.520	⁹⁵ Zn	42.710±1.760 †	¹⁰⁵ Ga	97.950±2.780 ‡	¹¹⁰ Ge	110.890±2.880
⁶											

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
⁶⁰ As	-6.700±0.870 †	⁶⁸ Se	-54.260±0.500	⁷⁶ Br	-73.990±0.520	⁸⁴ Kr	-82.460±0.350	⁸⁶ Rb	-82.290±0.520	⁸⁶ Sr	-84.720±0.560
⁶¹ As	-18.000±0.840 †	⁶⁹ Se	-56.630±0.470	⁷⁹ Br	-76.380±0.630	⁸⁵ Kr	-81.420±0.530	⁸⁷ Rb	-84.250±0.400	⁸⁷ Sr	-84.940±0.470
⁶² As	-25.280±0.790 †	⁷⁰ Se	-61.810±0.440	⁸⁰ Br	-76.060±0.570	⁸⁶ Kr	-83.280±0.490	⁸⁸ Rb	-82.420±0.460	⁸⁸ Sr	-87.710±0.420
⁶³ As	-33.520±0.760 †	⁷¹ Se	-63.190±0.410	⁸¹ Br	-77.890±0.570	⁸⁷ Kr	-80.630±0.460	⁸⁹ Rb	-81.720±0.430	⁸⁹ Sr	-86.100±0.440
⁶⁴ As	-39.570±0.610 †	⁷² Se	-67.680±0.430	⁸² Br	-77.210±0.510	⁸⁸ Kr	-79.710±0.500	⁹⁰ Rb	-79.250±0.460	⁹⁰ Sr	-86.080±0.490
⁶⁵ As	-46.780±0.510 †	⁷³ Se	-68.450±0.510	⁸³ Br	-78.690±0.380	⁸⁹ Kr	-76.560±0.490	⁹¹ Rb	-77.760±0.500	⁹¹ Sr	-83.680±0.510
⁶⁶ As	-51.800±0.580	⁷⁴ Se	-72.060±0.540	⁸⁴ Br	-77.730±0.410	⁹⁰ Kr	-75.000±0.530	⁹² Rb	-74.580±0.490	⁹² Sr	-82.890±0.570
⁶⁷ As	-56.830±0.460	⁷⁵ Se	-72.170±0.530	⁸⁵ Br	-78.430±0.470	⁹¹ Kr	-71.120±0.500	⁹³ Rb	-72.690±0.470	⁹³ Sr	-79.990±0.610
⁶⁸ As	-58.980±0.400	⁷⁶ Se	-75.460±0.620	⁸⁶ Br	-75.680±0.460	⁹² Kr	-68.960±0.510	⁹⁴ Rb	-68.670±0.500	⁹⁴ Sr	-78.710±0.450
⁶⁹ As	-63.170±0.440	⁷⁷ Se	-74.850±0.590	⁸⁷ Br	-73.960±0.500	⁹³ Kr	-64.320±0.620	⁹⁵ Rb	-66.210±0.580	⁹⁵ Sr	-74.940±0.500
⁷⁰ As	-64.420±0.460	⁷⁸ Se	-77.160±0.610	⁸⁸ Br	-70.580±0.560	⁹⁴ Kr	-61.620±0.660	⁹⁶ Rb	-61.640±0.670	⁹⁶ Sr	-73.110±0.560
⁷¹ As	-67.820±0.500	⁷⁹ Se	-76.000±0.610	⁸⁹ Br	-68.340±0.510	⁹⁵ Kr	-56.420±0.700	⁹⁷ Rb	-58.980±0.700	⁹⁷ Sr	-68.800±0.620
⁷² As	-68.490±0.510	⁸⁰ Se	-77.570±0.570	⁹⁰ Br	-64.390±0.580	⁹⁶ Kr	-53.490±0.810	⁹⁸ Rb	-54.100±0.560	⁹⁸ Sr	-66.620±0.590
⁷³ As	-71.010±0.520	⁸¹ Se	-76.160±0.570	⁹¹ Br	-61.530±0.560	⁹⁷ Kr	-48.130±0.720	⁹⁹ Rb	-51.240±0.560	⁹⁹ Sr	-62.060±0.520
⁷⁴ As	-70.950±0.450	⁸² Se	-77.250±0.480	⁹² Br	-56.620±0.660	⁹⁸ Kr	-44.960±0.700	¹⁰⁰ Rb	-46.390±0.640	¹⁰⁰ Sr	-60.130±0.500
⁷⁵ As	-73.140±0.600	⁸³ Se	-75.420±0.470	⁹³ Br	-53.300±0.710	⁹⁹ Kr	-39.170±0.790	¹⁰¹ Rb	-43.310±0.720	¹⁰¹ Sr	-55.260±0.620
⁷⁶ As	-72.650±0.620	⁸⁴ Se	-76.190±0.510	⁹⁴ Br	-47.850±0.720	¹⁰⁰ Kr	-36.120±0.850	¹⁰² Rb	-37.820±0.940	¹⁰² Sr	-53.000±0.750
⁷⁷ As	-74.050±0.570	⁸⁵ Se	-72.290±0.570	⁹⁵ Br	-44.300±0.780	¹⁰¹ Kr	-29.810±0.990	¹⁰³ Rb	-34.470±1.010	¹⁰³ Sr	-47.780±0.820
⁷⁸ As	-72.810±0.590	⁸⁶ Se	-70.470±0.530	⁹⁶ Br	-38.670±0.750	¹⁰² Kr	-26.180±1.180	¹⁰⁴ Rb	-28.600±1.270	¹⁰⁴ Sr	-44.960±1.040
⁷⁹ As	-73.540±0.610	⁸⁷ Se	-66.280±0.660	⁹⁷ Br	-35.020±0.860	¹⁰³ Kr	-19.790±1.280	¹⁰⁵ Rb	-24.610±1.360	¹⁰⁵ Sr	-39.070±1.190
⁸⁰ As	-71.860±0.600	⁸⁸ Se	-63.820±0.680	⁹⁸ Br	-28.910±0.890	¹⁰⁴ Kr	-15.810±1.460	¹⁰⁶ Rb	-18.260±1.410	¹⁰⁶ Sr	-35.670±1.250
⁸¹ As	-72.210±0.500	⁸⁹ Se	-59.180±0.770	⁹⁹ Br	-24.930±0.940	¹⁰⁵ Kr	-8.870±1.540	¹⁰⁷ Rb	-13.890±1.540	¹⁰⁷ Sr	-29.430±1.350
⁸² As	-69.990±0.520	⁹⁰ Se	-56.250±0.760	¹⁰⁰ Br	-18.640±1.030	¹⁰⁶ Kr	-4.390±1.620	¹⁰⁸ Rb	-7.380±1.660	¹⁰⁸ Sr	-25.900±1.490
⁸³ As	-69.900±0.470	⁹¹ Se	-50.640±0.830	¹⁰¹ Br	-14.200±1.230	¹⁰⁷ Kr	2.950±1.760	¹⁰⁹ Rb	-2.610±1.730	¹⁰⁹ Sr	-19.260±1.560
⁸⁴ As	-66.070±0.560	⁹² Se	-47.050±0.840	¹⁰² Br	-7.540±1.400	¹⁰⁸ Kr	7.600±1.870	¹¹⁰ Rb	4.060±1.720	¹¹⁰ Sr	-15.490±1.510
⁸⁵ As	-63.090±0.640	⁹³ Se	-40.990±0.860	¹⁰³ Br	-3.030±1.430	¹⁰⁹ Kr	15.270±1.970	¹¹¹ Rb	9.070±1.830	¹¹¹ Sr	-8.660±1.630
⁸⁶ As	-58.800±0.660	⁹⁴ Se	-37.190±0.870	¹⁰⁴ Br	3.900±1.670	¹¹⁰ Kr	20.120±1.960	¹¹² Rb	16.010±1.890	¹¹² Sr	-4.390±1.690
⁸⁷ As	-55.540±0.750	⁹⁵ Se	-30.940±0.860	¹⁰⁵ Br	8.970±1.740	¹¹¹ Kr	27.790±2.050	¹¹³ Rb	20.970±1.980	¹¹³ Sr	2.510±1.780
⁸⁸ As	-50.680±0.840	⁹⁶ Se	-27.020±0.960	¹⁰⁶ Br	16.430±1.830	¹¹² Kr	32.800±2.100	¹¹⁴ Rb	27.720±2.130	¹¹⁴ Sr	6.680±1.880
⁸⁹ As	-47.060±0.860	⁹⁷ Se	-20.430±1.050	¹⁰⁷ Br	21.900±1.950	¹¹³ Kr	40.340±2.240	¹¹⁵ Rb	32.680±2.120	¹¹⁵ Sr	13.300±1.960
⁹⁰ As	-41.380±0.960	⁹⁸ Se	-16.130±1.070	¹⁰⁸ Br	29.440±2.120	¹¹⁴ Kr	45.420±2.300	¹¹⁶ Rb	39.630±2.220	¹¹⁶ Sr	17.640±1.960
⁹¹ As	-37.090±0.930	⁹⁹ Se	-8.910±1.160	¹⁰⁹ Br	35.300±2.200	¹¹⁵ Kr	53.000±2.390	¹¹⁷ Rb	44.900±2.230	¹¹⁷ Sr	24.570±2.020
⁹² As	-30.750±0.970	¹⁰⁰ Se	-4.490±1.300	¹¹⁰ Br	42.810±2.190	¹¹⁶ Kr	58.290±2.470	¹¹⁸ Rb	51.870±2.250	¹¹⁸ Sr	29.180±2.110
⁹³ As	-26.340±0.980	¹⁰¹ Se	2.990±1.470	¹¹¹ Br	48.550±2.270	¹¹⁷ Kr	65.910±2.400	¹¹⁹ Rb	57.380±2.280	¹¹⁹ Sr	35.960±2.040
⁹⁴ As	-19.840±0.910	¹⁰² Se	7.770±1.590	¹¹² Br	56.130±2.360	¹¹⁸ Kr	71.610±2.530	¹²⁰ Rb	66.280±2.420 †	¹²⁰ Sr	40.780±2.170
⁹⁵ As	-15.300±1.040	¹⁰³ Se	15.230±1.650	¹¹³ Br	62.010±2.400	¹¹⁹ Kr	81.210±2.570 †	¹²¹ Rb	73.880±2.470 ‡	¹²¹ Sr	49.520±2.250 †
⁹⁶ As	-8.450±1.130	¹⁰⁴ Se	20.280±1.880	¹¹⁴ Br	69.720±2.570	¹²⁰ Kr	88.970±2.670 ‡	¹²² Rb	83.000±2.620 †	¹²² Sr	56.570±2.340
⁹⁷ As	-3.660±1.160	¹⁰⁵ Se	28.330±1.970	¹¹⁵ Br	75.620±2.630	¹²¹ Kr	98.630±2.770 †	¹²³ Rb	90.690±2.730 ‡	¹²³ Sr	65.550±2.520 †
⁹⁸ As	3.870±1.280	¹⁰⁶ Se	33.920±2.040	¹¹⁶ Br	83.280±2.630	¹²² Kr	106.470±2.870 ‡	¹²⁴ Rb	100.100±2.840 †	¹²⁴ Sr	72.680±2.590
⁹⁹ As	9.220±1.410	¹⁰⁷ Se	42.290±2.200 †	¹¹⁷ Br	89.630±2.670	¹²³ Kr	116.440±3.020 †	¹²⁵ Rb	107.990±2.930 ‡	¹²⁵ Sr	82.090±2.650 †
¹⁰⁰ As	16.680±1.520	¹⁰⁸ Se	48.020±2.330	¹¹⁸ Br	99.410±2.800 †	¹²⁴ Kr	124.330±3.150 ‡	¹²⁶ Rb	117.610±2.960 †	¹²⁶ Sr	89.350±2.750 ‡
¹⁰¹ As	22.280±1.630	¹⁰⁹ Se	56.540±2.430 †	¹¹⁹ Br	107.860±2.810 †	¹²⁵ Kr	134.580±3.190 †	¹²⁷ Rb	125.670±3.110 ‡	¹²⁷ Sr	99.100±2.760 †
¹⁰² As	30.010±1.770	¹¹⁰ Se	62.120±2.410	¹²⁰ Br	117.690±2.970 †	¹²⁶ Kr	142.510±3.330 ‡	¹²⁸ Rb	135.390±3.220 †	¹²⁸ Sr	106.480±2.980 ‡
¹⁰³ As	35.600±1.850	¹¹¹ Se	70.430±2.530 †	¹²¹ Br	126.070±3.010 †	¹²⁷ Kr	152.910±3.370 †	¹²⁹ Rb	143.600±3.290 †	¹²⁹ Sr	116.190±3.030 †
¹⁰⁴ As	43.620±2.090	¹¹² Se	76.350±2.530	¹²² Br	136.190±3.140 †	¹²⁸ Kr	161.130±3.510 †	¹³⁰ Rb	153.370±3.390 †	¹³⁰ Sr	123.820±3.110 ‡
¹⁰⁵ As	49.810±2.170	¹¹³ Se	84.850±2.680 †	¹²³ Br	144.640±3.300 †	¹²⁹ Kr	171.480±3.610 †	¹³¹ Rb	161.790±3.470 †	¹³¹ Sr	133.520±3.250 †
¹⁰⁶ As	58.290±2.280 †	¹¹⁴ Se	90.890±2.810	¹²⁴ Br	154.880±3.380 †	¹³⁰ Kr	179.970±3.650 †	¹³² Rb	171.790±3.580 †	¹³² Sr	141.350±3.300 ‡
¹⁰⁷ As	64.850±2.430	¹¹⁵ Se	99.160±2.800 †	¹²⁵ Br	163.450±3.540 †	¹³¹ Kr	190.560±3.790 †	¹³³ Rb	180.540±3.720 †	¹³³ Sr	151.450±3.430 †
¹⁰⁸ As	73.240±2.560 †	¹¹⁶ Se	105.540±2.900	¹²⁶ Br	173.730±3.590 †	¹³² Kr	199.210±3.890 †	¹³⁴ Rb	191.090±3.850 †	¹³⁴ Sr	159.820±3.550 †
¹⁰⁹ As	79.820±2.650	¹¹⁷ Se	115.970±2.940 †	¹²⁷ Br	182.610±3.650 †	¹³³ Kr	210.130±4.050 †	¹³⁵ Rb	200.130±4.010 †	¹³⁵ Sr	170.170±3.670 †
¹¹⁰ As	87.970±2.680 †	¹¹⁸ Se	124.610±3.040 †	⁵⁹ Kr	79.080±1.560 †	¹³⁴ Kr	219.380±4.220 †	¹³⁶ Rb	210.960±4.180 †	¹³⁶ Sr	178.890±3.900 †
¹¹¹ As	94.630±2.700	¹¹⁹ Se	135.130±3.090 †	⁶⁰ Kr	62.620±1.490 †	¹³⁵ Kr	230.530±4.330 †	¹³⁷ Rb	220.340±4.260 †	¹³⁷ Sr	189.500±3.960 †
¹¹² As	103.170±2.800 †	¹²⁰ Se	143.680±3.200 †	⁶¹ Kr	50.120±1.480 †	¹³⁶ Kr	240.130±4.500 †	⁶³ Sr	76.640±1.950 †	¹³⁸ Sr	198.280±4.040 †
¹¹³ As	110.000±2.910	¹²¹ Se	154.340±3.290 †	⁶² Kr	34.920±1.440 †	⁶⁴ Rb	36.510±1.410 †	⁶⁴ Sr	59.920±1.650 †	¹³⁹ Sr	209.150±4.110 †
¹¹⁴ As	118.400±2.970 †	¹²² Se	162.930±3.420 †	⁶³ Kr	23.790±1.430 †	⁶⁵ Rb	22.600±1.260 †	⁶⁵ Sr	47.530±1.470 †	¹⁴⁰ Sr	218.340±4.260 †
¹¹⁵ As	125.400±3.060	¹²³ Se	173.740±3.540 †	⁶⁴ Kr	9.780±1.190 †	⁶⁶ Rb	12.550±1.060 †	⁶⁶ Sr	32.270±1.250 †	¹⁴¹ Sr	229.340±4.390 †
¹¹⁶ As	135.860±3.150 †	¹²⁴ Se	182.300±3.720 †	⁶⁵ Kr	1.080±1.050 †	⁶⁷ Rb	1.690±0.950 †	⁶⁷ Sr	22.230±1.130 †	¹⁴² Sr	238.760±4.530 †
¹¹⁷ As	145.150±3.160 †	¹²⁵ Se	193.210±3.790 †	⁶⁶ Kr	-9.780±0.880 †	⁶⁸ Rb	-6.470±0.810 †	⁶⁸ Sr	10.500±0.980 †	⁶⁸ Y	35.070±1.150 †
¹¹⁸ As	155.860±3.310 †	¹²⁶ Se	201.980±3.870 †	⁶⁷ Kr	-17.070±0.780 †	⁶⁹ Rb	-16.130±0.770 †	⁶⁹ Sr	2.120±0.940 †	⁶⁹ Y	23.130±1.120 †
¹¹⁹ As	165.100±3.320 †	⁶² Br	13.860±1.210 †	⁶⁸ Kr	-26.510±0.660 ‡	⁷⁰ Rb	-23.230±0.780 †	⁷⁰ Sr	-8.550±0.950 †	⁷⁰ Y	13.740±1.140 †
¹²⁰ As	175.920±3.470 †	⁶³ Br	1.220±1.190 †	⁶⁹ Kr	-32.600±0.620	⁷¹ Rb	-31.970±0.750 †	⁷¹ Sr	-15.770±0.930 †	⁷¹ Y	2.950±1.120 †
¹²¹ As	185.060±3.550 †	⁶⁴ Br	-7.580±0.980 †	⁷⁰ Kr	-41.220±0.610	⁷² Rb	-38.030±0.740 †	⁷² Sr	-25.590±0.940 ‡	⁷² Y	-5.360±1.150 †
⁵⁵ Se	80.010±1.600 †	⁶⁵ Br	-17.090±0.860 †	⁷¹ Kr	-46.200±0.580	⁷³ Rb	-45.870±0.720 †	⁷³ Sr	-31.760±0.920	⁷³ Y	-15.290±1.130 †
⁵⁶ Se	63.880±1.380 †	⁶⁶ Br	-24.390±0.710 †	⁷² Kr</							

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
⁸⁶ Y	-79.910±0.610	⁸⁴ Zr	-71.260±0.560	⁸² Nb	-50.610±0.970	⁷⁷ Mo	3.880±1.340 †	¹⁵² Mo	217.260±4.400 †	¹⁴⁸ Tc	154.460±3.730 †
⁸⁷ Y	-83.440±0.610	⁸⁵ Zr	-73.110±0.560	⁸³ Nb	-56.990±0.890	⁷⁸ Mo	-7.110±1.140 †	¹⁵³ Mo	227.790±4.510 †	¹⁴⁹ Tc	162.900±3.880 †
⁸⁸ Y	-84.460±0.550	⁸⁶ Zr	-78.020±0.550	⁸⁴ Nb	-60.480±0.830	⁷⁹ Mo	-14.440±1.130 †	¹⁵⁴ Mo	236.880±4.600 †	¹⁵⁰ Tc	172.410±3.990 †
⁸⁹ Y	-87.450±0.560	⁸⁷ Zr	-79.790±0.550	⁸⁵ Nb	-65.890±0.680	⁸⁰ Mo	-24.500±1.140 ‡	⁷⁶ Tc	37.040±1.570 †	¹⁵¹ Tc	180.760±4.000 †
⁹⁰ Y	-86.520±0.510	⁸⁸ Zr	-84.130±0.560	⁸⁶ Nb	-68.910±0.620	⁸¹ Mo	-31.120±1.130 ‡	⁷⁷ Tc	24.870±1.570 †	¹⁵² Tc	190.510±4.150 †
⁹¹ Y	-86.580±0.580	⁸⁹ Zr	-85.380±0.590	⁸⁷ Nb	-73.920±0.530	⁸² Mo	-39.870±0.930	⁷⁸ Tc	15.550±1.350 †	¹⁵³ Tc	199.180±4.230 †
⁹² Y	-84.870±0.560	⁹⁰ Zr	-89.040±0.570	⁸⁸ Nb	-76.490±0.540	⁸³ Mo	-45.240±0.890	⁷⁹ Tc	4.480±1.340 †	¹⁵⁴ Tc	209.230±4.360 †
⁹³ Y	-84.360±0.590	⁹¹ Zr	-88.180±0.530	⁸⁹ Nb	-81.050±0.610	⁸⁴ Mo	-53.270±0.990	⁸⁰ Tc	-3.690±1.370 †	¹⁵⁵ Tc	218.300±4.460 †
⁹⁴ Y	-82.070±0.630	⁹² Zr	-88.940±0.610	⁹⁰ Nb	-82.980±0.540	⁸⁵ Mo	-56.680±0.900	⁸¹ Tc	-14.020±1.360 †	¹⁵⁶ Tc	228.750±4.510 †
⁹⁵ Y	-81.040±0.540	⁹³ Zr	-87.510±0.690	⁹¹ Nb	-86.730±0.570	⁸⁶ Mo	-63.260±0.800	⁸² Tc	-21.370±1.130 †	¹⁵⁷ Tc	237.810±4.610 †
⁹⁶ Y	-77.900±0.560	⁹⁴ Zr	-87.610±0.670	⁹² Nb	-86.570±0.560	⁸⁷ Mo	-66.380±0.720	⁸³ Tc	-30.510±1.110 †	⁷⁴ Ru	84.780±2.060 †
⁹⁷ Y	-76.330±0.640	⁹⁵ Zr	-85.570±0.700	⁹³ Nb	-87.600±0.680	⁸⁸ Mo	-72.190±0.650	⁸⁴ Tc	-36.750±0.930 †	⁷⁵ Ru	72.830±1.820 †
⁹⁸ Y	-72.500±0.650	⁹⁶ Zr	-85.170±0.600	⁹⁴ Nb	-86.780±0.650	⁸⁹ Mo	-74.990±0.640	⁸⁵ Tc	-44.710±0.910 †	⁷⁶ Ru	58.490±1.800 †
⁹⁹ Y	-70.640±0.620	⁹⁷ Zr	-82.290±0.700	⁹⁵ Nb	-87.130±0.700	⁹⁰ Mo	-80.220±0.570	⁸⁶ Tc	-50.630±1.040	⁷⁷ Ru	47.840±1.810 †
¹⁰⁰ Y	-67.010±0.580	⁹⁸ Zr	-81.200±0.660	⁹⁶ Nb	-85.710±0.780	⁹¹ Mo	-82.230±0.510	⁸⁷ Tc	-57.300±0.920	⁷⁸ Ru	34.760±1.560 †
¹⁰¹ Y	-65.060±0.550	⁹⁹ Zr	-77.690±0.660	⁹⁷ Nb	-85.580±0.700	⁹² Mo	-86.670±0.540	⁸⁸ Tc	-61.230±0.870	⁷⁹ Ru	25.360±1.570 †
¹⁰² Y	-61.000±0.690	¹⁰⁰ Zr	-76.760±0.600	⁹⁸ Nb	-83.180±0.760	⁹³ Mo	-86.780±0.570	⁸⁹ Tc	-67.270±0.800	⁸⁰ Ru	13.440±1.610 †
¹⁰³ Y	-59.010±0.680	¹⁰¹ Zr	-73.110±0.570	⁹⁹ Nb	-82.410±0.630	⁹⁴ Mo	-88.430±0.580	⁹⁰ Tc	-70.740±0.690	⁸¹ Ru	5.010±1.620 †
¹⁰⁴ Y	-54.330±0.850	¹⁰² Zr	-71.980±0.570	¹⁰⁰ Nb	-79.830±0.750	⁹⁵ Mo	-87.860±0.630	⁹¹ Tc	-76.060±0.600	⁸² Ru	-6.050±1.350 †
¹⁰⁵ Y	-51.490±1.000	¹⁰³ Zr	-68.190±0.490	¹⁰¹ Nb	-78.880±0.620	⁹⁶ Mo	-88.840±0.720	⁹² Tc	-78.760±0.530	⁸³ Ru	-13.800±1.330 †
¹⁰⁶ Y	-46.190±1.100	¹⁰⁴ Zr	-66.730±0.640	¹⁰² Nb	-76.040±0.600	⁹⁷ Mo	-87.690±0.740	⁹³ Tc	-83.470±0.560	⁸⁴ Ru	-23.800±1.130 ‡
¹⁰⁷ Y	-42.910±1.190	¹⁰⁵ Zr	-62.030±0.810	¹⁰³ Nb	-75.180±0.530	⁹⁸ Mo	-88.030±0.680	⁹⁴ Tc	-84.200±0.510	⁸⁵ Ru	-29.960±1.120 ‡
¹⁰⁸ Y	-37.500±1.300	¹⁰⁶ Zr	-59.780±0.940	¹⁰⁴ Nb	-71.920±0.570	⁹⁹ Mo	-85.940±0.640	⁹⁵ Tc	-86.100±0.640	⁸⁶ Ru	-39.080±0.950
¹⁰⁹ Y	-33.830±1.400	¹⁰⁷ Zr	-54.600±1.010	¹⁰⁵ Nb	-70.450±0.690	¹⁰⁰ Mo	-86.110±0.710	⁹⁶ Tc	-86.150±0.760	⁸⁷ Ru	-45.100±0.920
¹¹⁰ Y	-28.200±1.350	¹⁰⁸ Zr	-52.150±1.120	¹⁰⁶ Nb	-66.330±0.820	¹⁰¹ Mo	-83.510±0.710	⁹⁷ Tc	-87.400±0.810	⁸⁸ Ru	-53.810±1.020
¹¹¹ Y	-24.270±1.400	¹⁰⁹ Zr	-46.610±1.180	¹⁰⁷ Nb	-64.200±0.920	¹⁰² Mo	-83.370±0.700	⁹⁸ Tc	-86.720±0.820	⁸⁹ Ru	-57.960±0.940
¹¹² Y	-18.180±1.510	¹¹⁰ Zr	-43.950±1.170	¹⁰⁸ Nb	-59.860±1.020	¹⁰³ Mo	-80.800±0.640	⁹⁹ Tc	-87.380±0.750	⁹⁰ Ru	-64.680±0.850
¹¹³ Y	-13.950±1.580	¹¹¹ Zr	-38.160±1.210	¹⁰⁹ Nb	-57.270±1.100	¹⁰⁴ Mo	-80.480±0.600	¹⁰⁰ Tc	-86.230±0.830	⁹¹ Ru	-68.220±0.770
¹¹⁴ Y	-7.840±1.680	¹¹² Zr	-34.960±1.260	¹¹⁰ Nb	-52.740±1.050	¹⁰⁵ Mo	-77.200±0.630	¹⁰¹ Tc	-86.380±0.790	⁹² Ru	-74.240±0.690
¹¹⁵ Y	-3.800±1.710	¹¹³ Zr	-28.910±1.380	¹¹¹ Nb	-49.920±1.080	¹⁰⁶ Mo	-76.320±0.660	¹⁰² Tc	-84.590±0.820	⁹³ Ru	-77.210±0.640
¹¹⁶ Y	2.200±1.810	¹¹⁴ Zr	-25.470±1.450	¹¹² Nb	-44.860±1.130	¹⁰⁷ Mo	-72.320±0.800	¹⁰³ Tc	-84.720±0.840	⁹⁴ Ru	-82.540±0.570
¹¹⁷ Y	6.510±1.750	¹¹⁵ Zr	-19.490±1.480	¹¹³ Nb	-41.710±1.190	¹⁰⁸ Mo	-71.020±0.940	¹⁰⁴ Tc	-82.690±0.730	⁹⁵ Ru	-83.520±0.660
¹¹⁸ Y	12.790±1.890	¹¹⁶ Zr	-16.070±1.530	¹¹⁴ Nb	-36.440±1.330	¹⁰⁹ Mo	-66.540±0.970	¹⁰⁵ Tc	-82.340±0.800	⁹⁶ Ru	-86.040±0.740
¹¹⁹ Y	17.210±1.880	¹¹⁷ Zr	-10.100±1.580	¹¹⁵ Nb	-33.130±1.320	¹¹⁰ Mo	-64.970±0.940	¹⁰⁶ Tc	-79.660±0.640	⁹⁷ Ru	-86.360±0.730
¹²⁰ Y	23.310±1.920	¹¹⁸ Zr	-6.440±1.590	¹¹⁶ Nb	-27.770±1.350	¹¹¹ Mo	-60.270±0.960	¹⁰⁷ Tc	-78.890±0.710	⁹⁸ Ru	-88.080±0.760
¹²¹ Y	27.960±1.980	¹¹⁹ Zr	-0.350±1.640	¹¹⁷ Nb	-24.380±1.370	¹¹² Mo	-58.190±0.990	¹⁰⁸ Tc	-75.720±0.880	⁹⁹ Ru	-87.730±0.820
¹²² Y	36.150±2.120 †	¹²⁰ Zr	3.380±1.730	¹¹⁸ Nb	-19.060±1.500	¹¹³ Mo	-53.170±1.060	¹⁰⁹ Tc	-74.290±0.870	¹⁰⁰ Ru	-89.320±0.760
¹²³ Y	43.060±2.230	¹²¹ Zr	9.310±1.720	¹¹⁹ Nb	-15.590±1.410	¹¹⁴ Mo	-50.800±1.140	¹¹⁰ Tc	-70.830±0.790	¹⁰¹ Ru	-88.150±0.820
¹²⁴ Y	51.480±2.370 †	¹²² Zr	13.420±1.830	¹²⁰ Nb	-10.190±1.560	¹¹⁵ Mo	-45.680±1.210	¹¹¹ Tc	-69.080±0.830	¹⁰² Ru	-89.110±0.870
¹²⁵ Y	58.610±2.390	¹²³ Zr	21.470±1.980	¹²¹ Nb	-6.620±1.620	¹¹⁶ Mo	-42.980±1.220	¹¹² Tc	-65.130±0.810	¹⁰³ Ru	-87.590±0.840
¹²⁶ Y	67.390±2.450 †	¹²⁴ Zr	27.820±2.060	¹²² Nb	-1.240±1.630	¹¹⁷ Mo	-37.650±1.230	¹¹³ Tc	-63.080±0.870	¹⁰⁴ Ru	-88.260±0.810
¹²⁷ Y	74.770±2.530 ‡	¹²⁵ Zr	36.240±2.150 †	¹²³ Nb	2.730±1.750	¹¹⁸ Mo	-34.910±1.310	¹¹⁴ Tc	-58.850±0.930	¹⁰⁵ Ru	-86.210±0.900
¹²⁸ Y	83.850±2.620 ‡	¹²⁶ Zr	42.740±2.190	¹²⁴ Nb	10.210±1.860	¹¹⁹ Mo	-29.780±1.350	¹¹⁵ Tc	-56.620±0.960	¹⁰⁶ Ru	-86.450±0.750
¹²⁹ Y	91.220±2.770 ‡	¹²⁷ Zr	51.640±2.230 †	¹²⁵ Nb	16.560±1.890	¹²⁰ Mo	-27.000±1.340	¹¹⁶ Tc	-52.110±1.060	¹⁰⁷ Ru	-83.880±0.660
¹³⁰ Y	100.350±2.820 †	¹²⁸ Zr	58.350±2.370	¹²⁶ Nb	24.350±2.000	¹²¹ Mo	-21.760±1.440	¹¹⁷ Tc	-49.440±1.020	¹⁰⁸ Ru	-83.940±0.790
¹³¹ Y	107.910±2.930 ‡	¹²⁹ Zr	67.410±2.400 †	¹²⁷ Nb	30.970±2.000	¹²² Mo	-18.740±1.510	¹¹⁸ Tc	-44.770±1.070	¹⁰⁹ Ru	-80.650±0.820
¹³² Y	117.020±3.050 †	¹³⁰ Zr	74.210±2.550	¹²⁸ Nb	39.210±2.100 †	¹²³ Mo	-13.500±1.510	¹¹⁹ Tc	-42.210±1.090	¹¹⁰ Ru	-80.230±0.700
¹³³ Y	124.950±3.130 ‡	¹³¹ Zr	83.270±2.650 †	¹²⁹ Nb	45.900±2.180	¹²⁴ Mo	-10.100±1.610	¹²⁰ Tc	-37.770±1.220	¹¹¹ Ru	-76.590±0.710
¹³⁴ Y	134.680±3.230 †	¹³² Zr	90.240±2.740	¹³⁰ Nb	54.390±2.200 †	¹²⁵ Mo	-2.610±1.660	¹²¹ Tc	-35.160±1.160	¹¹² Ru	-75.590±0.750
¹³⁵ Y	142.850±3.350 †	¹³³ Zr	99.450±2.870 †	¹³¹ Nb	61.110±2.400	¹²⁶ Mo	3.110±1.700	¹²² Tc	-30.470±1.310	¹¹³ Ru	-71.670±0.750
¹³⁶ Y	152.870±3.520 †	¹³⁴ Zr	107.010±2.910 ‡	¹³² Nb	69.580±2.480 †	¹²⁷ Mo	11.020±1.780	¹²³ Tc	-27.590±1.360	¹¹⁴ Ru	-70.420±0.750
¹³⁷ Y	161.370±3.650 †	¹³⁵ Zr	116.530±3.020 †	¹³³ Nb	76.650±2.600	¹²⁸ Mo	16.970±1.860	¹²⁴ Tc	-22.910±1.320	¹¹⁵ Ru	-66.320±0.790
¹³⁸ Y	171.370±3.710 †	¹³⁶ Zr	124.370±3.190 ‡	¹³⁴ Nb	85.490±2.690 †	¹²⁹ Mo	25.190±1.890 †	¹²⁵ Tc	-19.500±1.360	¹¹⁶ Ru	-64.710±0.810
¹³⁹ Y	180.210±3.830 †	¹³⁷ Zr	134.170±3.270 †	¹³⁵ Nb	92.840±2.730 ‡	¹³⁰ Mo	31.320±1.980	¹²⁶ Tc	-12.640±1.400	¹¹⁷ Ru	-60.220±0.880
¹⁴⁰ Y	190.500±3.910 †	¹³⁸ Zr	142.070±3.400 ‡	¹³⁶ Nb	102.040±2.890 †	¹³¹ Mo	39.730±2.040 †	¹²⁷ Tc	-6.810±1.430	¹¹⁸ Ru	-58.210±0.890
¹⁴¹ Y	199.560±4.030 †	¹³⁹ Zr	152.130±3.500 †	¹³⁷ Nb	109.660±2.960 ‡	¹³² Mo	45.860±2.190	¹²⁸ Tc	0.440±1.580	¹¹⁹ Ru	-53.720±0.900
¹⁴² Y	209.960±4.200 †	¹⁴⁰ Zr	160.390±3.630 †	¹³⁸ Nb	118.860±3.050 †	¹³³ Mo	54.430±2.310 †	¹²⁹ Tc	6.380±1.590	¹²⁰ Ru	-51.850±0.970
¹⁴³ Y	219.300±4.330 †	¹⁴¹ Zr	170.540±3.680 †	¹³⁹ Nb	126.820±3.210 ‡	¹³⁴ Mo	61.130±2.380	¹³⁰ Tc	14.020±1.630	¹²¹ Ru	-47.580±1.070
⁶⁷ Zr	73.430±1.530 †	¹⁴² Zr	179.000±3.850 †	¹⁴⁰ Nb	136.300±3.320 †	¹³⁵ Mo	69.760±2.490 †	¹³¹ Tc	20.070±1.760	¹²² Ru	-45.510±1.050
⁶⁸ Zr	57.310±1.340 †	¹⁴³ Zr	189.320±4.010 †	¹⁴¹ Nb	144.420±3.400 †	¹³⁶ Mo	76.790±2.580	¹³² Tc	27.890±1.780	¹²³ Ru	-40.960±1.190
⁶⁹ Zr	46.170±1.300 †	¹⁴⁴ Zr	198.070±4.160 †	¹⁴² Nb	153.970±3.500 †	¹³⁷ Mo	85.760±2.630 †	¹³³ Tc	34.120±1.990	¹²⁴ Ru	-38.650±1.210
⁷⁰ Zr	33.220±1.340 †	¹⁴⁵ Zr	208.350±4.280 †	¹⁴³ Nb	162.350±3.650 †	¹³⁸ Mo	92.790±2.700	¹³⁴ Tc	42.320±2.050 †	¹²⁵ Ru	-33.970±1.170
⁷¹ Zr	23.700±1.330 †	¹⁴⁶ Zr	217.580±4.490 †	¹⁴⁴ Nb	172.070±3.840 †	¹³⁹ Mo	102.050±2.810 †	¹³⁵ Tc	48.810±2.160	¹²⁶ Ru	-31.190±1.190
⁷² Zr	11.840±1.370 †	¹⁴⁷ Zr	228.200±4.600 †	¹⁴⁵ Nb	180.730±3.950						

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹³⁹ Ru	57.250±2.220 †	¹³¹ Rh	-15.600±1.360	¹²⁰ Pd	-70.830±0.590	¹¹⁰ Ag	-87.840±0.680	⁹⁷ Cd	-59.480±0.810	¹⁷² Cd	239.420±4.660 †
¹⁴⁰ Ru	63.750±2.370	¹³² Rh	-8.620±1.390	¹²¹ Pd	-67.200±0.660	¹¹¹ Ag	-88.610±0.650	⁹⁸ Cd	-66.430±0.840	⁸⁸ In	38.540±1.830 †
¹⁴¹ Ru	72.290±2.450 †	¹³³ Rh	-3.060±1.520	¹²² Pd	-66.040±0.730	¹¹² Ag	-86.890±0.570	⁹⁹ Cd	-69.090±0.830	⁸⁹ In	26.320±1.840 †
¹⁴² Ru	78.930±2.660	¹³⁴ Rh	4.490±1.540	¹²³ Pd	-62.460±0.810	¹¹³ Ag	-87.080±0.410	¹⁰⁰ Cd	-73.610±0.860	⁹⁰ In	17.180±1.580 †
¹⁴³ Ru	87.590±2.750 †	¹³⁵ Rh	10.150±1.690	¹²⁴ Pd	-61.100±0.820	¹¹⁴ Ag	-85.020±0.500	¹⁰¹ Cd	-75.640±0.740	⁹¹ In	6.180±1.460 †
¹⁴⁴ Ru	94.440±2.880	¹³⁶ Rh	17.820±1.830	¹²⁵ Pd	-57.110±0.880	¹¹⁵ Ag	-84.970±0.450	¹⁰² Cd	-79.400±0.840	⁹² In	-2.320±1.280 †
¹⁴⁵ Ru	103.220±2.950 †	¹³⁷ Rh	23.760±1.900	¹²⁶ Pd	-55.420±0.900	¹¹⁶ Ag	-82.600±0.420	¹⁰³ Cd	-81.040±0.740	⁹³ In	-12.980±1.270 †
¹⁴⁶ Ru	110.610±3.180 †	¹³⁸ Rh	31.240±1.970	¹²⁷ Pd	-51.250±0.870	¹¹⁷ Ag	-82.120±0.470	¹⁰⁴ Cd	-84.240±0.750	⁹⁴ In	-20.720±1.090 †
¹⁴⁷ Ru	119.600±3.320 †	¹³⁹ Rh	37.510±1.990	¹²⁸ Pd	-49.020±0.890	¹¹⁸ Ag	-79.320±0.480	¹⁰⁵ Cd	-84.660±0.900	⁹⁵ In	-30.450±0.980 †
¹⁴⁸ Ru	127.040±3.410 †	¹⁴⁰ Rh	45.360±2.110	¹²⁹ Pd	-42.720±0.900	¹¹⁹ Ag	-78.580±0.450	¹⁰⁶ Cd	-87.000±0.690	⁹⁶ In	-37.250±0.840 †
¹⁴⁹ Ru	136.220±3.590 †	¹⁴¹ Rh	51.730±2.190	¹³⁰ Pd	-38.140±0.970	¹²⁰ Ag	-75.620±0.520	¹⁰⁷ Cd	-86.710±0.500	⁹⁷ In	-46.210±0.810 †
¹⁵⁰ Ru	144.030±3.700 †	¹⁴² Rh	59.670±2.350	¹³¹ Pd	-31.570±1.070	¹²¹ Ag	-74.650±0.530	¹⁰⁸ Cd	-88.890±0.600	⁹⁸ In	-52.240±0.950
¹⁵¹ Ru	153.400±3.780 †	¹⁴³ Rh	66.220±2.500	¹³² Pd	-26.860±1.100	¹²² Ag	-71.560±0.570	¹⁰⁹ Cd	-88.250±0.690	⁹⁹ In	-59.510±0.890
¹⁵² Ru	161.090±3.810 †	¹⁴⁴ Rh	74.300±2.620 †	¹³³ Pd	-19.780±1.160	¹²³ Ag	-70.550±0.720	¹¹⁰ Cd	-90.320±0.690	¹⁰⁰ In	-63.100±0.940
¹⁵³ Ru	170.780±3.970 †	¹⁴⁵ Rh	81.050±2.720	¹³⁴ Pd	-14.600±1.250	¹²⁴ Ag	-67.530±0.810	¹¹¹ Cd	-89.290±0.610	¹⁰¹ In	-67.600±0.850
¹⁵⁴ Ru	178.970±4.050 †	¹⁴⁶ Rh	89.520±2.880 †	¹³⁵ Pd	-7.250±1.300	¹²⁵ Ag	-66.160±0.760	¹¹² Cd	-90.810±0.650	¹⁰² In	-70.440±0.860
¹⁵⁵ Ru	189.010±4.190 †	¹⁴⁷ Rh	96.580±3.010	¹³⁶ Pd	-1.920±1.500	¹²⁶ Ag	-62.800±0.810	¹¹³ Cd	-89.130±0.600	¹⁰³ In	-74.480±0.730
¹⁵⁶ Ru	197.510±4.230 †	¹⁴⁸ Rh	104.990±3.160 †	¹³⁷ Pd	5.530±1.540	¹²⁷ Ag	-61.040±0.790	¹¹⁴ Cd	-90.110±0.580	¹⁰⁴ In	-76.650±0.800
¹⁵⁷ Ru	207.860±4.300 †	¹⁴⁹ Rh	112.550±3.280	¹³⁸ Pd	10.870±1.620	¹²⁸ Ag	-57.490±0.830	¹¹⁵ Cd	-88.180±0.540	¹⁰⁵ In	-79.820±0.830
¹⁵⁸ Ru	216.560±4.440 †	¹⁵⁰ Rh	121.100±3.420 †	¹³⁹ Pd	18.410±1.720	¹²⁹ Ag	-55.280±0.770	¹¹⁶ Cd	-88.750±0.550	¹⁰⁶ In	-80.850±0.730
¹⁵⁹ Ru	227.410±4.470 †	¹⁵¹ Rh	128.760±3.490 †	¹⁴⁰ Pd	24.100±1.770	¹³⁰ Ag	-49.560±0.830	¹¹⁷ Cd	-86.400±0.520	¹⁰⁷ In	-83.300±0.580
¹⁶⁰ Ru	236.520±4.720 †	¹⁵² Rh	137.480±3.600 †	¹⁴¹ Pd	31.810±1.820	¹³¹ Ag	-45.050±0.860	¹¹⁸ Cd	-86.580±0.530	¹⁰⁸ In	-83.830±0.530
¹⁶¹ Ru	247.490±4.760 †	¹⁵³ Rh	145.100±3.640 †	¹⁴² Pd	37.580±2.010	¹³² Ag	-39.060±0.940	¹¹⁹ Cd	-83.960±0.540	¹⁰⁹ In	-85.890±0.610
¹⁶² Ru	256.830±4.770 †	¹⁵⁴ Rh	154.320±3.810 †	¹⁴³ Pd	45.430±2.130	¹³³ Ag	-34.260±1.010	¹²⁰ Cd	-83.910±0.520	¹¹⁰ In	-86.250±0.600
⁸⁰ Rh	38.100±1.860 †	¹⁵⁵ Rh	162.490±3.910 †	¹⁴⁴ Pd	51.400±2.300	¹³⁴ Ag	-27.560±1.040	¹²¹ Cd	-81.120±0.530	¹¹¹ In	-88.160±0.660
⁸¹ Rh	25.920±1.880 †	¹⁵⁶ Rh	171.960±3.990 †	¹⁴⁵ Pd	59.380±2.410	¹³⁵ Ag	-22.570±1.130	¹²² Cd	-80.700±0.480	¹¹² In	-87.870±0.670
⁸² Rh	16.750±1.590 †	¹⁵⁷ Rh	180.380±4.060 †	¹⁴⁶ Pd	65.820±2.570	¹³⁶ Ag	-15.550±1.250	¹²³ Cd	-77.750±0.520	¹¹³ In	-89.420±0.610
⁸³ Rh	5.300±1.570 †	¹⁵⁸ Rh	190.350±4.180 †	¹⁴⁷ Pd	73.970±2.630 †	¹³⁷ Ag	-10.440±1.320	¹²⁴ Cd	-77.300±0.610	¹¹⁴ In	-88.540±0.560
⁸⁴ Rh	-3.310±1.350 †	¹⁵⁹ Rh	199.000±4.220 †	¹⁴⁸ Pd	80.450±2.790	¹³⁸ Ag	-3.600±1.390	¹²⁵ Cd	-74.270±0.660	¹¹⁵ In	-89.650±0.520
⁸⁵ Rh	-13.240±1.340 †	¹⁶⁰ Rh	209.370±4.360 †	¹⁴⁹ Pd	88.980±2.970 †	¹³⁹ Ag	1.810±1.480	¹²⁶ Cd	-73.540±0.610	¹¹⁶ In	-88.330±0.520
⁸⁶ Rh	-20.560±1.140 †	¹⁶¹ Rh	218.390±4.510 †	¹⁵⁰ Pd	95.900±3.050	¹⁴⁰ Ag	8.770±1.610	¹²⁷ Cd	-70.060±0.650	¹¹⁷ In	-88.940±0.550
⁸⁷ Rh	-29.780±1.130 †	¹⁶² Rh	228.970±4.550 †	¹⁵¹ Pd	104.300±3.160 †	¹⁴¹ Ag	14.320±1.590	¹²⁸ Cd	-68.920±0.690	¹¹⁸ In	-87.240±0.530
⁸⁸ Rh	-36.610±0.970 †	¹⁶³ Rh	238.160±4.640 †	¹⁵² Pd	111.310±3.270	¹⁴² Ag	21.400±1.720	¹²⁹ Cd	-65.430±0.720	¹¹⁹ In	-87.600±0.540
⁸⁹ Rh	-45.540±0.950 †	⁷⁸ Pd	85.060±2.030 †	¹⁵³ Pd	119.960±3.380 †	¹⁴³ Ag	27.110±1.870	¹³⁰ Cd	-63.790±0.660	¹²⁰ In	-85.680±0.540
⁹⁰ Rh	-51.620±0.950	⁷⁹ Pd	73.410±2.050 †	¹⁵⁴ Pd	127.110±3.440	¹⁴⁴ Ag	34.380±2.020	¹³¹ Cd	-58.150±0.740	¹²¹ In	-85.790±0.530
⁹¹ Rh	-58.410±0.870	⁸⁰ Pd	59.410±2.130 †	¹⁵⁵ Pd	136.310±3.640 †	¹⁴⁵ Ag	40.250±2.160	¹³² Cd	-54.230±0.790	¹²² In	-83.550±0.520
⁹² Rh	-62.660±0.820	⁸¹ Pd	48.900±2.160 †	¹⁵⁶ Pd	143.920±3.660 †	¹⁴⁶ Ag	47.920±2.330	¹³³ Cd	-48.140±0.870	¹²³ In	-83.270±0.500
⁹³ Rh	-68.940±0.730	⁸² Pd	35.990±1.830 †	¹⁵⁷ Pd	153.300±3.770 †	¹⁴⁷ Ag	54.040±2.400	¹³⁴ Cd	-43.710±0.890	¹²⁴ In	-80.890±0.540
⁹⁴ Rh	-72.530±0.650	⁸³ Pd	26.430±1.820 †	¹⁵⁸ Pd	161.340±3.880 †	¹⁴⁸ Ag	61.600±2.470	¹³⁵ Cd	-37.210±0.940	¹²⁵ In	-80.430±0.480
⁹⁵ Rh	-78.110±0.640	⁸⁴ Pd	14.110±1.570 †	¹⁵⁹ Pd	171.260±3.920 †	¹⁴⁹ Ag	68.200±2.660	¹³⁶ Cd	-32.550±1.040	¹²⁶ In	-78.030±0.560
⁹⁶ Rh	-79.710±0.690	⁸⁵ Pd	5.580±1.580 †	¹⁶⁰ Pd	179.430±4.080 †	¹⁵⁰ Ag	76.090±2.800	¹³⁷ Cd	-25.750±1.060	¹²⁷ In	-77.180±0.460
⁹⁷ Rh	-82.500±0.670	⁸⁶ Pd	-5.510±1.360 †	¹⁶¹ Pd	189.710±4.120 †	¹⁵¹ Ag	82.870±2.850	¹³⁸ Cd	-21.250±1.160	¹²⁸ In	-74.370±0.520
⁹⁸ Rh	-83.300±0.700	⁸⁷ Pd	-12.940±1.350 †	¹⁶² Pd	198.340±4.260 †	¹⁵² Ag	90.620±2.980	¹³⁹ Cd	-14.340±1.240	¹²⁹ In	-73.250±0.480
⁹⁹ Rh	-85.340±0.760	⁸⁸ Pd	-22.960±1.170 †	¹⁶³ Pd	208.770±4.380 †	¹⁵³ Ag	97.560±3.100	¹⁴⁰ Cd	-9.520±1.370	¹³⁰ In	-70.330±0.490
¹⁰⁰ Rh	-85.910±0.820	⁸⁹ Pd	-30.010±1.150 †	¹⁶⁴ Pd	217.610±4.360 †	¹⁵⁴ Ag	105.740±3.230 †	¹⁴¹ Cd	-2.690±1.430	¹³¹ In	-68.760±0.480
¹⁰¹ Rh	-87.490±0.690	⁹⁰ Pd	-39.620±0.970	¹⁶⁵ Pd	228.370±4.480 †	¹⁵⁵ Ag	112.880±3.290	¹⁴² Cd	2.260±1.480	¹³² In	-63.710±0.580
¹⁰² Rh	-87.130±0.820	⁹¹ Pd	-45.770±0.880	¹⁶⁶ Pd	237.430±4.640 †	¹⁵⁶ Ag	121.510±3.410 †	¹⁴³ Cd	9.290±1.580	¹³³ In	-59.690±0.660
¹⁰³ Rh	-88.360±0.790	⁹² Pd	-54.370±0.970	¹⁶⁷ Pd	248.380±4.720 †	¹⁵⁷ Ag	129.020±3.470 †	¹⁴⁴ Cd	14.380±1.740	¹³⁴ In	-53.980±0.680
¹⁰⁴ Rh	-87.380±0.800	⁹³ Pd	-58.890±0.890	¹⁶⁸ Pd	257.460±4.840 †	¹⁵⁸ Ag	138.030±3.620 †	¹⁴⁵ Cd	21.550±1.860	¹³⁵ In	-49.750±0.750
¹⁰⁵ Rh	-88.030±0.860	⁹⁴ Pd	-65.790±0.750	⁸⁴ Ag	38.700±1.810 †	¹⁵⁹ Ag	146.020±3.640 †	¹⁴⁶ Cd	27.110±2.060	¹³⁶ In	-43.570±0.790
¹⁰⁶ Rh	-86.570±0.640	⁹⁵ Pd	-69.630±0.770	⁸⁵ Ag	26.450±1.820 †	¹⁶⁰ Ag	155.470±3.780 †	¹⁴⁷ Cd	34.460±2.130	¹³⁷ In	-39.130±0.830
¹⁰⁷ Rh	-86.930±0.610	⁹⁶ Pd	-75.830±0.680	⁸⁶ Ag	16.760±1.580 †	¹⁶¹ Ag	163.540±3.850 †	¹⁴⁸ Cd	39.990±2.220	¹³⁸ In	-32.940±0.870
¹⁰⁸ Rh	-85.190±0.620	⁹⁷ Pd	-77.700±0.690	⁸⁷ Ag	5.570±1.580 †	¹⁶² Ag	173.430±3.880 †	¹⁴⁹ Cd	47.680±2.320	¹³⁹ In	-28.370±0.960
¹⁰⁹ Rh	-85.120±0.650	⁹⁸ Pd	-80.960±0.730	⁸⁸ Ag	-2.660±1.380 †	¹⁶³ Ag	181.910±4.110 †	¹⁵⁰ Cd	53.630±2.460	¹⁴⁰ In	-22.050±1.120
¹¹⁰ Rh	-82.830±0.630	⁹⁹ Pd	-82.080±0.740	⁸⁹ Ag	-12.900±1.370 †	¹⁶⁴ Ag	191.990±4.100 †	¹⁵¹ Cd	61.390±2.570	¹⁴¹ In	-17.360±1.150
¹¹¹ Rh	-82.250±0.560	¹⁰⁰ Pd	-85.060±0.750	⁹⁰ Ag	-20.640±1.160 †	¹⁶⁵ Ag	200.720±4.190 †	¹⁵² Cd	67.510±2.670	¹⁴² In	-11.140±1.280
¹¹² Rh	-79.350±0.610	¹⁰¹ Pd	-85.610±0.690	⁹¹ Ag	-30.320±1.060 †	¹⁶⁶ Ag	211.040±4.270 †	¹⁵³ Cd	75.190±2.810	¹⁴³ In	-6.270±1.310
¹¹³ Rh	-78.380±0.670	¹⁰² Pd	-88.000±0.730	⁹² Ag	-37.170±0.920 †	¹⁶⁷ Ag	220.090±4.440 †	¹⁵⁴ Cd	81.660±2.930	¹⁴⁴ In	0.170±1.400
¹¹⁴ Rh	-75.260±0.650	¹⁰³ Pd	-87.910±0.750	⁹³ Ag	-46.040±0.900 †	¹⁶⁸ Ag	230.400±4.490 †	¹⁵⁵ Cd	89.820±3.070 †	¹⁴⁵ In	5.170±1.550
¹¹⁵ Rh	-74.140±0.630	¹⁰⁴ Pd	-89.670±0.720	⁹⁴ Ag	-51.970±0.880	¹⁶⁹ Ag	239.630±4.630 †	¹⁵⁶ Cd	96.400±3.070	¹⁴⁶ In	12.030±1.750
¹¹⁶ Rh	-70.660±0.720	¹⁰⁵ Pd	-88.670±0.810	⁹⁵ Ag	-59.120±0.810	⁸² Cd	85.640±2.350 †	¹⁵⁷ Cd	104.930±3.220 †	¹⁴⁷ In	17.270±1.850
¹¹⁷ Rh	-69.070±0.690	¹⁰⁶ Pd	-89.910±0.640	⁹⁶ Ag	-63.580±0.770	⁸³ Cd	74.010±2.370 †	¹⁵⁸ Cd	112.080±3.340	¹⁴⁸ In	24.030±1.940
¹¹⁸ Rh	-65.240±0.760	¹⁰⁷ Pd	-88.570±0.600	⁹⁷ Ag	-70.050±0.710	⁸⁴ Cd	59.840±2.060 †	¹⁵⁹ Cd	121.030±3.400 †	¹⁴⁹ In	29.680±2.050
¹¹⁹ Rh	-63.410±0.730	¹⁰⁸ Pd	-89.760±0.								

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁶² In	123.550±3.310 †	¹⁴⁷ Sn	0.270±1.650	¹³⁹ Sb	-52.200±0.640	¹²⁷ Te	-88.110±0.660	¹¹⁸ I	-81.110±0.500	¹⁰⁶ Xe	-30.320±1.170 †
¹⁶³ In	131.090±3.440 ‡	¹⁴⁸ Sn	4.920±1.750	¹⁴⁰ Sb	-46.530±0.800	¹²⁸ Te	-88.830±0.630	¹¹⁹ I	-83.700±0.470	¹⁰⁷ Xe	-35.790±1.090 †
¹⁶⁴ In	140.470±3.450 ‡	¹⁴⁹ Sn	11.800±1.870	¹⁴¹ Sb	-42.670±0.780	¹²⁹ Te	-87.000±0.600	¹²⁰ I	-83.950±0.480	¹⁰⁸ Xe	-43.570±1.210 ‡
¹⁶⁵ In	148.500±3.650 ‡	¹⁵⁰ Sn	16.820±1.910	¹⁴² Sb	-37.090±0.930	¹³⁰ Te	-87.400±0.530	¹²¹ I	-86.240±0.500	¹⁰⁹ Xe	-47.130±1.140
¹⁶⁶ In	158.020±3.720 †	¹⁵¹ Sn	23.720±1.950	¹⁴³ Sb	-33.090±1.040	¹³¹ Te	-85.260±0.540	¹²² I	-86.140±0.480	¹¹⁰ Xe	-52.730±0.940
¹⁶⁷ In	166.300±3.780 †	¹⁵² Sn	28.880±2.120	¹⁴⁴ Sb	-27.530±1.110	¹³² Te	-85.370±0.530	¹²³ I	-88.050±0.430	¹¹¹ Xe	-55.400±0.870
¹⁶⁸ In	175.970±3.830 †	¹⁵³ Sn	35.920±2.260	¹⁴⁵ Sb	-23.350±1.140	¹³³ Te	-83.020±0.470	¹²⁴ I	-87.540±0.410	¹¹² Xe	-60.130±0.700
¹⁶⁹ In	184.530±3.990 †	¹⁵⁴ Sn	41.500±2.350	¹⁴⁶ Sb	-17.310±1.290	¹³⁴ Te	-82.320±0.450	¹²⁵ I	-88.900±0.390	¹¹³ Xe	-62.160±0.730
¹⁷⁰ In	194.590±4.010 †	¹⁵⁵ Sn	48.690±2.540	¹⁴⁷ Sb	-12.950±1.400	¹³⁵ Te	-77.740±0.440	¹²⁶ I	-87.990±0.520	¹¹⁴ Xe	-66.630±0.800
¹⁷¹ In	203.190±4.180 †	¹⁵⁶ Sn	54.580±2.580	¹⁴⁸ Sb	-7.000±1.510	¹³⁶ Te	-74.620±0.500	¹²⁷ I	-88.780±0.590	¹¹⁵ Xe	-68.530±0.630
¹⁷² In	213.360±4.330 †	¹⁵⁷ Sn	62.080±2.670	¹⁴⁹ Sb	-2.220±1.660	¹³⁷ Te	-69.660±0.550	¹²⁸ I	-87.570±0.630	¹¹⁶ Xe	-72.750±0.600
¹⁷³ In	222.390±4.400 †	¹⁵⁸ Sn	68.190±2.750	¹⁵⁰ Sb	4.020±1.700	¹³⁸ Te	-66.580±0.550	¹²⁹ I	-88.310±0.530	¹¹⁷ Xe	-74.070±0.510
¹⁷⁴ In	232.680±4.490 †	¹⁵⁹ Sn	76.310±2.880 †	¹⁵¹ Sb	8.890±1.760	¹³⁹ Te	-61.170±0.570	¹³⁰ I	-87.050±0.610	¹¹⁸ Xe	-77.850±0.530
¹⁷⁵ In	242.630±4.610 †	¹⁶⁰ Sn	82.920±3.000	¹⁵² Sb	15.140±1.850	¹⁴⁰ Te	-57.850±0.630	¹³¹ I	-87.520±0.520	¹¹⁹ Xe	-78.570±0.490
		¹⁶¹ Sn	91.300±3.070 †	¹⁵³ Sb	20.240±2.020	¹⁴¹ Te	-52.310±0.610	¹³² I	-85.970±0.600	¹²⁰ Xe	-81.860±0.480
⁸⁶ Sn	85.770±2.310 †	¹⁶² Sn	98.330±3.100	¹⁵⁴ Sb	26.800±2.150	¹⁴² Te	-49.070±0.770	¹³³ I	-85.980±0.530	¹²¹ Xe	-82.270±0.480
⁸⁷ Sn	74.150±2.340 †	¹⁶³ Sn	107.140±3.210 †	¹⁵⁵ Sb	32.370±2.260	¹⁴³ Te	-43.560±0.860	¹³⁴ I	-84.000±0.470	¹²² Xe	-85.110±0.440
⁸⁸ Sn	59.840±2.070 †	¹⁶⁴ Sn	114.320±3.220	¹⁵⁶ Sb	38.990±2.350	¹⁴⁴ Te	-40.150±0.960	¹³⁵ I	-83.500±0.490	¹²³ Xe	-85.150±0.410
⁸⁹ Sn	49.020±2.100 †	¹⁶⁵ Sn	123.610±3.340 †	¹⁵⁷ Sb	44.780±2.450	¹⁴⁵ Te	-34.690±1.050	¹³⁶ I	-79.250±0.470	¹²⁴ Xe	-87.620±0.320
⁹⁰ Sn	36.130±1.800 †	¹⁶⁶ Sn	131.190±3.510 ‡	¹⁵⁸ Sb	51.920±2.580	¹⁴⁶ Te	-30.820±1.150	¹³⁷ I	-76.350±0.430	¹²⁵ Xe	-87.110±0.340
⁹¹ Sn	26.920±1.680 †	¹⁶⁷ Sn	140.700±3.570 †	¹⁵⁹ Sb	57.970±2.580	¹⁴⁷ Te	-25.100±1.190	¹³⁸ I	-71.990±0.440	¹²⁶ Xe	-89.100±0.380
⁹² Sn	15.220±1.480 †	¹⁶⁸ Sn	148.330±3.600 ‡	¹⁶⁰ Sb	65.610±2.800	¹⁴⁸ Te	-21.330±1.310	¹³⁹ I	-68.850±0.420	¹²⁷ Xe	-88.070±0.510
⁹³ Sn	6.440±1.480 †	¹⁶⁹ Sn	158.160±3.680 †	¹⁶¹ Sb	72.130±2.830	¹⁴⁹ Te	-15.250±1.480	¹⁴⁰ I	-64.020±0.510	¹²⁸ Xe	-89.530±0.600
⁹⁴ Sn	-4.830±1.270 †	¹⁷⁰ Sn	166.310±3.780 †	¹⁶² Sb	80.120±2.890	¹⁵⁰ Te	-11.120±1.520	¹⁴¹ I	-60.840±0.510	¹²⁹ Xe	-88.330±0.620
⁹⁵ Sn	-12.820±1.150 †	¹⁷¹ Sn	176.160±3.870 †	¹⁶³ Sb	87.000±2.990	¹⁵¹ Te	-5.020±1.580	¹⁴² I	-55.910±0.570	¹³⁰ Xe	-89.650±0.460
⁹⁶ Sn	-23.180±1.000 ‡	¹⁷² Sn	184.390±4.050 †	¹⁶⁴ Sb	95.460±2.980 †	¹⁵² Te	-0.800±1.670	¹⁴³ I	-52.740±0.680	¹³¹ Xe	-88.460±0.560
⁹⁷ Sn	-30.250±0.970 ‡	¹⁷³ Sn	194.420±4.150 †	¹⁶⁵ Sb	102.540±3.120	¹⁵³ Te	5.390±1.740	¹⁴⁴ I	-47.830±0.740	¹³² Xe	-89.530±0.580
⁹⁸ Sn	-39.680±0.920 ‡	¹⁷⁴ Sn	203.150±4.190 †	¹⁶⁶ Sb	111.380±3.200 †	¹⁵⁴ Te	10.010±1.930	¹⁴⁵ I	-44.510±0.850	¹³³ Xe	-87.870±0.510
⁹⁹ Sn	-46.030±0.900	¹⁷⁵ Sn	213.490±4.360 †	¹⁶⁷ Sb	118.940±3.360 ‡	¹⁵⁵ Te	16.550±2.070	¹⁴⁶ I	-39.360±0.990	¹³⁴ Xe	-88.260±0.490
¹⁰⁰ Sn	-55.430±1.080	¹⁷⁶ Sn	222.770±4.510 †	¹⁶⁸ Sb	127.820±3.410 †	¹⁵⁶ Te	21.550±2.110	¹⁴⁷ I	-35.810±0.990	¹³⁵ Xe	-86.480±0.550
¹⁰¹ Sn	-59.010±1.020	¹⁷⁷ Sn	234.860±4.600 †	¹⁶⁹ Sb	135.610±3.450 ‡	¹⁵⁷ Te	28.080±2.250	¹⁴⁸ I	-30.680±1.060	¹³⁶ Xe	-86.310±0.470
¹⁰² Sn	-64.320±1.000	¹⁷⁸ Sn	245.510±4.720 †	¹⁷⁰ Sb	145.020±3.470 †	¹⁵⁸ Te	33.510±2.370	¹⁴⁹ I	-26.780±1.210	¹³⁷ Xe	-82.280±0.430
¹⁰³ Sn	-67.430±0.860			¹⁷¹ Sb	152.960±3.640 ‡	¹⁵⁹ Te	40.590±2.430	¹⁵⁰ I	-21.350±1.310	¹³⁸ Xe	-79.990±0.400
¹⁰⁴ Sn	-72.000±0.880	⁹⁶ Sb	-0.790±1.160 †	¹⁷² Sb	162.430±3.750 †	¹⁶⁰ Te	46.170±2.530	¹⁵¹ I	-17.360±1.360	¹³⁹ Xe	-75.560±0.430
¹⁰⁵ Sn	-74.160±0.960	⁹⁷ Sb	-11.410±1.130 †	¹⁷³ Sb	170.530±3.870 †	¹⁶¹ Te	53.710±2.640	¹⁵² I	-11.910±1.450	¹⁴⁰ Xe	-73.010±0.490
¹⁰⁶ Sn	-77.920±0.730	⁹⁸ Sb	-18.950±1.080 †	¹⁷⁴ Sb	180.250±3.940 †	¹⁶² Te	59.840±2.660	¹⁵³ I	-7.760±1.540	¹⁴¹ Xe	-68.310±0.380
¹⁰⁷ Sn	-79.060±0.700	⁹⁹ Sb	-28.710±1.060 †	¹⁷⁵ Sb	189.040±4.060 †	¹⁶³ Te	67.680±2.810	¹⁵⁴ I	-2.050±1.620	¹⁴² Xe	-65.730±0.440
¹⁰⁸ Sn	-82.340±0.630	¹⁰⁰ Sb	-35.990±1.050 †	¹⁷⁶ Sb	198.710±4.260 †	¹⁶⁴ Te	74.210±2.790	¹⁵⁵ I	2.560±1.790	¹⁴³ Xe	-60.880±0.550
¹⁰⁹ Sn	-82.750±0.620	¹⁰¹ Sb	-45.370±1.030 †	¹⁷⁷ Sb	207.980±4.300 †	¹⁶⁵ Te	82.560±2.890 †	¹⁵⁶ I	8.540±1.880	¹⁴⁴ Xe	-58.300±0.660
¹¹⁰ Sn	-85.810±0.640	¹⁰² Sb	-50.650±1.090 †	¹⁷⁸ Sb	219.700±4.430 †	¹⁶⁶ Te	89.200±2.990	¹⁵⁷ I	13.440±1.950	¹⁴⁵ Xe	-53.480±0.690
¹¹¹ Sn	-86.010±0.590	¹⁰³ Sb	-56.230±1.050 †	¹⁷⁹ Sb	230.300±4.610 †	¹⁶⁷ Te	98.020±3.050 †	¹⁵⁸ I	19.610±2.140	¹⁴⁶ Xe	-50.470±0.890
¹¹² Sn	-88.650±0.630	¹⁰⁴ Sb	-59.880±1.020 †	¹⁸⁰ Sb	242.200±4.720 †	¹⁶⁸ Te	104.950±3.200	¹⁵⁹ I	24.980±2.170	¹⁴⁷ Xe	-45.650±0.900
¹¹³ Sn	-88.400±0.560	¹⁰⁵ Sb	-64.430±0.960 †	¹⁸¹ Sb	252.690±4.840 †	¹⁶⁹ Te	113.980±3.250 †	¹⁶⁰ I	31.580±2.340	¹⁴⁸ Xe	-42.690±0.930
¹¹⁴ Sn	-89.750±0.560	¹⁰⁶ Sb	-67.180±0.850			¹⁷⁰ Te	121.360±3.240 ‡	¹⁶¹ I	37.060±2.320	¹⁴⁹ Xe	-37.440±1.010
¹¹⁵ Sn	-89.990±0.510	¹⁰⁷ Sb	-71.060±0.670	⁹⁵ Te	31.280±1.520 †	¹⁷¹ Te	130.560±3.330 †	¹⁶² I	44.220±2.430	¹⁵⁰ Xe	-34.180±1.070
¹¹⁶ Sn	-91.720±0.530	¹⁰⁸ Sb	-73.020±0.750	⁹⁶ Te	19.140±1.330 †	¹⁷² Te	138.130±3.540 ‡	¹⁶³ I	50.200±2.530	¹⁵¹ Xe	-28.890±1.180
¹¹⁷ Sn	-90.440±0.490	¹⁰⁹ Sb	-76.170±0.650	⁹⁷ Te	10.260±1.310 †	¹⁷³ Te	147.460±3.580 †	¹⁶⁴ I	57.690±2.550	¹⁵² Xe	-25.550±1.270
¹¹⁸ Sn	-91.690±0.520	¹¹⁰ Sb	-77.590±0.640	⁹⁸ Te	-0.840±1.250 †	¹⁷⁴ Te	155.260±3.670 ‡	¹⁶⁵ I	64.110±2.650	¹⁵³ Xe	-20.170±1.330
¹¹⁹ Sn	-90.180±0.500	¹¹¹ Sb	-80.490±0.690	⁹⁹ Te	-8.710±1.240 †	¹⁷⁵ Te	165.040±3.820 †	¹⁶⁶ I	72.020±2.710	¹⁵⁴ Xe	-16.480±1.420
¹²⁰ Sn	-91.240±0.510	¹¹² Sb	-81.420±0.650	¹⁰⁰ Te	-19.400±1.230 †	¹⁷⁶ Te	173.150±3.990 †	¹⁶⁷ I	78.640±2.800	¹⁵⁵ Xe	-10.790±1.520
¹²¹ Sn	-89.480±0.470	¹¹³ Sb	-84.110±0.680	¹⁰¹ Te	-26.660±1.220 †	¹⁷⁷ Te	182.820±4.070 †	¹⁶⁸ I	86.820±2.860 †	¹⁵⁶ Xe	-6.750±1.640
¹²² Sn	-90.140±0.520	¹¹⁴ Sb	-84.650±0.610	¹⁰² Te	-36.850±1.070 †	¹⁷⁸ Te	191.710±4.160 †	¹⁶⁹ I	93.910±3.010	¹⁵⁷ Xe	-0.870±1.740
¹²³ Sn	-88.040±0.540	¹¹⁵ Sb	-87.120±0.610	¹⁰³ Te	-42.400±1.050 †	¹⁷⁹ Te	203.380±4.330 †	¹⁷⁰ I	102.530±2.990 †	¹⁵⁸ Xe	3.670±1.850
¹²⁴ Sn	-88.320±0.510	¹¹⁶ Sb	-86.990±0.520	¹⁰⁴ Te	-49.780±1.260	¹⁸⁰ Te	213.560±4.470 †	¹⁷¹ I	109.700±3.050	¹⁵⁹ Xe	9.780±1.970
¹²⁵ Sn	-85.930±0.520	¹¹⁷ Sb	-88.750±0.500	¹⁰⁵ Te	-53.410±1.150	¹⁸¹ Te	225.100±4.580 †	¹⁷² I	118.530±3.170 †	¹⁶⁰ Xe	14.680±2.100
¹²⁶ Sn	-86.110±0.500	¹¹⁸ Sb	-88.110±0.520	¹⁰⁶ Te	-58.560±0.980	¹⁸² Te	235.270±4.740 †	¹⁷³ I	125.960±3.310 ‡	¹⁶¹ Xe	21.180±2.160
¹²⁷ Sn	-83.590±0.580	¹¹⁹ Sb	-89.550±0.540	¹⁰⁷ Te	-61.420±0.900	¹⁸³ Te	247.450±4.870 †	¹⁷⁴ I	134.990±3.310 †	¹⁶² Xe	26.280±2.150
¹²⁸ Sn	-83.400±0.520	¹²⁰ Sb	-88.730±0.550	¹⁰⁸ Te	-66.130±0.860			¹⁷⁵ I	142.840±3.490 ‡	¹⁶³ Xe	33.280±2.330
¹²⁹ Sn	-80.610±0.460	¹²¹ Sb	-89.950±0.530	¹⁰⁹ Te	-67.960±0.770	¹⁰⁰ I	3.260±1.420 †	¹⁷⁶ I	151.950±3.690 †	¹⁶⁴ Xe	38.910±2.320
¹³⁰ Sn	-80.060±0.390	¹²² Sb	-88.740±0.510	¹¹⁰ Te	-72.120±0.560	¹⁰¹ I	-7.410±1.410 †	¹⁷⁷ I	160.050±3.730 †	¹⁶⁵ Xe	46.290±2.450
¹³¹ Sn	-77.220±0.370	¹²³ Sb	-89.540±0.460	¹¹¹ Te	-73.380±0.640	¹⁰² I	-15.480±1.250 †	¹⁷⁸ I	169.340±3.860 †	¹⁶⁶ Xe	52.270±2.500
¹³² Sn	-76.240±0.430	¹²⁴ Sb	-88.010±0.500	¹¹² Te	-77.010±0.690	¹⁰³ I	-25.950±1.240 †	¹⁷⁹ I	178.190±3.990 †	¹⁶⁷ Xe	60.170±2.570
¹³³ Sn	-71.080±0.540	¹²⁵ Sb	-88.280±0.540	¹¹³ Te	-77.990±0.640	¹⁰⁴ I	-32.030±1.170 †	¹⁸⁰ I	189.430±4.120 †	¹⁶⁸ Xe	66.150±2.650
¹³⁴ Sn	-67.440±0.550	¹²⁶ Sb	-86.520±0.600	¹¹⁴ Te	-81.460±0.610	¹⁰⁵ I	-39.390±1.150 †</				

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁸¹ Xe	173.830±3.940 †	¹⁷¹ Cs	71.340±2.670	¹⁵⁷ Ba	-25.140±1.240	¹⁴⁸ La	-63.570±0.540	¹³⁶ Ce	-86.550±0.500	¹³⁰ Pr	-71.480±0.710
¹⁸² Xe	183.330±4.130 †	¹⁷² Cs	79.380±2.760	¹⁵⁸ Ba	-21.560±1.390	¹⁴⁹ La	-61.350±0.660	¹³⁷ Ce	-86.020±0.560	¹³¹ Pr	-74.680±0.720
¹⁸³ Xe	194.550±4.180 †	¹⁷³ Cs	86.030±2.770	¹⁵⁹ Ba	-16.100±1.470	¹⁵⁰ La	-57.630±0.630	¹³⁸ Ce	-87.760±0.560	¹³² Pr	-75.570±0.720
¹⁸⁴ Xe	204.490±4.380 †	¹⁷⁴ Cs	94.420±2.780 †	¹⁶⁰ Ba	-12.090±1.620	¹⁵¹ La	-55.330±0.690	¹³⁹ Ce	-87.070±0.570	¹³³ Pr	-78.180±0.650
¹⁸⁵ Xe	216.010±4.550 †	¹⁷⁵ Cs	101.610±2.990	¹⁶¹ Ba	-6.560±1.710	¹⁵² La	-51.520±0.790	¹⁴⁰ Ce	-88.250±0.590	¹³⁴ Pr	-78.490±0.590
¹⁸⁶ Xe	225.700±4.620 †	¹⁷⁶ Cs	110.020±3.130 †	¹⁶² Ba	-2.140±1.740	¹⁵³ La	-49.120±0.830	¹⁴¹ Ce	-85.470±0.510	¹³⁵ Pr	-80.950±0.560
¹⁸⁷ Xe	237.150±4.770 †	¹⁷⁷ Cs	117.190±3.210	¹⁶³ Ba	3.830±1.860	¹⁵⁴ La	-45.010±0.910	¹⁴² Ce	-84.440±0.480	¹³⁶ Pr	-81.150±0.570
¹⁸⁸ Xe	247.190±4.940 †	¹⁷⁸ Cs	125.920±3.330 †	¹⁶⁴ Ba	8.410±1.810	¹⁵⁵ La	-42.230±1.000	¹⁴³ Ce	-81.420±0.480	¹³⁷ Pr	-83.240±0.480
¹⁰⁴ Cs	6.910±1.570 †	¹⁷⁹ Cs	133.600±3.450 †	¹⁶⁵ Ba	14.960±1.970	¹⁵⁶ La	-37.910±1.020	¹⁴⁴ Ce	-80.270±0.400	¹³⁸ Pr	-83.310±0.570
¹⁰⁵ Cs	-4.070±1.560 †	¹⁸⁰ Cs	142.410±3.580 †	¹⁶⁶ Ba	20.040±2.050	¹⁵⁷ La	-34.900±1.100	¹⁴⁵ Ce	-76.940±0.380	¹³⁹ Pr	-84.990±0.550
¹⁰⁶ Cs	-10.720±1.360 †	¹⁸¹ Cs	150.480±3.670 †	¹⁶⁷ Ba	26.970±2.140	¹⁵⁸ La	-30.240±1.170	¹⁴⁶ Ce	-75.440±0.480	¹⁴⁰ Pr	-84.890±0.560
¹⁰⁷ Cs	-18.790±1.280 †	¹⁸² Cs	161.050±3.850 †	¹⁶⁸ Ba	32.290±2.180	¹⁵⁹ La	-26.710±1.270	¹⁴⁷ Ce	-71.900±0.430	¹⁴¹ Pr	-86.190±0.540
¹⁰⁸ Cs	-25.090±1.160 †	¹⁸³ Cs	170.550±3.920 †	¹⁶⁹ Ba	39.710±2.220	¹⁶⁰ La	-21.730±1.440	¹⁴⁸ Ce	-70.640±0.440	¹⁴² Pr	-84.020±0.430
¹⁰⁹ Cs	-32.740±1.150 †	¹⁸⁴ Cs	181.530±4.110 †	¹⁷⁰ Ba	45.430±2.260	¹⁶¹ La	-17.820±1.460	¹⁴⁹ Ce	-66.920±0.520	¹⁴³ Pr	-83.070±0.420
¹¹⁰ Cs	-38.450±1.170 †	¹⁸⁵ Cs	191.050±4.220 †	¹⁷¹ Ba	53.150±2.310	¹⁶² La	-12.670±1.580	¹⁵⁰ Ce	-65.340±0.540	¹⁴⁴ Pr	-80.640±0.450
¹¹¹ Cs	-43.880±1.030 †	¹⁸⁶ Cs	202.140±4.380 †	¹⁷² Ba	59.240±2.510	¹⁶³ La	-8.410±1.670	¹⁵¹ Ce	-61.760±0.610	¹⁴⁵ Pr	-79.590±0.450
¹¹² Cs	-47.290±0.910 †	¹⁸⁷ Cs	211.670±4.480 †	¹⁷³ Ba	67.140±2.510	¹⁶⁴ La	-2.790±1.670	¹⁵² Ce	-60.110±0.670	¹⁴⁶ Pr	-76.570±0.480
¹¹³ Cs	-52.060±0.810 †	¹⁸⁸ Cs	222.740±4.630 †	¹⁷⁴ Ba	73.490±2.470	¹⁶⁵ La	1.690±1.730	¹⁵³ Ce	-56.360±0.700	¹⁴⁷ Pr	-75.390±0.470
¹¹⁴ Cs	-54.880±0.830	¹⁸⁹ Cs	232.810±4.730 †	¹⁷⁵ Ba	81.940±2.590 †	¹⁶⁶ La	7.800±1.850	¹⁵⁴ Ce	-54.440±0.760	¹⁴⁸ Pr	-72.440±0.440
¹¹⁵ Cs	-59.480±0.810	¹⁹⁰ Cs	243.970±4.830 †	¹⁷⁶ Ba	88.450±2.830	¹⁶⁷ La	12.860±1.930	¹⁵⁵ Ce	-50.350±0.900	¹⁴⁹ Pr	-71.060±0.440
¹¹⁶ Cs	-61.990±0.680	¹⁹¹ Cs	254.040±4.970 †	¹⁷⁷ Ba	96.860±2.840 †	¹⁶⁸ La	19.150±2.000	¹⁵⁶ Ce	-48.130±0.900	¹⁵⁰ Pr	-67.970±0.470
¹¹⁷ Cs	-66.250±0.610	¹⁰³ Ba	39.470±1.850 †	¹⁷⁸ Ba	103.650±2.980	¹⁶⁹ La	24.630±2.040	¹⁵⁷ Ce	-43.900±0.970	¹⁵¹ Pr	-66.540±0.510
¹¹⁸ Cs	-68.220±0.560	¹⁰⁴ Ba	27.180±1.780 †	¹⁷⁹ Ba	112.320±3.130 †	¹⁷⁰ La	31.630±2.030	¹⁵⁸ Ce	-41.270±1.070	¹⁵² Pr	-63.610±0.640
¹¹⁹ Cs	-72.180±0.590	¹⁰⁵ Ba	18.320±1.780 †	¹⁸⁰ Ba	119.580±3.220	¹⁷¹ La	37.150±2.140	¹⁵⁹ Ce	-36.660±1.110	¹⁵³ Pr	-62.030±0.640
¹²⁰ Cs	-73.600±0.540	¹⁰⁶ Ba	6.740±1.560 †	¹⁸¹ Ba	128.040±3.360 †	¹⁷² La	44.490±2.220	¹⁶⁰ Ce	-33.610±1.280	¹⁵⁴ Pr	-58.750±0.670
¹²¹ Cs	-77.050±0.510	¹⁰⁷ Ba	-0.020±1.470 †	¹⁸² Ba	135.790±3.500 †	¹⁷³ La	50.440±2.320	¹⁶¹ Ce	-28.720±1.340	¹⁵⁵ Pr	-56.840±0.740
¹²² Cs	-78.010±0.440	¹⁰⁸ Ba	-8.920±1.350 †	¹⁸³ Ba	146.360±3.570 †	¹⁷⁴ La	58.040±2.300	¹⁶² Ce	-25.200±1.370	¹⁵⁶ Pr	-53.320±0.830
¹²³ Cs	-81.000±0.370	¹⁰⁹ Ba	-15.090±1.330 †	¹⁸⁴ Ba	155.620±3.780 †	¹⁷⁵ La	64.450±2.370	¹⁶³ Ce	-20.200±1.520	¹⁵⁷ Pr	-51.200±0.840
¹²⁴ Cs	-81.590±0.350	¹¹⁰ Ba	-23.750±1.160 †	¹⁸⁵ Ba	166.190±3.880 †	¹⁷⁶ La	72.220±2.530	¹⁶⁴ Ce	-16.290±1.500	¹⁵⁸ Pr	-47.340±0.920
¹²⁵ Cs	-84.060±0.370	¹¹¹ Ba	-29.300±1.030 †	¹⁸⁶ Ba	175.260±3.990 †	¹⁷⁷ La	78.730±2.640	¹⁶⁵ Ce	-10.780±1.620	¹⁵⁹ Pr	-44.760±0.960
¹²⁶ Cs	-84.180±0.440	¹¹² Ba	-37.670±1.150 †	¹⁸⁷ Ba	186.210±4.180 †	¹⁷⁸ La	86.760±2.690	¹⁶⁶ Ce	-6.740±1.650	¹⁶⁰ Pr	-40.620±1.090
¹²⁷ Cs	-86.050±0.470	¹¹³ Ba	-41.120±1.060	¹⁸⁸ Ba	195.360±4.280 †	¹⁷⁹ La	93.500±2.870	¹⁶⁷ Ce	-0.650±1.780	¹⁶¹ Pr	-37.670±1.160
¹²⁸ Cs	-85.690±0.500	¹¹⁴ Ba	-46.680±0.940	¹⁸⁹ Ba	206.460±4.360 †	¹⁸⁰ La	101.750±2.980 †	¹⁶⁸ Ce	3.780±1.820	¹⁶² Pr	-33.170±1.230
¹²⁹ Cs	-87.160±0.640	¹¹⁵ Ba	-49.630±0.900	¹⁹⁰ Ba	215.770±4.520 †	¹⁸¹ La	108.660±3.080	¹⁶⁹ Ce	10.220±1.910	¹⁶³ Pr	-29.800±1.280
¹³⁰ Cs	-86.540±0.650	¹¹⁶ Ba	-54.850±0.880	¹⁹¹ Ba	226.870±4.610 †	¹⁸² La	116.800±3.270 †	¹⁷⁰ Ce	15.290±1.900	¹⁶⁴ Pr	-25.150±1.370
¹³¹ Cs	-87.930±0.510	¹¹⁷ Ba	-57.400±0.740	¹⁹² Ba	236.390±4.800 †	¹⁸³ La	124.540±3.290	¹⁷¹ Ce	22.080±1.930	¹⁶⁵ Pr	-21.350±1.430
¹³² Cs	-87.330±0.590	¹¹⁸ Ba	-62.300±0.740	¹⁰⁹ La	4.000±1.530 †	¹⁸⁴ La	134.870±3.490 †	¹⁷² Ce	27.220±2.080	¹⁶⁶ Pr	-16.280±1.520
¹³³ Cs	-88.300±0.590	¹¹⁹ Ba	-64.460±0.680	¹¹⁰ La	-3.180±1.340 †	¹⁸⁵ La	143.720±3.630 †	¹⁷³ Ce	34.430±2.080	¹⁶⁷ Pr	-12.250±1.550
¹³⁴ Cs	-87.020±0.610	¹²⁰ Ba	-69.110±0.720	¹¹¹ La	-11.680±1.200 †	¹⁸⁶ La	153.850±3.720 †	¹⁷⁴ Ce	40.080±2.130	¹⁶⁸ Pr	-6.800±1.640
¹³⁵ Cs	-87.600±0.600	¹²¹ Ba	-70.700±0.650	¹¹² La	-17.960±1.080 †	¹⁸⁷ La	162.770±3.850 †	¹⁷⁵ Ce	47.730±2.220	¹⁶⁹ Pr	-2.220±1.710
¹³⁶ Cs	-86.160±0.590	¹²² Ba	-74.690±0.620	¹¹³ La	-26.370±1.060 †	¹⁸⁸ La	173.330±4.040 †	¹⁷⁶ Ce	53.470±2.330	¹⁷⁰ Pr	3.810±1.740
¹³⁷ Cs	-86.200±0.620	¹²³ Ba	-75.790±0.580	¹¹⁴ La	-32.300±1.210 †	¹⁸⁹ La	182.510±4.080 †	¹⁷⁷ Ce	61.240±2.370	¹⁷¹ Pr	8.670±1.760
¹³⁸ Cs	-82.770±0.560	¹²⁴ Ba	-79.340±0.550	¹¹⁵ La	-37.990±1.030 †	¹⁹⁰ La	192.860±4.210 †	¹⁷⁸ Ce	67.360±2.510	¹⁷² Pr	15.090±1.870
¹³⁹ Cs	-80.420±0.550	¹²⁵ Ba	-79.940±0.520	¹¹⁶ La	-41.560±1.000 †	¹⁹¹ La	202.100±4.360 †	¹⁷⁹ Ce	75.350±2.600	¹⁷³ Pr	20.090±1.910
¹⁴⁰ Cs	-76.580±0.540	¹²⁶ Ba	-83.030±0.490	¹¹⁷ La	-46.810±0.930 †	¹⁹² La	212.660±4.510 †	¹⁸⁰ Ce	81.670±2.740	¹⁷⁴ Pr	27.000±1.870
¹⁴¹ Cs	-74.160±0.470	¹²⁷ Ba	-83.040±0.460	¹¹⁸ La	-50.010±0.870 †	¹⁹³ La	222.120±4.560 †	¹⁸¹ Ce	89.560±2.860	¹⁷⁵ Pr	32.700±2.030
¹⁴² Cs	-70.070±0.450	¹²⁸ Ba	-85.570±0.450	¹¹⁹ La	-55.090±0.800	¹⁰⁷ Ce	44.540±1.880 †	¹⁸² Ce	96.150±3.020	¹⁷⁶ Pr	39.680±2.170
¹⁴³ Cs	-67.570±0.440	¹²⁹ Ba	-85.220±0.540	¹²⁰ La	-57.940±0.780	¹⁰⁸ Ce	32.020±1.740 †	¹⁸³ Ce	104.280±3.080 †	¹⁷⁷ Pr	45.410±2.140
¹⁴⁴ Cs	-63.300±0.440	¹³⁰ Ba	-87.270±0.550	¹²¹ La	-62.760±0.770	¹⁰⁹ Ce	24.550±1.740 †	¹⁸⁴ Ce	111.790±3.250	¹⁷⁸ Pr	52.800±2.210
¹⁴⁵ Cs	-60.820±0.600	¹³¹ Ba	-86.720±0.500	¹²² La	-64.890±0.740	¹¹⁰ Ce	14.770±1.530 †	¹⁸⁵ Ce	121.710±3.370 †	¹⁷⁹ Pr	58.880±2.410
¹⁴⁶ Cs	-56.310±0.700	¹³² Ba	-88.700±0.550	¹²³ La	-69.040±0.750	¹¹¹ Ce	7.760±1.370 †	¹⁸⁶ Ce	130.110±3.500 †	¹⁸⁰ Pr	66.440±2.450
¹⁴⁷ Cs	-53.630±0.840	¹³³ Ba	-88.010±0.630	¹²⁴ La	-70.700±0.730	¹¹² Ce	-1.470±1.240 †	¹⁸⁷ Ce	140.090±3.620 †	¹⁸¹ Pr	72.400±2.600
¹⁴⁸ Cs	-49.390±0.810	¹³⁴ Ba	-89.350±0.540	¹²⁵ La	-74.240±0.690	¹¹³ Ce	-7.800±1.230 †	¹⁸⁸ Ce	148.640±3.750 †	¹⁸² Pr	79.980±2.790
¹⁴⁹ Cs	-46.310±0.900	¹³⁵ Ba	-88.260±0.650	¹²⁶ La	-75.470±0.650	¹¹⁴ Ce	-16.990±1.080 †	¹⁸⁹ Ce	159.230±3.870 †	¹⁸³ Pr	86.560±2.820
¹⁵⁰ Cs	-41.700±0.900	¹³⁶ Ba	-89.180±0.560	¹²⁷ La	-78.440±0.580	¹¹⁵ Ce	-23.060±1.040 †	¹⁹⁰ Ce	167.650±3.950 †	¹⁸⁴ Pr	94.460±3.010
¹⁵¹ Cs	-38.580±0.990	¹³⁷ Ba	-87.960±0.600	¹²⁸ La	-79.110±0.560	¹¹⁶ Ce	-31.190±1.150 †	¹⁹¹ Ce	177.930±4.080 †	¹⁸⁵ Pr	101.560±3.100
¹⁵² Cs	-33.940±1.130	¹³⁸ Ba	-88.600±0.650	¹²⁹ La	-81.670±0.550	¹¹⁷ Ce	-34.790±1.070 †	¹⁹² Ce	186.630±4.280 †	¹⁸⁶ Pr	111.030±3.210 †
¹⁵³ Cs	-30.670±1.180	¹³⁹ Ba	-85.110±0.610	¹³⁰ La	-81.890±0.580	¹¹⁸ Ce	-40.680±1.090	¹⁹³ Ce	197.130±4.300 †	¹⁸⁷ Pr	119.290±3.380 †
¹⁵⁴ Cs	-25.760±1.250	¹⁴⁰ Ba	-83.340±0.600	¹³¹ La	-84.010±0.540	¹¹⁹ Ce	-44.070±0.950	¹⁴⁴ Pr	4.490±1.240 †	¹⁸⁸ Pr	128.890±3.490 †
¹⁵⁵ Cs	-22.090±1.370	¹⁴¹ Ba	-79.630±0.510	¹³² La	-84.060±0.530	¹²⁰ Ce	-49.850±0.940	¹⁴⁵ Pr	-4.840±1.200 †	¹⁸⁹ Pr	137.460±3.550 †
¹⁵⁶ Cs	-16.960±1.400	¹⁴² Ba	-77.820±0.450	¹³³ La	-85.930±0.550	¹²¹ Ce	-52.860±0.880	¹⁴⁶ Pr	-11.520±1.090 †	¹⁹⁰ Pr	147.290±3.720 †
¹⁵⁷ Cs	-13.020±1.540	¹⁴³ Ba	-73.810±0.450	¹³⁴ La	-85.610±0.580	¹²² Ce	-58.230±0.890	¹⁴⁷ Pr	-19.680±1.070 †	¹⁹¹ Pr	155.650±3.800 †
¹⁵⁸ Cs	-7.510±1.670	¹⁴⁴ Ba	-71.900±0.420	¹³⁵ La	-87.150±0.580	¹²³ Ce	-65.500±0.920	¹⁴⁸			

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹²¹ Nd	-29.440±1.240 †	¹⁹⁶ Nd	177.760±4.170 †	¹⁸⁶ Pm	73.630±2.710	¹⁷² Sm	-21.850±1.430	¹⁶³ Eu	-58.200±0.720	¹⁴⁸ Gd	-76.100±0.510
¹²² Nd	-35.930±1.200	¹⁹⁷ Nd	187.850±4.250 †	¹⁸⁷ Pm	80.140±2.820	¹⁷³ Sm	-16.540±1.410	¹⁶⁴ Eu	-55.060±0.760	¹⁴⁹ Gd	-74.860±0.540
¹²³ Nd	-39.640±1.230	¹⁹⁸ Nd	196.590±4.380 †	¹⁸⁸ Pm	89.080±2.970 †	¹⁷⁴ Sm	-12.490±1.370	¹⁶⁵ Eu	-53.100±0.810	¹⁵⁰ Gd	-75.550±0.510
¹²⁴ Nd	-45.710±1.240	¹⁹⁹ Nd	206.990±4.450 †	¹⁸⁹ Pm	96.990±3.050 †	¹⁷⁵ Sm	-6.460±1.440	¹⁶⁶ Eu	-49.660±0.910	¹⁵¹ Gd	-74.100±0.500
¹²⁵ Nd	-48.540±1.210	²⁰⁰ Nd	216.070±4.540 †	¹⁹⁰ Pm	105.860±3.140 †	¹⁷⁶ Sm	-2.380±1.630	¹⁶⁷ Eu	-47.190±0.910	¹⁵² Gd	-74.820±0.620
¹²⁶ Nd	-53.870±1.160	²⁰¹ Nd	226.960±4.670 †	¹⁹¹ Pm	113.610±3.240 †	¹⁷⁷ Sm	3.900±1.600	¹⁶⁸ Eu	-43.750±0.990	¹⁵³ Gd	-73.250±0.590
¹²⁷ Nd	-56.040±1.080	²⁰² Nd	236.260±4.710 †	¹⁹² Pm	122.830±3.460 †	¹⁷⁸ Sm	8.560±1.710	¹⁶⁹ Eu	-40.890±1.040	¹⁵⁴ Gd	-73.840±0.520
¹²⁸ Nd	-60.760±1.030			¹⁹³ Pm	130.580±3.460 †	¹⁷⁹ Sm	15.100±1.750	¹⁷⁰ Eu	-36.730±1.110	¹⁵⁵ Gd	-72.100±0.550
¹²⁹ Nd	-62.550±0.930	¹¹⁸ Pm	10.780±1.350 †	¹⁹⁴ Pm	139.850±3.580 †	¹⁸⁰ Sm	19.980±1.790	¹⁷¹ Eu	-33.810±1.070	¹⁵⁶ Gd	-72.440±0.560
¹³⁰ Nd	-66.780±0.850	¹¹⁹ Pm	1.790±1.340 †	¹⁹⁵ Pm	147.960±3.740 †	¹⁸¹ Sm	26.540±1.860	¹⁷² Eu	-29.200±1.220	¹⁵⁷ Gd	-70.730±0.540
¹³¹ Nd	-68.120±0.840	¹²⁰ Pm	-5.140±1.260 †	¹⁹⁶ Pm	157.340±3.840 †	¹⁸² Sm	31.520±2.090	¹⁷³ Eu	-25.750±1.210	¹⁵⁸ Gd	-70.670±0.550
¹³² Nd	-71.910±0.780	¹²¹ Pm	-13.980±1.250 †	¹⁹⁷ Pm	165.700±3.950 †	¹⁸³ Sm	38.410±2.060	¹⁷⁴ Eu	-20.740±1.180	¹⁵⁹ Gd	-68.490±0.530
¹³³ Nd	-72.700±0.800	¹²² Pm	-20.330±1.450 †	¹⁹⁸ Pm	175.400±4.040 †	¹⁸⁴ Sm	43.810±2.290	¹⁷⁵ Eu	-16.640±1.240	¹⁶⁰ Gd	-68.140±0.550
¹³⁴ Nd	-75.680±0.710	¹²³ Pm	-26.960±1.430 †	¹⁹⁹ Pm	183.990±4.130 †	¹⁸⁵ Sm	50.730±2.410	¹⁷⁶ Eu	-11.270±1.370	¹⁶¹ Gd	-65.710±0.550
¹³⁵ Nd	-76.200±0.730	¹²⁴ Pm	-31.230±1.410 †	²⁰⁰ Pm	194.020±4.240 †	¹⁸⁶ Sm	56.220±2.490	¹⁷⁷ Eu	-7.200±1.420	¹⁶² Gd	-64.970±0.660
¹³⁶ Nd	-78.980±0.690	¹²⁵ Pm	-37.290±1.400 †	²⁰¹ Pm	203.200±4.330 †	¹⁸⁷ Sm	63.120±2.620	¹⁷⁸ Eu	-1.290±1.440	¹⁶³ Gd	-62.270±0.660
¹³⁷ Nd	-79.410±0.580	¹²⁶ Pm	-40.760±1.360 †	²⁰² Pm	213.340±4.370 †	¹⁸⁸ Sm	69.240±2.730	¹⁷⁹ Eu	3.310±1.550	¹⁶⁴ Gd	-61.150±0.720
¹³⁸ Nd	-82.100±0.490	¹²⁷ Pm	-45.970±1.250 †	²⁰³ Pm	222.800±4.520 †	¹⁸⁹ Sm	78.210±2.800 †	¹⁸⁰ Eu	9.430±1.590	¹⁶⁵ Gd	-58.110±0.770
¹³⁹ Nd	-82.110±0.490	¹²⁸ Pm	-48.810±1.250			¹⁹⁰ Sm	85.360±2.920	¹⁸¹ Eu	13.950±1.640	¹⁶⁶ Gd	-56.600±0.850
¹⁴⁰ Nd	-84.370±0.530	¹²⁹ Pm	-53.540±1.120	¹¹⁵ Sm	58.220±1.710 †	¹⁹¹ Sm	94.170±3.000 †	¹⁸² Eu	20.200±1.760	¹⁶⁷ Gd	-53.170±0.870
¹⁴¹ Nd	-84.400±0.450	¹³⁰ Pm	-55.910±1.040	¹¹⁶ Sm	47.410±1.580 †	¹⁹² Sm	101.380±3.160	¹⁸³ Eu	25.170±1.850	¹⁶⁸ Gd	-51.350±0.850
¹⁴² Nd	-86.310±0.410	¹³¹ Pm	-60.220±0.980	¹¹⁷ Sm	39.520±1.570 †	¹⁹³ Sm	110.540±3.250 †	¹⁸⁴ Eu	31.820±1.970	¹⁶⁹ Gd	-47.750±0.950
¹⁴³ Nd	-84.220±0.380	¹³² Pm	-62.140±0.910	¹¹⁸ Sm	28.890±1.520 †	¹⁹⁴ Sm	117.880±3.330 †	¹⁸⁵ Eu	36.810±2.110	¹⁷⁰ Gd	-45.300±0.990
¹⁴⁴ Nd	-83.860±0.420	¹³³ Pm	-65.830±0.880	¹¹⁹ Sm	21.340±1.510 †	¹⁹⁵ Sm	127.020±3.450 †	¹⁸⁶ Eu	43.290±2.230	¹⁷¹ Gd	-41.350±1.000
¹⁴⁵ Nd	-81.520±0.450	¹³⁴ Pm	-66.990±0.830	¹²⁰ Sm	11.650±1.440 †	¹⁹⁶ Sm	134.550±3.620 †	¹⁸⁷ Eu	48.630±2.350	¹⁷² Gd	-38.800±1.040
¹⁴⁶ Nd	-80.780±0.510	¹³⁵ Pm	-70.180±0.770	¹²¹ Sm	4.550±1.420 †	¹⁹⁷ Sm	143.950±3.680 †	¹⁸⁸ Eu	55.150±2.480	¹⁷³ Gd	-34.330±1.050
¹⁴⁷ Nd	-78.080±0.480	¹³⁶ Pm	-71.020±0.750	¹²² Sm	-4.830±1.440 †	¹⁹⁸ Sm	151.910±3.800 †	¹⁸⁹ Eu	61.300±2.510	¹⁷⁴ Gd	-31.180±1.070
¹⁴⁸ Nd	-77.490±0.490	¹³⁷ Pm	-74.030±0.600	¹²³ Sm	-11.320±1.430 †	¹⁹⁹ Sm	161.470±3.840 †	¹⁹⁰ Eu	69.510±2.630 †	¹⁷⁵ Gd	-26.110±1.130
¹⁴⁹ Nd	-74.420±0.460	¹³⁸ Pm	-75.060±0.560	¹²⁴ Sm	-19.890±1.520 †	²⁰⁰ Sm	169.680±3.960 †	¹⁹¹ Eu	76.600±2.760	¹⁷⁶ Gd	-22.690±1.290
¹⁵⁰ Nd	-73.680±0.530	¹³⁹ Pm	-77.680±0.520	¹²⁵ Sm	-24.160±1.490 †	²⁰¹ Sm	179.820±4.070 †	¹⁹² Eu	84.860±2.890 †	¹⁷⁷ Gd	-17.330±1.240
¹⁵¹ Nd	-70.730±0.470	¹⁴⁰ Pm	-78.280±0.520	¹²⁶ Sm	-30.850±1.480 †	²⁰² Sm	188.240±4.070 †	¹⁹³ Eu	92.010±2.920	¹⁷⁸ Gd	-13.630±1.330
¹⁵² Nd	-69.950±0.590	¹⁴¹ Pm	-80.670±0.490	¹²⁷ Sm	-34.200±1.400	²⁰³ Sm	198.540±4.220 †	¹⁹⁴ Eu	100.750±3.090 †	¹⁷⁹ Gd	-7.770±1.350
¹⁵³ Nd	-67.090±0.650	¹⁴² Pm	-81.310±0.440	¹²⁸ Sm	-40.070±1.360	²⁰⁴ Sm	207.400±4.290 †	¹⁹⁵ Eu	107.970±3.170	¹⁸⁰ Gd	-3.600±1.470
¹⁵⁴ Nd	-65.980±0.640	¹⁴³ Pm	-83.300±0.420	¹²⁹ Sm	-42.920±1.270	²⁰⁵ Sm	218.250±4.410 †	¹⁹⁶ Eu	116.540±3.310 †	¹⁸¹ Gd	2.170±1.500
¹⁵⁵ Nd	-62.720±0.660	¹⁴⁴ Pm	-81.800±0.440	¹³⁰ Sm	-48.240±1.180	²⁰⁶ Sm	227.730±4.510 †	¹⁹⁷ Eu	124.080±3.430	¹⁸² Gd	6.370±1.630
¹⁵⁶ Nd	-61.380±0.700	¹⁴⁵ Pm	-81.530±0.400	¹³¹ Sm	-50.670±1.130	²⁰⁷ Sm	238.790±4.660 †	¹⁹⁸ Eu	133.080±3.510 †	¹⁸³ Gd	12.610±1.600
¹⁵⁷ Nd	-57.950±0.750	¹⁴⁶ Pm	-79.500±0.470	¹³² Sm	-55.570±1.010	²⁰⁸ Sm	248.770±4.780 †	¹⁹⁹ Eu	140.900±3.580 †	¹⁸⁴ Gd	17.350±1.830
¹⁵⁸ Nd	-56.200±0.800	¹⁴⁷ Pm	-79.080±0.420	¹³³ Sm	-57.400±0.950			²⁰⁰ Eu	150.090±3.660 †	¹⁸⁵ Gd	23.590±1.890
¹⁵⁹ Nd	-52.390±0.840	¹⁴⁸ Pm	-76.980±0.420	¹³⁴ Sm	-61.460±0.920	¹²⁵ Eu	-8.330±1.490 †	²⁰¹ Eu	158.400±3.790 †	¹⁸⁶ Gd	28.140±2.030
¹⁶⁰ Nd	-50.280±0.980	¹⁴⁹ Pm	-76.260±0.410	¹³⁵ Sm	-62.830±0.920	¹²⁶ Eu	-14.790±1.590 †	²⁰² Eu	167.790±3.800 †	¹⁸⁷ Gd	34.470±2.170
¹⁶¹ Nd	-46.250±0.990	¹⁵⁰ Pm	-73.830±0.420	¹³⁶ Sm	-66.340±0.900	¹²⁷ Eu	-21.360±1.520 †	²⁰³ Eu	176.360±3.910 †	¹⁸⁸ Gd	39.430±2.300
¹⁶² Nd	-43.680±1.090	¹⁵¹ Pm	-73.230±0.460	¹³⁷ Sm	-67.400±0.770	¹²⁸ Eu	-25.380±1.500 †	²⁰⁴ Eu	186.060±3.970 †	¹⁸⁹ Gd	45.970±2.350
¹⁶³ Nd	-39.330±1.170	¹⁵² Pm	-70.940±0.510	¹³⁸ Sm	-71.010±0.650	¹²⁹ Eu	-31.270±1.380 †	²⁰⁵ Eu	195.220±4.100 †	¹⁹⁰ Gd	51.360±2.430
¹⁶⁴ Nd	-36.310±1.160	¹⁵³ Pm	-70.220±0.540	¹³⁹ Sm	-71.980±0.560	¹³⁰ Eu	-34.690±1.340 †	²⁰⁶ Eu	205.530±4.200 †	¹⁹¹ Gd	59.510±2.550 †
¹⁶⁵ Nd	-31.770±1.320	¹⁵⁴ Pm	-67.830±0.650	¹⁴⁰ Sm	-75.190±0.490	¹³¹ Eu	-40.080±1.250 †	²⁰⁷ Eu	215.090±4.340 †	¹⁹² Gd	66.060±2.720
¹⁶⁶ Nd	-28.410±1.330	¹⁵⁵ Pm	-66.740±0.620	¹⁴¹ Sm	-75.920±0.470	¹³² Eu	-43.110±1.130 †	²⁰⁸ Eu	225.650±4.470 †	¹⁹³ Gd	74.260±2.710 †
¹⁶⁷ Nd	-23.360±1.450	¹⁵⁶ Pm	-64.050±0.650	¹⁴² Sm	-78.920±0.410	¹³³ Eu	-47.900±1.050 †	²⁰⁹ Eu	235.610±4.560 †	¹⁹⁴ Gd	80.990±2.820
¹⁶⁸ Nd	-19.970±1.440	¹⁵⁷ Pm	-62.800±0.640	¹⁴³ Sm	-79.630±0.490	¹³⁴ Eu	-50.100±0.990 †			¹⁹⁵ Gd	89.620±2.990 †
¹⁶⁹ Nd	-14.360±1.530	¹⁵⁸ Pm	-59.740±0.720	¹⁴⁴ Sm	-82.210±0.430	¹³⁵ Eu	-54.370±0.970	¹²⁰ Gd	53.910±1.800 †	¹⁹⁶ Gd	96.260±3.090
¹⁷⁰ Nd	-10.200±1.570	¹⁵⁹ Pm	-58.040±0.710	¹⁴⁵ Sm	-80.800±0.410	¹³⁶ Eu	-56.060±1.010	¹²¹ Gd	45.500±1.800 †	¹⁹⁷ Gd	104.840±3.170 †
¹⁷¹ Nd	-4.370±1.620	¹⁶⁰ Pm	-54.710±0.820	¹⁴⁶ Sm	-80.850±0.550	¹³⁷ Eu	-59.790±0.830	¹²² Gd	35.100±1.840 †	¹⁹⁸ Gd	111.980±3.320
¹⁷² Nd	0.110±1.730	¹⁶¹ Pm	-52.700±0.860	¹⁴⁷ Sm	-79.140±0.490	¹³⁸ Eu	-61.460±0.730	¹²³ Gd	27.320±1.830 †	¹⁹⁹ Gd	120.840±3.350 †
¹⁷³ Nd	6.390±1.690	¹⁶² Pm	-49.050±0.890	¹⁴⁸ Sm	-79.310±0.440	¹³⁹ Eu	-65.000±0.630	¹²⁴ Gd	17.230±1.700 †	²⁰⁰ Gd	128.290±3.450 †
¹⁷⁴ Nd	11.100±1.710	¹⁶³ Pm	-46.630±1.020	¹⁴⁹ Sm	-77.080±0.410	¹⁴⁰ Eu	-66.560±0.620	¹²⁵ Gd	10.180±1.690 †	²⁰¹ Gd	137.580±3.530 †
¹⁷⁵ Nd	18.060±1.800	¹⁶⁴ Pm	-42.640±1.000	¹⁵⁰ Sm	-77.010±0.490	¹⁴¹ Eu	-69.900±0.470	¹²⁶ Gd	0.980±1.530 †	²⁰² Gd	145.140±3.560 †
¹⁷⁶ Nd	23.090±2.010	¹⁶⁵ Pm	-39.730±1.080	¹⁵¹ Sm	-74.720±0.470	¹⁴² Eu	-71.240±0.500	¹²⁷ Gd	-5.350±1.520 †	²⁰³ Gd	154.670±3.690 †
¹⁷⁷ Nd	30.060±1.970	¹⁶⁶ Pm	-35.630±1.220	¹⁵² Sm	-74.770±0.540	¹⁴³ Eu	-74.310±0.410	¹²⁸ Gd	-13.770±1.660 †	²⁰⁴ Gd	162.650±3.710 †
¹⁷⁸ Nd	35.420±2.000	¹⁶⁷ Pm	-32.280±1.260	¹⁵³ Sm	-72.540±0.500	¹⁴⁴ Eu	-75.620±0.400	¹²⁹ Gd	-17.800±1.580 †	²⁰⁵ Gd	172.650±3.840 †
¹⁷⁹ Nd	42.760±2.120	¹⁶⁸ Pm	-27.870±1.310	¹⁵⁴ Sm	-72.300±0.510	¹⁴⁵ Eu	-78.290±0.400	¹³⁰ Gd	-24.270±1.490 †	²⁰⁶ Gd	181.270±3.940 †
¹⁸⁰ Nd	48.410±2.260	¹⁶⁹ Pm	-24.320±1.310	¹⁵⁵ Sm	-69.930±0.520	¹⁴⁶ Eu	-77.190±0.440	¹³¹ Gd	-27.770±1.460 †	²⁰⁷ Gd	191.660±4.070 †
¹⁸¹ Nd	55.620±2.320	¹⁷⁰ Pm	-19.130±1.420	¹⁵⁶ Sm	-69.400±0.540	¹⁴⁷ Eu	-77.560±0.450	¹³² Gd	-33.750±1.330	²⁰⁸ Gd	200.720±4.190 †
¹⁸² Nd	61.260±2.540	¹⁷¹ Pm	-15.170±1.460	¹⁵⁷ Sm	-66.800±0.550	¹⁴⁸ Eu	-76.440±0.440	¹³³ Gd	-36.670±1.250	²⁰⁹ Gd	211.260±4.290 †
¹⁸³ Nd	68.830±2.600	¹⁷² Pm	-9.720±1.580	¹⁵⁸ Sm	-65.920±0.610	¹⁴⁹ Eu	-76.490±0.460	¹³⁴ Gd	-41.850±1.150	²¹⁰ Gd	220.900±4.410 †
¹⁸⁴ Nd	75.										

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹³⁸ Tb	-43.090±1.000 †	²¹³ Tb	229.290±4.370 †	²⁰⁰ Dy	91.740±2.930	¹⁹² Ho	24.590±1.970	¹⁸⁰ Er	-36.240±0.840	¹⁷⁴ Tm	-53.990±0.430
¹³⁹ Tb	-47.360±0.860 †	¹²⁶ Dy	41.650±1.930 †	²⁰¹ Dy	100.330±2.980 †	¹⁹³ Ho	29.320±1.960	¹⁸¹ Er	-32.090±0.900	¹⁷⁵ Tm	-52.510±0.480
¹⁴⁰ Tb	-49.560±0.860	¹²⁷ Dy	34.080±1.930 †	²⁰² Dy	107.120±2.990	¹⁹⁴ Ho	36.450±2.090	¹⁸² Er	-29.540±1.040	¹⁷⁶ Tm	-49.990±0.720
¹⁴¹ Tb	-53.820±0.740	¹²⁸ Dy	24.340±1.790 †	²⁰³ Dy	115.810±3.100 †	¹⁹⁵ Ho	42.390±2.210	¹⁸³ Er	-24.780±0.980	¹⁷⁷ Tm	-48.500±0.620
¹⁴² Tb	-56.110±0.740	¹²⁹ Dy	17.320±1.790 †	²⁰⁴ Dy	122.930±3.160	¹⁹⁶ Ho	49.480±2.300	¹⁸⁴ Er	-21.520±1.110	¹⁷⁸ Tm	-45.330±0.690
¹⁴³ Tb	-60.140±0.640	¹³⁰ Dy	8.310±1.600 †	²⁰⁵ Dy	132.170±3.250 †	¹⁹⁷ Ho	55.530±2.380	¹⁸⁵ Er	-16.730±1.170	¹⁷⁹ Tm	-43.230±0.680
¹⁴⁴ Tb	-62.140±0.620	¹³¹ Dy	1.990±1.590 †	²⁰⁶ Dy	139.900±3.310 †	¹⁹⁸ Ho	63.200±2.540	¹⁸⁶ Er	-13.610±1.170	¹⁸⁰ Tm	-39.700±0.720
¹⁴⁵ Tb	-65.900±0.540	¹³² Dy	-6.400±1.650 †	²⁰⁷ Dy	149.440±3.440 †	¹⁹⁹ Ho	69.310±2.560	¹⁸⁷ Er	-8.610±1.240	¹⁸¹ Tm	-37.480±0.750
¹⁴⁶ Tb	-67.610±0.570	¹³³ Dy	-10.390±1.610 †	²⁰⁸ Dy	157.640±3.570 †	²⁰⁰ Ho	76.980±2.650	¹⁸⁸ Er	-5.260±1.400	¹⁸² Tm	-33.650±0.800
¹⁴⁷ Tb	-70.920±0.500	¹³⁴ Dy	-16.640±1.500 †	²⁰⁹ Dy	167.510±3.660 †	²⁰¹ Ho	83.710±2.770	¹⁸⁹ Er	0.030±1.390	¹⁸³ Tm	-31.100±0.880
¹⁴⁸ Tb	-70.730±0.460	¹³⁵ Dy	-20.140±1.420 †	²¹⁰ Dy	176.240±3.770 †	²⁰² Ho	91.540±2.740	¹⁹⁰ Er	3.320±1.520	¹⁸⁴ Tm	-26.580±0.930
¹⁴⁹ Tb	-71.560±0.520	¹³⁶ Dy	-25.840±1.350 †	²¹¹ Dy	186.290±3.860 †	²⁰³ Ho	98.490±2.870	¹⁹¹ Er	8.480±1.640	¹⁸⁵ Tm	-23.730±1.000
¹⁵⁰ Tb	-70.960±0.480	¹³⁷ Dy	-28.790±1.230 †	²¹² Dy	195.420±3.950 †	²⁰⁴ Ho	106.580±2.890 †	¹⁹² Er	12.100±1.780	¹⁸⁶ Tm	-19.380±1.020
¹⁵¹ Tb	-71.790±0.500	¹³⁸ Dy	-34.200±1.120 †	²¹³ Dy	206.010±4.040 †	²⁰⁵ Ho	114.000±3.010	¹⁹³ Er	17.220±1.770	¹⁸⁷ Tm	-16.420±1.080
¹⁵² Tb	-71.000±0.540	¹³⁹ Dy	-36.660±1.040	²¹⁴ Dy	215.440±4.130 †	²⁰⁶ Ho	122.690±3.090 †	¹⁹⁴ Er	21.530±1.860	¹⁸⁸ Tm	-11.800±1.170
¹⁵³ Tb	-71.780±0.590	¹⁴⁰ Dy	-41.510±0.980	²¹⁵ Dy	226.150±4.240 †	²⁰⁷ Ho	130.510±3.170 †	¹⁹⁵ Er	28.540±1.970	¹⁸⁹ Tm	-8.420±1.270
¹⁵⁴ Tb	-70.680±0.580	¹⁴¹ Dy	-43.840±0.830	²¹⁶ Dy	235.740±4.310 †	²⁰⁸ Ho	139.550±3.290 †	¹⁹⁶ Er	33.910±2.110	¹⁹⁰ Tm	-3.890±1.290
¹⁵⁵ Tb	-71.290±0.530	¹⁴² Dy	-48.710±0.790	¹³⁴ Ho	0.150±1.730 †	²⁰⁹ Ho	147.730±3.380 †	¹⁹⁷ Er	41.010±2.150	¹⁹¹ Tm	-0.660±1.400
¹⁵⁶ Tb	-70.120±0.610	¹⁴³ Dy	-51.080±0.780	¹³⁵ Ho	-6.300±1.630 †	²¹⁰ Ho	157.290±3.500 †	¹⁹⁸ Er	46.660±2.250	¹⁹² Tm	3.960±1.580
¹⁵⁷ Tb	-70.560±0.580	¹⁴⁴ Dy	-55.700±0.680	¹³⁶ Ho	-10.130±1.580 †	²¹¹ Ho	165.840±3.570 †	¹⁹⁹ Er	54.180±2.360	¹⁹³ Tm	7.520±1.580
¹⁵⁸ Tb	-69.210±0.570	¹⁴⁵ Dy	-57.790±0.680	¹³⁷ Ho	-16.050±1.390 †	²¹² Ho	175.550±3.680 †	²⁰⁰ Er	59.930±2.410	¹⁹⁴ Tm	12.220±1.670
¹⁵⁹ Tb	-69.200±0.580	¹⁴⁶ Dy	-61.860±0.690	¹³⁸ Ho	-19.600±1.290 †	²¹³ Ho	184.710±3.740 †	²⁰¹ Er	67.700±2.490	¹⁹⁵ Tm	16.410±1.750
¹⁶⁰ Tb	-67.500±0.540	¹⁴⁷ Dy	-63.900±0.590	¹³⁹ Ho	-24.950±1.170 †	²¹⁴ Ho	194.980±3.850 †	²⁰² Er	73.670±2.530	¹⁹⁶ Tm	22.840±1.870
¹⁶¹ Tb	-67.250±0.550	¹⁴⁸ Dy	-67.790±0.540	¹⁴⁰ Ho	-27.990±1.150 †	²¹⁵ Ho	204.230±3.970 †	²⁰³ Er	81.660±2.610	¹⁹⁷ Tm	28.230±1.980
¹⁶² Tb	-65.210±0.570	¹⁴⁹ Dy	-67.480±0.560	¹⁴¹ Ho	-32.980±1.030 †	²¹⁶ Ho	214.420±4.010 †	²⁰⁴ Er	88.010±2.640	¹⁹⁸ Tm	34.930±2.030
¹⁶³ Tb	-64.620±0.500	¹⁵⁰ Dy	-68.960±0.520	¹⁴² Ho	-35.910±0.970 †	²¹⁷ Ho	223.960±4.150 †	²⁰⁵ Er	96.400±2.710 †	¹⁹⁹ Tm	40.440±2.080
¹⁶⁴ Tb	-62.280±0.620	¹⁵¹ Dy	-68.500±0.560	¹⁴³ Ho	-40.860±0.920 †	¹³¹ Er	41.860±2.000 †	²⁰⁶ Er	103.280±2.830	²⁰⁰ Tm	47.590±2.210
¹⁶⁵ Tb	-61.260±0.650	¹⁵² Dy	-69.980±0.540	¹⁴⁴ Ho	-43.820±0.840	¹³² Er	32.190±1.820 †	²⁰⁷ Er	112.050±2.930 †	²⁰¹ Tm	53.440±2.270
¹⁶⁶ Tb	-58.660±0.680	¹⁵³ Dy	-69.250±0.570	¹⁴⁵ Ho	-48.530±0.730	¹³³ Er	25.370±1.810 †	²⁰⁸ Er	119.370±3.000	²⁰² Tm	60.450±2.260
¹⁶⁷ Tb	-57.160±0.720	¹⁵⁴ Dy	-70.510±0.630	¹⁴⁶ Ho	-50.940±0.750	¹³⁴ Er	16.710±1.650 †	²⁰⁹ Er	128.380±3.090 †	²⁰³ Tm	66.580±2.400
¹⁶⁸ Tb	-54.370±0.720	¹⁵⁵ Dy	-69.430±0.630	¹⁴⁷ Ho	-55.330±0.630	¹³⁵ Er	10.470±1.640 †	²¹⁰ Er	136.250±3.210 †	²⁰⁴ Tm	73.970±2.390
¹⁶⁹ Tb	-52.400±0.730	¹⁵⁶ Dy	-70.600±0.580	¹⁴⁸ Ho	-57.960±0.550	¹³⁶ Er	2.460±1.770 †	²¹¹ Er	145.630±3.280 †	²⁰⁵ Tm	80.620±2.490
¹⁷⁰ Tb	-49.210±0.830	¹⁵⁷ Dy	-69.530±0.620	¹⁴⁹ Ho	-61.730±0.550	¹³⁷ Er	-1.590±1.580 †	²¹² Er	153.850±3.380 †	²⁰⁶ Tm	88.470±2.540
¹⁷¹ Tb	-46.970±0.810	¹⁵⁸ Dy	-70.330±0.650	¹⁵⁰ Ho	-62.060±0.480	¹³⁸ Er	-8.110±1.410 †	²¹³ Er	163.600±3.460 †	²⁰⁷ Tm	95.430±2.680
¹⁷² Tb	-43.390±0.920	¹⁵⁹ Dy	-69.040±0.640	¹⁵¹ Ho	-63.670±0.550	¹³⁹ Er	-11.600±1.310 †	²¹⁴ Er	172.430±3.540 †	²⁰⁸ Tm	103.700±2.770 †
¹⁷³ Tb	-40.980±0.890	¹⁶⁰ Dy	-69.500±0.630	¹⁵² Ho	-63.870±0.560	¹⁴⁰ Er	-17.540±1.270 †	²¹⁵ Er	182.510±3.680 †	²⁰⁹ Tm	111.000±2.810
¹⁷⁴ Tb	-36.810±0.890	¹⁶¹ Dy	-67.900±0.570	¹⁵³ Ho	-65.410±0.560	¹⁴¹ Er	-20.710±1.180 †	²¹⁶ Er	191.250±3.730 †	²¹⁰ Tm	119.700±2.930 †
¹⁷⁵ Tb	-33.610±0.970	¹⁶² Dy	-68.030±0.650	¹⁵⁴ Ho	-65.160±0.550	¹⁴² Er	-26.310±1.110 †	²¹⁷ Er	201.380±3.850 †	²¹¹ Tm	127.390±3.000 †
¹⁷⁶ Tb	-29.210±1.090	¹⁶³ Dy	-66.140±0.530	¹⁵⁵ Ho	-66.430±0.560	¹⁴³ Er	-29.320±1.070	²¹⁸ Er	210.310±3.970 †	²¹² Tm	136.440±3.100 †
¹⁷⁷ Tb	-25.790±1.080	¹⁶⁴ Dy	-65.910±0.600	¹⁵⁶ Ho	-65.920±0.580	¹⁴⁴ Er	-34.850±0.940	²¹⁹ Er	220.750±4.110 †	²¹³ Tm	144.680±3.170 †
¹⁷⁸ Tb	-20.810±1.100	¹⁶⁵ Dy	-63.670±0.550	¹⁵⁷ Ho	-67.180±0.520	¹⁴⁵ Er	-37.900±0.860	²²⁰ Er	229.790±4.210 †	²¹⁴ Tm	154.110±3.270 †
¹⁷⁹ Tb	-17.160±1.170	¹⁶⁶ Dy	-63.100±0.670	¹⁵⁸ Ho	-66.480±0.600	¹⁴⁶ Er	-42.930±0.860	¹⁴⁰ Tm	-1.400±1.480 †	²¹⁵ Tm	162.760±3.380 †
¹⁸⁰ Tb	-11.730±1.210	¹⁶⁷ Dy	-60.510±0.700	¹⁵⁹ Ho	-67.330±0.610	¹⁴⁷ Er	-45.660±0.780	¹⁴¹ Tm	-7.470±1.340 †	²¹⁶ Tm	172.330±3.440 †
¹⁸¹ Tb	-7.910±1.320	¹⁶⁸ Dy	-59.650±0.700	¹⁶⁰ Ho	-66.520±0.570	¹⁴⁸ Er	-50.640±0.710	¹⁴² Tm	-11.240±1.330 †	²¹⁷ Tm	181.010±3.560 †
¹⁸² Tb	-2.460±1.420	¹⁶⁹ Dy	-56.700±0.710	¹⁶¹ Ho	-67.090±0.600	¹⁴⁹ Er	-53.140±0.660	¹⁴³ Tm	-16.920±1.250 †	²¹⁸ Tm	190.530±3.670 †
¹⁸³ Tb	1.740±1.390	¹⁷⁰ Dy	-55.140±0.730	¹⁶² Ho	-65.870±0.650	¹⁵⁰ Er	-57.550±0.540	¹⁴⁴ Tm	-20.520±1.170 †	²¹⁹ Tm	199.500±3.790 †
¹⁸⁴ Tb	7.750±1.540	¹⁷¹ Dy	-52.160±0.810	¹⁶³ Ho	-66.150±0.530	¹⁵¹ Er	-58.030±0.530	¹⁴⁵ Tm	-26.150±1.040 †	²²⁰ Tm	209.340±3.900 †
¹⁸⁵ Tb	12.070±1.680	¹⁷² Dy	-50.290±0.810	¹⁶⁴ Ho	-64.620±0.670	¹⁵² Er	-60.290±0.560	¹⁴⁶ Tm	-29.510±1.070 †	²²¹ Tm	218.160±4.100 †
¹⁸⁶ Tb	17.860±1.720	¹⁷³ Dy	-46.860±0.840	¹⁶⁵ Ho	-64.490±0.560	¹⁵³ Er	-60.550±0.550	¹⁴⁷ Tm	-34.860±0.910 †	¹³⁶ Yb	41.640±1.840 †
¹⁸⁷ Tb	22.260±1.880	¹⁷⁴ Dy	-44.750±0.800	¹⁶⁶ Ho	-62.690±0.560	¹⁵⁴ Er	-62.570±0.570	¹⁴⁸ Tm	-38.170±0.830 †	¹³⁷ Yb	34.850±1.770 †
¹⁸⁸ Tb	28.210±2.050	¹⁷⁵ Dy	-40.520±0.890	¹⁶⁷ Ho	-62.130±0.580	¹⁵⁵ Er	-62.330±0.540	¹⁴⁹ Tm	-43.040±0.830 †	¹³⁸ Yb	26.020±1.590 †
¹⁸⁹ Tb	33.200±2.100	¹⁷⁶ Dy	-37.990±1.010	¹⁶⁸ Ho	-60.190±0.570	¹⁵⁶ Er	-64.170±0.510	¹⁵⁰ Tm	-46.180±0.720	¹³⁹ Yb	19.840±1.510 †
¹⁹⁰ Tb	38.990±2.180	¹⁷⁷ Dy	-33.610±0.990	¹⁶⁹ Ho	-59.170±0.610	¹⁵⁷ Er	-63.750±0.540	¹⁵¹ Tm	-50.730±0.670	¹⁴⁰ Yb	11.640±1.660 †
¹⁹¹ Tb	44.320±2.260	¹⁷⁸ Dy	-30.560±1.010	¹⁷⁰ Ho	-56.640±0.620	¹⁵⁸ Er	-65.390±0.500	¹⁵² Tm	-51.860±0.620	¹⁴¹ Yb	7.430±1.530 †
¹⁹² Tb	51.930±2.420	¹⁷⁹ Dy	-25.630±1.030	¹⁷¹ Ho	-55.280±0.580	¹⁵⁹ Er	-64.740±0.540	¹⁵³ Tm	-54.190±0.540	¹⁴² Yb	0.760±1.490 †
¹⁹³ Tb	58.400±2.470	¹⁸⁰ Dy	-22.400±1.150	¹⁷² Ho	-52.670±0.760	¹⁶⁰ Er	-66.070±0.500	¹⁵⁴ Tm	-54.920±0.540	¹⁴³ Yb	-3.100±1.460 †
¹⁹⁴ Tb	66.190±2.540	¹⁸¹ Dy	-17.330±1.140	¹⁷³ Ho	-50.950±0.660	¹⁶¹ Er	-65.360±0.490	¹⁵⁵ Tm	-56.960±0.540	¹⁴⁴ Yb	-9.360±1.360 †
¹⁹⁵ Tb	72.810±2.670	¹⁸² Dy	-13.830±1.280	¹⁷⁴ Ho	-47.810±0.710	¹⁶² Er	-66.300±0.560	¹⁵⁶ Tm	-57.280±0.540	¹⁴⁵ Yb	-13.050±1.280 †
¹⁹⁶ Tb	80.850±2.850	¹⁸³ Dy	-8.380±1.260	¹⁷⁵ Ho	-45.640±0.720	¹⁶³ Er	-65.240±0.480	¹⁵⁷ Tm	-59.220±0.560	¹⁴⁶ Yb	-18.990±1.220 †
¹⁹⁷ Tb	87.510±2.900	¹⁸⁴ Dy	-4.410±1.340	¹⁷⁶ Ho	-42.090±0.850	¹⁶⁴ Er	-65.880±0.570	¹⁵⁸ Tm	-59.170±0.500	¹⁴⁷ Yb	-22.680±1.100 †
¹⁹⁸ Tb	95.690±3.000 †	¹⁸⁵ Dy	1.180±1.420	¹⁷⁷ Ho	-39.570±0.870	¹⁶⁵ Er	-64.440±0.610	¹⁵⁹ Tm	-60.860±0.460	¹⁴⁸ Yb	-28.620±0.960
¹⁹⁹ Tb	102.690±3.100	¹⁸⁶ Dy	5.060±1.570	¹⁷⁸ Ho	-35.560±0.910	¹⁶⁶ Er	-64.760±0.550	¹⁶⁰ Tm	-60.680±0.460	¹⁴⁹ Yb	-31.810±0.980
²⁰⁰ Tb	111.180±3.160 †	¹⁸⁷ Dy	10.700±1.620	¹⁷⁹ Ho	-32.560±0.930	¹⁶⁷ Er	-62.970±0.650				

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁶³ Yb	-59.600±0.440	¹⁵⁴ Lu	-39.910±0.670	¹⁴³ Hf	29.150±1.650 †	²¹⁸ Hf	131.990±2.780	²¹¹ Ta	64.330±1.950	²⁰¹ W	-3.360±1.190
¹⁶⁴ Yb	-61.060±0.560	¹⁵⁵ Lu	-42.730±0.630	¹⁴⁴ Hf	20.690±1.760 †	²¹⁹ Hf	140.920±2.910 †	²¹² Ta	71.760±2.020	²⁰² W	0.450±1.190
¹⁶⁵ Yb	-60.450±0.550	¹⁵⁶ Lu	-44.050±0.550	¹⁴⁵ Hf	16.150±1.700 †	²²⁰ Hf	148.430±3.000 ‡	²¹³ Ta	78.270±2.040	²⁰³ W	6.140±1.220
¹⁶⁶ Yb	-61.640±0.570	¹⁵⁷ Lu	-46.750±0.500	¹⁴⁶ Hf	9.490±1.660 †	²²¹ Hf	157.180±3.180 †	²¹⁴ Ta	86.170±2.120	²⁰⁴ W	10.190±1.230
¹⁶⁷ Yb	-60.660±0.570	¹⁵⁸ Lu	-47.530±0.500	¹⁴⁷ Hf	5.160±1.550 †	²²² Hf	165.040±3.270 ‡	²¹⁵ Ta	93.040±2.240	²⁰⁵ W	16.540±1.340
¹⁶⁸ Yb	-61.630±0.520	¹⁵⁹ Lu	-49.890±0.480	¹⁴⁸ Hf	-1.690±1.390 †	²²³ Hf	174.230±3.320 †	²¹⁶ Ta	101.110±2.290	²⁰⁶ W	20.940±1.360
¹⁶⁹ Yb	-60.330±0.600	¹⁶⁰ Lu	-50.370±0.450	¹⁴⁹ Hf	-5.850±1.350 †	²²⁴ Hf	182.090±3.370 ‡	²¹⁷ Ta	108.270±2.400	²⁰⁷ W	27.350±1.450
¹⁷⁰ Yb	-60.670±0.650	¹⁶¹ Lu	-52.640±0.470	¹⁵⁰ Hf	-12.300±1.180 ‡	²²⁵ Hf	191.620±3.500 ‡	²¹⁸ Ta	116.330±2.530	²⁰⁸ W	32.220±1.530
¹⁷¹ Yb	-59.180±0.590	¹⁶² Lu	-52.940±0.550	¹⁵¹ Hf	-16.270±1.110 ‡	²²⁶ Hf	199.660±3.540 ‡	²¹⁹ Ta	123.840±2.630	²⁰⁹ W	38.930±1.560
¹⁷² Yb	-59.170±0.640	¹⁶³ Lu	-54.910±0.490	¹⁵² Hf	-22.570±1.060 ‡	²²⁷ Hf	209.610±3.660 †	²²⁰ Ta	132.180±2.730 †	²¹⁰ W	44.290±1.670
¹⁷³ Yb	-57.350±0.450	¹⁶⁴ Lu	-55.090±0.530	¹⁵³ Hf	-26.570±0.980	²²⁸ Hf	218.160±3.820 †	²²¹ Ta	139.470±2.920	²¹¹ W	51.210±1.680
¹⁷⁴ Yb	-56.810±0.500	¹⁶⁵ Lu	-56.640±0.540	¹⁵⁴ Hf	-32.310±0.870	²²⁹ Hf	227.880±3.960 †	²²² Ta	147.930±2.980 †	²¹² W	56.820±1.820
¹⁷⁵ Yb	-54.590±0.540	¹⁶⁶ Lu	-56.480±0.550	¹⁵⁵ Hf	-34.000±0.800	¹⁴⁸ Ta	15.310±1.610 †	²²³ Ta	155.640±3.020 ‡	²¹³ W	64.280±1.840
¹⁷⁶ Yb	-53.780±0.580	¹⁶⁷ Lu	-57.680±0.490	¹⁵⁶ Hf	-37.380±0.670	¹⁴⁹ Ta	8.590±1.500 †	²²⁴ Ta	164.310±3.070 †	²¹⁴ W	70.460±1.880
¹⁷⁷ Yb	-51.270±0.570	¹⁶⁸ Lu	-57.340±0.460	¹⁵⁷ Hf	-38.790±0.670	¹⁵⁰ Ta	3.790±1.340 †	²²⁵ Ta	172.070±3.180 ‡	²¹⁵ W	78.180±2.000
¹⁷⁸ Yb	-50.150±0.600	¹⁶⁹ Lu	-58.150±0.560	¹⁵⁸ Hf	-41.860±0.590	¹⁵¹ Ta	-2.810±1.190 †	²²⁶ Ta	181.080±3.230 †	²¹⁶ W	84.540±2.060
¹⁷⁹ Yb	-47.030±0.630	¹⁷⁰ Lu	-57.270±0.610	¹⁵⁹ Hf	-42.700±0.560	¹⁵² Ta	-7.430±1.140 †	²²⁷ Ta	189.150±3.340 †	²¹⁷ W	92.540±2.180
¹⁸⁰ Yb	-45.360±0.660	¹⁷¹ Lu	-57.810±0.530	¹⁶⁰ Hf	-45.540±0.570	¹⁵³ Ta	-13.790±1.080 †	²²⁸ Ta	198.520±3.470 †	²¹⁸ W	99.100±2.290
¹⁸¹ Yb	-42.180±0.700	¹⁷² Lu	-56.710±0.550	¹⁶¹ Hf	-46.110±0.560	¹⁵⁴ Ta	-18.270±0.980 †	²²⁹ Ta	207.090±3.580 †	²¹⁹ W	107.190±2.420 †
¹⁸² Yb	-40.280±0.750	¹⁷³ Lu	-56.830±0.520	¹⁶² Hf	-48.760±0.570	¹⁵⁵ Ta	-24.030±0.920 †	²³⁰ Ta	216.130±3.770 †	²²⁰ W	114.110±2.500
¹⁸³ Yb	-36.450±0.660	¹⁷⁴ Lu	-55.310±0.460	¹⁶³ Hf	-49.220±0.550	¹⁵⁶ Ta	-26.270±0.770 †	¹⁴⁶ W	45.170±1.730 †	²²¹ W	122.230±2.710 †
¹⁸⁴ Yb	-34.140±0.870	¹⁷⁵ Lu	-54.710±0.540	¹⁶⁴ Hf	-51.540±0.590	¹⁵⁷ Ta	-29.760±0.700 †	¹⁴⁷ W	38.160±1.710 †	²²² W	129.230±2.770
¹⁸⁵ Yb	-30.040±0.810	¹⁷⁶ Lu	-53.170±0.440	¹⁶⁵ Hf	-51.820±0.560	¹⁵⁸ Ta	-31.540±0.630	¹⁴⁸ W	29.390±1.840 †	²²³ W	137.540±2.790 †
¹⁸⁶ Yb	-27.630±0.860	¹⁷⁷ Lu	-52.360±0.460	¹⁶⁶ Hf	-53.830±0.600	¹⁵⁹ Ta	-34.660±0.560	¹⁴⁹ W	24.600±1.780 †	²²⁴ W	144.730±2.840
¹⁸⁷ Yb	-23.430±0.950	¹⁷⁸ Lu	-50.230±0.450	¹⁶⁷ Hf	-53.670±0.680	¹⁶⁰ Ta	-35.980±0.560	¹⁵⁰ W	17.230±1.580 †	²²⁵ W	153.300±2.960 †
¹⁸⁸ Yb	-20.840±0.990	¹⁷⁹ Lu	-49.170±0.410	¹⁶⁸ Hf	-55.510±0.560	¹⁶¹ Ta	-38.910±0.510	¹⁵¹ W	12.300±1.450 †	²²⁶ W	160.540±2.990
¹⁸⁹ Yb	-16.200±1.020	¹⁸⁰ Lu	-46.470±0.510	¹⁶⁹ Hf	-55.020±0.610	¹⁶² Ta	-39.870±0.500	¹⁵² W	5.050±1.330 †	²²⁷ W	169.590±3.100 †
¹⁹⁰ Yb	-13.570±1.130	¹⁸¹ Lu	-45.150±0.560	¹⁷⁰ Hf	-56.240±0.600	¹⁶³ Ta	-42.670±0.470	¹⁵³ W	0.350±1.280 †	²²⁸ W	177.080±3.220 ‡
¹⁹¹ Yb	-9.110±1.150	¹⁸² Lu	-42.290±0.640	¹⁷¹ Hf	-55.560±0.560	¹⁶⁴ Ta	-43.480±0.580	¹⁵⁴ W	-6.480±1.210 †	²²⁹ W	186.460±3.310 †
¹⁹² Yb	-6.420±1.320	¹⁸³ Lu	-40.400±0.520	¹⁷² Hf	-56.490±0.570	¹⁶⁵ Ta	-45.910±0.580	¹⁵⁵ W	-10.970±1.150 †	²³⁰ W	194.350±3.470 ‡
¹⁹³ Yb	-1.870±1.350	¹⁸⁴ Lu	-36.800±0.640	¹⁷³ Hf	-55.520±0.640	¹⁶⁶ Ta	-46.630±0.590	¹⁵⁶ W	-17.300±1.020 ‡	²³¹ W	203.360±3.600 †
¹⁹⁴ Yb	1.280±1.470	¹⁸⁵ Lu	-34.900±0.770	¹⁷⁴ Hf	-55.940±0.550	¹⁶⁷ Ta	-48.650±0.560	¹⁵⁷ W	-19.640±0.900	¹⁵⁴ Re	10.110±1.390 †
¹⁹⁵ Yb	5.860±1.530	¹⁸⁶ Lu	-31.240±0.730	¹⁷⁵ Hf	-54.370±0.530	¹⁶⁸ Ta	-49.140±0.560	¹⁵⁸ W	-23.490±0.860	¹⁵⁵ Re	3.260±1.370 †
¹⁹⁶ Yb	9.470±1.620	¹⁸⁷ Lu	-28.980±0.800	¹⁷⁶ Hf	-54.440±0.510	¹⁶⁹ Ta	-50.820±0.580	¹⁵⁹ W	-25.320±0.730	¹⁵⁶ Re	-1.800±1.220 †
¹⁹⁷ Yb	15.920±1.690	¹⁸⁸ Lu	-25.160±0.910	¹⁷⁷ Hf	-52.900±0.540	¹⁷⁰ Ta	-50.740±0.660	¹⁶⁰ W	-28.920±0.710	¹⁵⁷ Re	-8.220±1.120 †
¹⁹⁸ Yb	20.910±1.820	¹⁸⁹ Lu	-22.550±0.890	¹⁷⁸ Hf	-52.470±0.560	¹⁷¹ Ta	-52.170±0.600	¹⁶¹ W	-30.340±0.650	¹⁵⁸ Re	-10.930±1.060 †
¹⁹⁹ Yb	27.470±1.820	¹⁹⁰ Lu	-18.660±0.940	¹⁷⁹ Hf	-50.390±0.510	¹⁷² Ta	-51.870±0.600	¹⁶² W	-33.650±0.550	¹⁵⁹ Re	-14.840±0.940 †
²⁰⁰ Yb	32.600±1.910	¹⁹¹ Lu	-16.100±1.040	¹⁸⁰ Hf	-49.750±0.500	¹⁷³ Ta	-52.920±0.670	¹⁶³ W	-34.770±0.540	¹⁶⁰ Re	-17.150±0.900 †
²⁰¹ Yb	39.860±2.040	¹⁹² Lu	-12.180±1.090	¹⁸¹ Hf	-47.410±0.540	¹⁷⁴ Ta	-52.260±0.670	¹⁶⁴ W	-37.920±0.560	¹⁶¹ Re	-20.840±0.770 †
²⁰² Yb	44.950±2.010	¹⁹³ Lu	-9.560±1.140	¹⁸² Hf	-46.410±0.610	¹⁷⁵ Ta	-52.620±0.550	¹⁶⁵ W	-38.840±0.550	¹⁶² Re	-22.640±0.650 †
²⁰³ Yb	52.120±2.110	¹⁹⁴ Lu	-5.420±1.260	¹⁸³ Hf	-43.550±0.540	¹⁷⁶ Ta	-51.720±0.510	¹⁶⁶ W	-41.710±0.560	¹⁶³ Re	-26.110±0.660 †
²⁰⁴ Yb	57.650±2.160	¹⁹⁵ Lu	-2.390±1.370	¹⁸⁴ Hf	-41.900±0.550	¹⁷⁷ Ta	-51.810±0.440	¹⁶⁷ W	-42.440±0.560	¹⁶⁴ Re	-27.580±0.580
²⁰⁵ Yb	65.340±2.210	¹⁹⁶ Lu	1.610±1.430	¹⁸⁵ Hf	-38.720±0.570	¹⁷⁸ Ta	-50.640±0.500	¹⁶⁸ W	-45.100±0.560	¹⁶⁵ Re	-30.840±0.570
²⁰⁶ Yb	71.450±2.280	¹⁹⁷ Lu	5.240±1.480	¹⁸⁶ Hf	-37.260±0.690	¹⁷⁹ Ta	-50.260±0.530	¹⁶⁹ W	-45.430±0.650	¹⁶⁶ Re	-32.200±0.610
²⁰⁷ Yb	79.380±2.360	¹⁹⁸ Lu	11.290±1.580	¹⁸⁷ Hf	-33.750±0.740	¹⁸⁰ Ta	-48.600±0.540	¹⁷⁰ W	-47.530±0.610	¹⁶⁷ Re	-35.080±0.540
²⁰⁸ Yb	85.830±2.480	¹⁹⁹ Lu	16.130±1.640	¹⁸⁸ Hf	-31.870±0.770	¹⁸¹ Ta	-48.320±0.490	¹⁷¹ W	-47.650±0.650	¹⁶⁸ Re	-36.460±0.530
²⁰⁹ Yb	94.090±2.530 †	²⁰⁰ Lu	22.320±1.680	¹⁸⁹ Hf	-28.020±0.810	¹⁸² Ta	-46.300±0.450	¹⁷² W	-49.460±0.650	¹⁶⁹ Re	-38.950±0.610
²¹⁰ Yb	101.070±2.600	²⁰¹ Lu	27.560±1.760	¹⁹⁰ Hf	-26.170±0.810	¹⁸³ Ta	-45.310±0.370	¹⁷³ W	-49.300±0.640	¹⁷⁰ Re	-39.700±0.630
²¹¹ Yb	109.600±2.670 †	²⁰² Lu	34.060±1.810	¹⁹¹ Hf	-22.340±0.820	¹⁸⁴ Ta	-42.680±0.470	¹⁷⁴ W	-50.660±0.710	¹⁷¹ Re	-42.000±0.560
²¹² Yb	116.950±2.770	²⁰³ Lu	39.300±1.880	¹⁹² Hf	-20.320±0.970	¹⁸⁵ Ta	-41.440±0.420	¹⁷⁵ W	-49.930±0.670	¹⁷² Re	-42.510±0.680
²¹³ Yb	126.030±2.840 †	²⁰⁴ Lu	45.880±1.880	¹⁹³ Hf	-16.460±0.920	¹⁸⁶ Ta	-38.700±0.390	¹⁷⁶ W	-50.970±0.580	¹⁷³ Re	-44.450±0.590
²¹⁴ Yb	133.960±2.920 ‡	²⁰⁵ Lu	51.710±1.990	¹⁹⁴ Hf	-14.250±1.040	¹⁸⁷ Ta	-37.390±0.690	¹⁷⁷ W	-50.080±0.520	¹⁷⁴ Re	-44.590±0.650
²¹⁵ Yb	143.190±3.060 †	²⁰⁶ Lu	58.850±2.010	¹⁹⁵ Hf	-10.230±1.180	¹⁸⁸ Ta	-34.260±0.670	¹⁷⁸ W	-50.540±0.570	¹⁷⁵ Re	-45.890±0.670
²¹⁶ Yb	151.340±3.090 †	²⁰⁷ Lu	65.050±2.120	¹⁹⁶ Hf	-7.780±1.270	¹⁸⁹ Ta	-32.360±0.630	¹⁷⁹ W	-49.420±0.610	¹⁷⁶ Re	-45.840±0.670
²¹⁷ Yb	160.840±3.230 †	²⁰⁸ Lu	72.470±2.180	¹⁹⁷ Hf	-3.770±1.280	¹⁹⁰ Ta	-29.260±0.680	¹⁸⁰ W	-49.470±0.550	¹⁷⁷ Re	-46.890±0.640
²¹⁸ Yb	168.910±3.340 ‡	²⁰⁹ Lu	78.910±2.290	¹⁹⁸ Hf	-0.540±1.360	¹⁹¹ Ta	-27.470±0.720	¹⁸¹ W	-48.170±0.590	¹⁷⁸ Re	-46.370±0.570
²¹⁹ Yb	178.480±3.440 †	²¹⁰ Lu	86.850±2.380	¹⁹⁹ Hf	5.370±1.380	¹⁹² Ta	-24.190±0.810	¹⁸² W	-48.200±0.590	¹⁷⁹ Re	-46.880±0.570
²²⁰ Yb	186.840±3.540 †	²¹¹ Lu	93.660±2.410	²⁰⁰ Hf	9.840±1.490	¹⁹³ Ta	-22.240±0.840	¹⁸³ W	-46.180±0.550	¹⁸⁰ Re	-46.190±0.590
²²¹ Yb	196.460±3.750 †	²¹² Lu	101.850±2.500 †	²⁰¹ Hf	16.130±1.500	¹⁹⁴ Ta	-18.790±0.870	¹⁸⁴ W	-45.420±0.600	¹⁸¹ Re	-46.590±0.520
²²² Yb	204.990±3.840 †	²¹³ Lu	109.240±2.570	²⁰² Hf	20.610±1.500	¹⁹⁵ Ta	-16.700±1.000	¹⁸⁵ W	-43.220±0.450	¹⁸² Re	-45.600±0.580
²²³ Yb	215.160±3.900 †	²¹⁴ Lu	117.990±2.660 †	²⁰³ Hf	27.270±1.660	¹⁹⁶ Ta	-13.260±1.130	¹⁸⁶ W	-42.410±0.460	¹⁸³ Re	-45.640±0.460
²²⁴ Yb	223.820±3.960 †	²¹⁵ Lu	125.730±2.770 ‡	²⁰⁴ Hf	31.910±1.650	¹⁹⁷ Ta	-10.800±1.170	¹⁸⁷ W	-39.830±0.430	¹⁸⁴ Re	-43.860±0.580
²²⁵ Yb	234.250±4.100 †	²¹⁶ Lu	134.460±2.830 †	²⁰⁵ Hf	38.790±1.700	¹⁹⁸ Ta	-7.180±1.200	¹			

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁹⁸ Re	-19.220±0.870	¹⁹² Os	-35.630±0.580	¹⁹⁵ Ir	-31.650±0.460	¹⁹³ Pt	-34.460±0.560	¹⁹⁸ Au	-29.190±0.630	¹⁹⁹ Hg	-29.030±0.560
¹⁹⁹ Re	-17.300±0.880	¹⁹³ Os	-33.200±0.470	¹⁹⁶ Ir	-29.540±0.490	¹⁹⁴ Pt	-34.400±0.620	¹⁹⁹ Au	-28.880±0.540	²⁰⁰ Hg	-29.080±0.510
²⁰⁰ Re	-14.190±0.880	¹⁹⁴ Os	-32.430±0.650	¹⁹⁷ Ir	-28.680±0.610	¹⁹⁵ Pt	-32.500±0.700	²⁰⁰ Au	-27.020±0.420	²⁰¹ Hg	-27.130±0.480
²⁰¹ Re	-11.370±0.940	¹⁹⁵ Os	-29.750±0.630	¹⁹⁸ Ir	-26.320±0.570	¹⁹⁶ Pt	-32.430±0.620	²⁰¹ Au	-26.310±0.490	²⁰² Hg	-27.170±0.460
²⁰² Re	-6.490±0.920	¹⁹⁶ Os	-28.900±0.660	¹⁹⁹ Ir	-25.330±0.640	¹⁹⁷ Pt	-30.310±0.510	²⁰² Au	-24.420±0.410	²⁰³ Hg	-25.120±0.420
²⁰³ Re	-2.520±1.030	¹⁹⁷ Os	-26.140±0.620	²⁰⁰ Ir	-22.790±0.650	¹⁹⁸ Pt	-29.850±0.560	²⁰³ Au	-23.370±0.400	²⁰⁴ Hg	-24.670±0.380
²⁰⁴ Re	2.580±0.990	¹⁹⁸ Os	-25.010±0.730	²⁰¹ Ir	-21.140±0.720	¹⁹⁹ Pt	-27.630±0.480	²⁰⁴ Au	-21.360±0.510	²⁰⁵ Hg	-22.360±0.330
²⁰⁵ Re	6.920±1.070	¹⁹⁹ Os	-22.100±0.770	²⁰² Ir	-18.680±0.650	²⁰⁰ Pt	-27.010±0.550	²⁰⁵ Au	-19.440±0.490	²⁰⁶ Hg	-20.980±0.360
²⁰⁶ Re	12.730±1.150	²⁰⁰ Os	-20.550±0.810	²⁰³ Ir	-16.470±0.680	²⁰¹ Pt	-24.370±0.650	²⁰⁶ Au	-15.240±0.530	²⁰⁷ Hg	-16.700±0.440
²⁰⁷ Re	17.220±1.210	²⁰¹ Os	-17.340±0.840	²⁰⁴ Ir	-12.030±0.690	²⁰² Pt	-23.470±0.560	²⁰⁷ Au	-12.030±0.620	²⁰⁸ Hg	-13.990±0.490
²⁰⁸ Re	23.120±1.260	²⁰² Os	-15.280±0.770	²⁰⁵ Ir	-8.350±0.810	²⁰³ Pt	-20.870±0.580	²⁰⁸ Au	-7.600±0.570	²⁰⁹ Hg	-9.580±0.450
²⁰⁹ Re	27.970±1.330	²⁰³ Os	-10.240±0.860	²⁰⁶ Ir	-3.510±0.760	²⁰⁴ Pt	-19.250±0.560	²⁰⁹ Au	-4.240±0.660	²¹⁰ Hg	-6.530±0.580
²¹⁰ Re	34.370±1.400	²⁰⁴ Os	-6.870±0.890	²⁰⁷ Ir	0.380±0.870	²⁰⁵ Pt	-14.510±0.630	²¹⁰ Au	0.820±0.740	²¹¹ Hg	-1.650±0.640
²¹¹ Re	39.550±1.450	²⁰⁵ Os	-1.470±0.900	²⁰⁸ Ir	5.760±0.940	²⁰⁶ Pt	-11.380±0.690	²¹¹ Au	4.290±0.760	²¹² Hg	1.490±0.660
²¹² Re	46.130±1.500	²⁰⁶ Os	2.320±0.950	²⁰⁹ Ir	9.730±0.960	²⁰⁷ Pt	-6.440±0.690	²¹² Au	9.350±0.840	²¹³ Hg	6.580±0.720
²¹³ Re	51.780±1.590	²⁰⁷ Os	8.220±1.050	²¹⁰ Ir	15.310±1.060	²⁰⁸ Pt	-3.070±0.780	²¹³ Au	13.410±0.870	²¹⁴ Hg	10.320±0.740
²¹⁴ Re	58.910±1.630	²⁰⁸ Os	12.200±1.080	²¹¹ Ir	19.670±1.110	²⁰⁹ Pt	2.300±0.840	²¹⁴ Au	19.000±0.870	²¹⁵ Hg	15.720±0.840
²¹⁵ Re	64.910±1.720	²⁰⁹ Os	18.090±1.140	²¹² Ir	25.550±1.180	²¹⁰ Pt	5.960±0.880	²¹⁵ Au	23.370±0.980	²¹⁶ Hg	19.580±0.870
²¹⁶ Re	72.110±1.760	²¹⁰ Os	22.630±1.250	²¹³ Ir	30.430±1.210	²¹¹ Pt	11.360±0.960	²¹⁶ Au	28.970±1.010	²¹⁷ Hg	25.110±0.930
²¹⁷ Re	78.420±1.880	²¹¹ Os	28.840±1.260	²¹⁴ Ir	36.720±1.220	²¹² Pt	15.380±1.020	²¹⁷ Au	33.530±1.160	²¹⁸ Hg	29.070±1.060
²¹⁸ Re	85.810±2.000	²¹² Os	33.690±1.350	²¹⁵ Ir	41.860±1.410	²¹³ Pt	21.290±1.010	²¹⁸ Au	39.300±1.210	²¹⁹ Hg	34.880±1.120
²¹⁹ Re	92.400±2.110	²¹³ Os	40.310±1.340	²¹⁶ Ir	48.300±1.410	²¹⁴ Pt	25.850±1.060	²¹⁹ Au	44.160±1.270	²²⁰ Hg	39.130±1.180
²²⁰ Re	99.900±2.210	²¹⁴ Os	45.630±1.450	²¹⁷ Ir	53.720±1.500	²¹⁵ Pt	31.960±1.130	²²⁰ Au	50.130±1.360	²²¹ Hg	44.890±1.350
²²¹ Re	106.600±2.390	²¹⁵ Os	52.580±1.560	²¹⁸ Ir	60.250±1.600	²¹⁶ Pt	36.580±1.240	²²¹ Au	55.050±1.540	²²² Hg	49.520±1.390
²²² Re	114.430±2.470	²¹⁶ Os	58.070±1.550	²¹⁹ Ir	65.990±1.710	²¹⁷ Pt	42.960±1.300	²²² Au	61.370±1.590	²²³ Hg	55.700±1.380
²²³ Re	121.280±2.480	²¹⁷ Os	65.210±1.680	²²⁰ Ir	72.820±1.790	²¹⁸ Pt	47.780±1.360	²²³ Au	66.720±1.580	²²⁴ Hg	60.520±1.410
²²⁴ Re	129.070±2.520	²¹⁸ Os	70.900±1.780	²²¹ Ir	78.600±1.990	²¹⁹ Pt	54.350±1.470	²²⁴ Au	73.040±1.620	²²⁵ Hg	66.740±1.490
²²⁵ Re	136.160±2.630	²¹⁹ Os	78.330±1.900	²²² Ir	85.590±2.060	²²⁰ Pt	59.480±1.550	²²⁵ Au	78.680±1.700	²²⁶ Hg	71.860±1.480
²²⁶ Re	144.210±2.660	²²⁰ Os	84.330±1.990	²²³ Ir	91.850±2.060	²²¹ Pt	66.100±1.750	²²⁶ Au	85.220±1.710	²²⁷ Hg	78.430±1.560
²²⁷ Re	151.480±2.750	²²¹ Os	91.610±2.190	²²⁴ Ir	99.010±2.100	²²² Pt	71.590±1.790	²²⁷ Au	90.960±1.770	²²⁸ Hg	83.590±1.660
²²⁸ Re	159.950±2.890 †	²²² Os	98.010±2.240	²²⁵ Ir	105.240±2.180	²²³ Pt	78.430±1.810	²²⁸ Au	97.580±1.880	²²⁹ Hg	90.230±1.710
²²⁹ Re	167.460±2.960	²²³ Os	105.700±2.280	²²⁶ Ir	112.410±2.190	²²⁴ Pt	84.170±1.830	²²⁹ Au	103.620±1.930	²³⁰ Hg	95.590±1.800
²³⁰ Re	176.160±3.090 †	²²⁴ Os	112.030±2.310	²²⁷ Ir	119.010±2.270	²²⁵ Pt	91.230±1.940	²³⁰ Au	110.460±2.040	²³¹ Hg	102.400±1.850
²³¹ Re	184.020±3.190 ‡	²²⁵ Os	119.720±2.400	²²⁸ Ir	126.510±2.390	²²⁶ Pt	96.940±1.940	²³¹ Au	116.460±2.090	²³² Hg	107.930±1.900
²³² Re	192.560±3.320 †	²²⁶ Os	126.290±2.430	²²⁹ Ir	133.220±2.450	²²⁷ Pt	104.140±2.010	²³² Au	123.770±2.150	²³³ Hg	115.180±2.010
		²²⁷ Os	134.370±2.520 †	²³⁰ Ir	141.030±2.570	²²⁸ Pt	110.160±2.130	²³³ Au	130.040±2.250	²³⁴ Hg	121.020±2.060
¹⁵² Os	37.690±1.790 †	²²⁸ Os	141.060±2.640	²³¹ Ir	147.830±2.620	²²⁹ Pt	117.680±2.190	²³⁴ Au	137.750±2.320	²³⁵ Hg	128.700±2.110
¹⁵³ Os	32.030±1.660 †	²²⁹ Os	149.550±2.720 †	²³² Ir	156.040±2.690 †	²³⁰ Pt	123.710±2.290	²³⁵ Au	144.620±2.420	²³⁶ Hg	135.120±2.280
¹⁵⁴ Os	24.250±1.550 †	²³⁰ Os	156.380±2.830	²³³ Ir	163.370±2.830	²³¹ Pt	131.490±2.370	²³⁶ Au	152.180±2.620	²³⁷ Hg	142.600±2.470
¹⁵⁵ Os	19.060±1.530 †	²³¹ Os	165.050±2.900 †	²³⁴ Ir	171.410±2.970	²³² Pt	137.820±2.420				
¹⁵⁶ Os	11.650±1.410 †	²³² Os	172.450±3.010	¹⁵⁸ Pt	32.000±1.670 †	²³³ Pt	145.970±2.530 †	¹⁶³ Hg	36.350±1.520 †	¹⁷² Tl	14.790±1.010 †
¹⁵⁷ Os	6.490±1.290 †	²³³ Os	180.930±3.180 †	¹⁵⁹ Pt	26.420±1.520 †	²³⁴ Pt	152.870±2.640	¹⁶⁴ Hg	30.980±1.350 †	¹⁷³ Tl	10.290±0.930 †
¹⁵⁸ Os	-0.300±1.230 †			¹⁶⁰ Pt	19.100±1.470 †	²³⁵ Pt	160.880±2.760	¹⁶⁵ Hg	27.580±1.310 †	¹⁷⁴ Tl	7.630±0.860 †
¹⁵⁹ Os	-3.060±1.090 †	¹⁶² Ir	-0.370±1.000 †	¹⁶¹ Pt	15.770±1.330 †			¹⁶⁶ Hg	22.440±1.200 †	¹⁷⁵ Tl	3.760±0.840 †
¹⁶⁰ Os	-7.440±1.060 †	¹⁶³ Ir	-4.600±0.950 †	¹⁶² Pt	10.900±1.200 †	¹⁶⁶ Au	10.680±1.010 †	¹⁶⁷ Hg	19.580±1.170 †	¹⁷⁶ Tl	1.370±0.900 †
¹⁶¹ Os	-9.850±0.940 †	¹⁶⁴ Ir	-6.910±0.840 †	¹⁶³ Pt	7.960±1.150 †	¹⁶⁷ Au	6.300±1.020 †	¹⁶⁸ Hg	14.550±1.070 †	¹⁷⁷ Tl	-2.370±0.840 †
¹⁶² Os	-13.930±0.800 ‡	¹⁶⁵ Ir	-10.840±0.820 †	¹⁶⁴ Pt	3.370±0.990 †	¹⁶⁸ Au	3.630±0.880 †	¹⁶⁹ Hg	12.040±1.010 †	¹⁷⁸ Tl	-4.310±0.910 †
¹⁶³ Os	-15.880±0.770	¹⁶⁶ Ir	-12.850±0.730 †	¹⁶⁵ Pt	0.960±0.960 †	¹⁶⁹ Au	-0.570±0.850 †	¹⁷⁰ Hg	7.430±0.830 †	¹⁷⁹ Tl	-7.610±0.920 †
¹⁶⁴ Os	-19.700±0.690	¹⁶⁷ Ir	-16.570±0.750 †	¹⁶⁶ Pt	-3.410±0.900 †	¹⁷⁰ Au	-2.840±0.720 †	¹⁷¹ Hg	4.950±0.860 †	¹⁸⁰ Tl	-9.220±0.930 †
¹⁶⁵ Os	-21.270±0.630	¹⁶⁸ Ir	-18.580±0.640 †	¹⁶⁷ Pt	-5.430±0.890 †	¹⁷¹ Au	-6.830±0.740 †	¹⁷² Hg	0.590±0.830 †	¹⁸¹ Tl	-12.410±0.960 †
¹⁶⁶ Os	-24.980±0.580	¹⁶⁹ Ir	-21.940±0.590 †	¹⁶⁸ Pt	-9.790±0.780 ‡	¹⁷² Au	-9.050±0.800 †	¹⁷³ Hg	-1.760±0.780 ‡	¹⁸² Tl	-13.890±1.010
¹⁶⁷ Os	-26.350±0.630	¹⁷⁰ Ir	-23.580±0.630 †	¹⁶⁹ Pt	-11.650±0.740 ‡	¹⁷³ Au	-12.680±0.710 †	¹⁷⁴ Hg	-5.700±0.700 ‡	¹⁸³ Tl	-16.460±0.830
¹⁶⁸ Os	-29.870±0.530	¹⁷¹ Ir	-26.700±0.650 †	¹⁷⁰ Pt	-15.430±0.650	¹⁷⁴ Au	-14.440±0.600 †	¹⁷⁵ Hg	-7.410±0.660 ‡	¹⁸⁴ Tl	-17.330±0.800
¹⁶⁹ Os	-31.090±0.610	¹⁷² Ir	-28.030±0.620	¹⁷¹ Pt	-17.270±0.670	¹⁷⁵ Au	-17.010±0.570 †	¹⁷⁶ Hg	-11.140±0.720	¹⁸⁵ Tl	-19.600±0.770
¹⁷⁰ Os	-34.010±0.630	¹⁷³ Ir	-30.850±0.580	¹⁷² Pt	-20.760±0.690	¹⁷⁶ Au	-19.570±0.720	¹⁷⁷ Hg	-12.710±0.750	¹⁸⁶ Tl	-20.670±0.690
¹⁷¹ Os	-34.960±0.600	¹⁷⁴ Ir	-31.790±0.610	¹⁷³ Pt	-22.230±0.640	¹⁷⁷ Au	-21.940±0.710	¹⁷⁸ Hg	-15.960±0.750	¹⁸⁷ Tl	-22.640±0.680
¹⁷² Os	-37.640±0.580	¹⁷⁵ Ir	-33.980±0.530	¹⁷⁴ Pt	-25.350±0.590	¹⁷⁸ Au	-23.070±0.780	¹⁷⁹ Hg	-17.140±0.810	¹⁸⁸ Tl	-23.280±0.710
¹⁷³ Os	-38.280±0.600	¹⁷⁶ Ir	-34.730±0.620	¹⁷⁵ Pt	-26.230±0.570	¹⁷⁹ Au	-25.480±0.740	¹⁸⁰ Hg	-19.980±0.800	¹⁸⁹ Tl	-24.910±0.650
¹⁷⁴ Os	-40.520±0.620	¹⁷⁷ Ir	-36.720±0.580	¹⁷⁶ Pt	-29.090±0.690	¹⁸⁰ Au	-26.290±0.780	¹⁸¹ Hg	-21.140±0.840	¹⁹⁰ Tl	-25.240±0.600
¹⁷⁵ Os	-40.600±0.590	¹⁷⁸ Ir	-37.050±0.680	¹⁷⁷ Pt	-29.860±0.670	¹⁸¹ Au	-28.540±0.790	¹⁸² Hg	-23.710±0.860	¹⁹¹ Tl	-26.660±0.550
¹⁷⁶ Os	-42.580±0.640	¹⁷⁹ Ir	-38.520±0.660	¹⁷⁸ Pt	-32.220±0.680	¹⁸² Au	-29.170±0.740	¹⁸³ Hg	-24.340±0.660	¹⁹² Tl	-26.760±0.700
¹⁷⁷ Os	-42.540±0.680	¹⁸⁰ Ir	-38.480±0.640	¹⁷⁹ Pt	-32.600±0.740	¹⁸³ Au	-30.780±0.700	¹⁸⁴ Hg	-26.190±0.690	¹⁹³ Tl	-27.890±0.680
¹⁷⁸ Os	-43.960±0.650	¹⁸¹ Ir	-39.760±0.660	¹⁸⁰ Pt	-34.490±0.710	¹⁸⁴ Au	-31.000±0.670	¹⁸⁵ Hg	-26.830±0.640	¹⁹⁴ Tl	-27.490±0.660
¹⁷⁹ Os	-43.490±0.590	¹⁸² Ir	-39.750±0.740	¹⁸¹ Pt	-34.810±0.660	¹⁸⁵ Au	-32.380±0.650	¹⁸⁶ Hg	-28.640±0.580	¹⁹⁵ Tl	-28.500±0.700
¹⁸⁰ Os	-44.420±0.630	¹⁸³ Ir	-40.470±0								

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
²⁰⁸ Tl	-16.900±0.330	²¹⁴ Pb	-0.220±0.400	²³¹ Bi	69.320±1.190	¹⁸⁶ At	20.820±1.380 †	²⁰⁰ Rn	-4.030±0.740	²²³ Fr	18.430±0.380
²⁰⁹ Tl	-13.910±0.370	²¹⁵ Pb	4.370±0.550	²³² Bi	74.780±1.210	¹⁸⁷ At	17.010±1.320 †	²⁰¹ Rn	-4.200±0.680	²²⁴ Fr	21.620±0.340
²¹⁰ Tl	-9.460±0.410	²¹⁶ Pb	7.410±0.610	²³³ Bi	79.580±1.290	¹⁸⁸ At	14.750±1.270 †	²⁰² Rn	-6.380±0.570	²²⁵ Fr	23.740±0.340
²¹¹ Tl	-6.590±0.480	²¹⁷ Pb	12.240±0.660	²³⁴ Bi	85.430±1.340	¹⁸⁹ At	11.550±1.190 †	²⁰³ Rn	-6.470±0.550	²²⁶ Fr	27.150±0.290
²¹² Tl	-2.040±0.580	²¹⁸ Pb	15.430±0.730	²³⁵ Bi	90.430±1.370	¹⁹⁰ At	9.210±1.030 †	²⁰⁴ Rn	-8.390±0.600	²²⁷ Fr	29.640±0.300
²¹³ Tl	1.130±0.540	²¹⁹ Pb	20.390±0.770	²³⁶ Bi	96.770±1.490	¹⁹¹ At	6.070±0.970 †	²⁰⁵ Rn	-7.980±0.480	²²⁸ Fr	33.270±0.390
²¹⁴ Tl	5.900±0.550	²²⁰ Pb	23.790±0.900	²³⁷ Bi	102.050±1.580	¹⁹² At	4.100±1.040 †	²⁰⁶ Rn	-9.370±0.500	²²⁹ Fr	36.080±0.410
²¹⁵ Tl	9.450±0.660	²²¹ Pb	28.780±1.010	²³⁸ Bi	108.810±1.660	¹⁹³ At	1.030±0.890 †	²⁰⁷ Rn	-8.780±0.410	²³⁰ Fr	39.910±0.470
²¹⁶ Tl	14.350±0.700	²²² Pb	32.530±1.000	²³⁹ Bi	114.670±1.800	¹⁹⁴ At	-0.380±0.870 †	²⁰⁸ Rn	-9.930±0.390	²³¹ Fr	42.870±0.480
²¹⁷ Tl	18.140±0.780	²²³ Pb	37.850±1.000	²⁴⁰ Bi	121.340±1.950	¹⁹⁵ At	-2.940±0.820 †	²⁰⁹ Rn	-9.160±0.310	²³² Fr	46.860±0.500
²¹⁸ Tl	23.070±0.810	²²⁴ Pb	41.810±1.010	¹⁷⁸ Po	33.240±1.280 †	¹⁹⁶ At	-4.210±0.730	²¹⁰ Rn	-9.700±0.320	²³³ Fr	50.210±0.560
²¹⁹ Tl	27.060±0.950	²²⁵ Pb	47.370±1.070	¹⁷⁹ Po	30.420±1.290 †	¹⁹⁷ At	-6.430±0.740 †	²¹¹ Rn	-8.860±0.290	²³⁴ Fr	54.550±0.590
²²⁰ Tl	32.270±1.000	²²⁶ Pb	51.560±1.070	¹⁸⁰ Po	25.830±1.270 †	¹⁹⁸ At	-7.120±0.770	²¹² Rn	-8.750±0.350	²³⁵ Fr	58.020±0.600
²²¹ Tl	36.310±1.130	²²⁷ Pb	57.300±1.120	¹⁸¹ Po	23.060±1.330 †	¹⁹⁹ At	-9.230±0.640	²¹³ Rn	-5.790±0.420	²³⁶ Fr	62.510±0.680
²²² Tl	41.780±1.150	²²⁸ Pb	61.870±1.220	¹⁸² Po	18.670±1.330 †	²⁰⁰ At	-9.510±0.680	²¹⁴ Rn	-4.210±0.440	²³⁷ Fr	66.320±0.750
²²³ Tl	46.260±1.150	²²⁹ Pb	67.880±1.260	¹⁸³ Po	16.380±1.270 †	²⁰¹ At	-10.940±0.620	²¹⁵ Rn	-1.100±0.490	²³⁸ Fr	71.210±0.810
²²⁴ Tl	51.920±1.170	²³⁰ Pb	72.380±1.340	¹⁸⁴ Po	12.640±1.310 †	²⁰² At	-11.180±0.600	²¹⁶ Rn	0.440±0.440	²³⁹ Fr	75.220±0.870
²²⁵ Tl	56.640±1.250	²³¹ Pb	78.310±1.380	¹⁸⁵ Po	10.500±1.230 †	²⁰³ At	-12.500±0.510	²¹⁷ Rn	3.940±0.540	²⁴⁰ Fr	80.650±0.930
²²⁶ Tl	62.340±1.260	²³² Pb	83.170±1.410	¹⁸⁶ Po	6.840±1.160 †	²⁰⁴ At	-12.390±0.520	²¹⁸ Rn	5.430±0.440	²⁴¹ Fr	84.980±0.990
²²⁷ Tl	67.490±1.300	²³³ Pb	89.450±1.500	¹⁸⁷ Po	4.960±1.130 †	²⁰⁵ At	-13.240±0.520	²¹⁹ Rn	8.870±0.430	²⁴² Fr	90.890±1.020
²²⁸ Tl	73.480±1.420	²³⁴ Pb	94.490±1.540	¹⁸⁸ Po	1.730±1.110 ‡	²⁰⁶ At	-12.730±0.460	²²⁰ Rn	10.680±0.460	²⁴³ Fr	95.870±1.150
²²⁹ Tl	78.660±1.450	²³⁵ Pb	101.270±1.610	¹⁸⁹ Po	0.150±0.950 ‡	²⁰⁷ At	-13.370±0.400	²²¹ Rn	14.120±0.470	²⁴⁴ Fr	101.590±1.350
²³⁰ Tl	84.620±1.540	²³⁶ Pb	106.630±1.710	¹⁹⁰ Po	-2.930±0.860 ‡	²⁰⁸ At	-12.590±0.350	²²² Rn	16.240±0.450	¹⁸⁸ Ra	53.860±1.900 †
²³¹ Tl	89.950±1.590	²³⁷ Pb	113.790±1.820	¹⁹¹ Po	-4.360±0.850	²⁰⁹ At	-12.810±0.320	²²³ Rn	19.960±0.430	¹⁸⁹ Ra	50.780±1.790 †
²³² Tl	96.290±1.630	²³⁸ Pb	119.720±1.960	¹⁹² Po	-7.360±0.870	²¹⁰ At	-11.800±0.350	²²⁴ Rn	22.180±0.470	¹⁹⁰ Ra	45.850±1.700 †
²³³ Tl	101.760±1.720	²³⁹ Pb	126.740±2.140	¹⁹³ Po	-8.360±0.750	²¹¹ At	-11.700±0.320	²²⁵ Rn	26.110±0.460	¹⁹¹ Ra	42.800±1.610 †
²³⁴ Tl	108.570±1.790	¹⁸² Bi	7.510±1.270 †	¹⁹⁴ Po	-10.800±0.710	²¹² At	-8.420±0.340	²²⁶ Rn	28.570±0.450	¹⁹² Ra	38.240±1.590 †
²³⁵ Tl	114.380±1.820	¹⁸³ Bi	4.000±1.120 †	¹⁹⁵ Po	-11.490±0.650	²¹³ At	-6.520±0.440	²²⁷ Rn	32.780±0.460	¹⁹³ Ra	35.230±1.370 †
²³⁶ Tl	121.610±1.950	¹⁸⁴ Bi	2.280±1.170 †	¹⁹⁶ Po	-13.730±0.650	²¹⁴ At	-3.230±0.430	²²⁸ Rn	35.570±0.550	¹⁹⁴ Ra	31.070±1.320 †
²³⁷ Tl	127.960±2.110	¹⁸⁵ Bi	-0.940±1.080 †	¹⁹⁷ Po	-14.020±0.650	²¹⁵ At	-1.170±0.440	²²⁹ Rn	40.080±0.550	¹⁹⁵ Ra	28.500±1.260 †
²³⁸ Tl	135.040±2.270	¹⁸⁶ Bi	-2.670±1.020 †	¹⁹⁸ Po	-15.990±0.680	²¹⁶ At	2.390±0.510	²³⁰ Rn	43.070±0.630	¹⁹⁶ Ra	24.330±1.270 †
¹⁷⁰ Pb	35.130±1.210 †	¹⁸⁷ Bi	-5.520±0.980 †	¹⁹⁹ Po	-15.890±0.680	²¹⁷ At	4.480±0.440	²³¹ Rn	47.530±0.650	¹⁹⁷ Ra	22.230±1.170 †
¹⁷¹ Pb	32.000±1.210 †	¹⁸⁸ Bi	-7.130±0.860 †	²⁰⁰ Po	-17.420±0.650	²¹⁸ At	7.890±0.470	²³² Rn	50.940±0.660	¹⁹⁸ Ra	18.710±1.140 ‡
¹⁷² Pb	26.810±1.170 †	¹⁸⁹ Bi	-9.450±0.770 †	²⁰¹ Po	-16.910±0.640	²¹⁹ At	10.300±0.480	²³³ Rn	55.710±0.730	¹⁹⁹ Ra	16.910±0.970 ‡
¹⁷³ Pb	23.820±1.100 †	¹⁹⁰ Bi	-10.820±0.790 †	²⁰² Po	-18.390±0.590	²²⁰ At	13.950±0.540	²³⁴ Rn	59.220±0.750	²⁰⁰ Ra	13.780±1.000
¹⁷⁴ Pb	19.020±1.000 †	¹⁹¹ Bi	-13.270±0.690 †	²⁰³ Po	-17.670±0.430	²²¹ At	16.370±0.630	²³⁵ Rn	64.150±0.760	²⁰¹ Ra	12.680±0.890
¹⁷⁵ Pb	16.420±0.980 †	¹⁹² Bi	-14.210±0.680	²⁰⁴ Po	-18.830±0.610	²²² At	20.230±0.610	²³⁶ Rn	68.040±0.840	²⁰² Ra	9.540±0.810
¹⁷⁶ Pb	11.870±1.070 †	¹⁹³ Bi	-16.240±0.630	²⁰⁵ Po	-17.770±0.500	²²³ At	22.970±0.630	²³⁷ Rn	73.330±0.930	²⁰³ Ra	8.770±0.720
¹⁷⁷ Pb	9.470±0.970 †	¹⁹⁴ Bi	-16.810±0.640	²⁰⁶ Po	-18.500±0.480	²²⁴ At	27.010±0.610	²³⁸ Rn	77.410±0.990	²⁰⁴ Ra	6.140±0.700
¹⁷⁸ Pb	5.360±0.960 †	¹⁹⁵ Bi	-18.470±0.640	²⁰⁷ Po	-17.210±0.380	²²⁵ At	29.980±0.630	²³⁹ Rn	83.190±1.070	²⁰⁵ Ra	5.760±0.660
¹⁷⁹ Pb	3.360±1.080 †	¹⁹⁶ Bi	-18.770±0.620	²⁰⁸ Po	-17.420±0.300	²²⁶ At	34.160±0.600	²⁴⁰ Rn	87.650±1.100	²⁰⁶ Ra	3.590±0.550
¹⁸⁰ Pb	-0.350±1.020 ‡	¹⁹⁷ Bi	-20.340±0.700	²⁰⁹ Po	-16.440±0.310	²²⁷ At	37.530±0.620	²⁴¹ Rn	93.860±1.190	²⁰⁷ Ra	3.540±0.420
¹⁸¹ Pb	-2.320±1.110 ‡	¹⁹⁸ Bi	-20.100±0.740	²¹⁰ Po	-16.120±0.340	²²⁸ At	42.020±0.700	²⁴² Rn	98.960±1.290	²⁰⁸ Ra	1.730±0.450
¹⁸² Pb	-5.830±1.130	¹⁹⁹ Bi	-21.260±0.650	²¹¹ Po	-12.550±0.370	²²⁹ At	45.690±0.740	²⁴³ Rn	105.070±1.450	²⁰⁹ Ra	1.800±0.330
¹⁸³ Pb	-7.310±1.010	²⁰⁰ Bi	-20.850±0.640	²¹² Po	-10.340±0.390	²³⁰ At	50.180±0.830	¹⁹² Fr	26.760±1.310 †	²¹⁰ Ra	0.320±0.350
¹⁸⁴ Pb	-10.120±0.980	²⁰¹ Bi	-21.570±0.630	²¹³ Po	-6.720±0.460	²³¹ At	54.060±0.840	¹⁹³ Fr	23.010±1.190 †	²¹¹ Ra	0.600±0.310
¹⁸⁵ Pb	-11.410±0.890	²⁰² Bi	-21.020±0.500	²¹⁴ Po	-4.470±0.380	²³² At	58.890±0.870	¹⁹⁴ Fr	20.560±1.220 †	²¹² Ra	-0.460±0.390
¹⁸⁶ Pb	-14.110±0.890	²⁰³ Bi	-21.570±0.540	²¹⁵ Po	-0.400±0.420	²³³ At	62.840±0.930	¹⁹⁵ Fr	16.970±1.120 †	²¹³ Ra	0.080±0.380
¹⁸⁷ Pb	-15.340±0.760	²⁰⁴ Bi	-20.810±0.590	²¹⁶ Po	1.750±0.410	²³⁴ At	67.800±0.960	¹⁹⁶ Fr	14.860±1.080 †	²¹⁴ Ra	-0.100±0.430
¹⁸⁸ Pb	-17.680±0.730	²⁰⁵ Bi	-21.000±0.510	²¹⁷ Po	5.760±0.460	²³⁵ At	72.130±0.980	¹⁹⁷ Fr	11.730±1.020 †	²¹⁵ Ra	2.360±0.440
¹⁸⁹ Pb	-18.290±0.690	²⁰⁶ Bi	-19.800±0.490	²¹⁸ Po	8.130±0.500	²³⁶ At	77.500±1.070	¹⁹⁸ Fr	10.080±0.950 †	²¹⁶ Ra	3.230±0.480
¹⁹⁰ Pb	-20.680±0.670	²⁰⁷ Bi	-19.850±0.400	²¹⁹ Po	12.400±0.570	²³⁷ At	81.980±1.160	¹⁹⁹ Fr	7.310±0.900 †	²¹⁷ Ra	5.770±0.560
¹⁹¹ Pb	-21.080±0.620	²⁰⁸ Bi	-18.810±0.350	²²⁰ Po	15.020±0.640	²³⁸ At	87.840±1.250	²⁰⁰ Fr	6.110±0.840 †	²¹⁸ Ra	6.650±0.430
¹⁹² Pb	-23.040±0.630	²⁰⁹ Bi	-18.170±0.400	²²¹ Po	19.170±0.720	²³⁹ At	92.650±1.300	²⁰¹ Fr	3.730±0.780 †	²¹⁹ Ra	9.580±0.530
¹⁹³ Pb	-23.210±0.660	²¹⁰ Bi	-14.420±0.400	²²² Po	22.060±0.770	²⁴⁰ At	98.980±1.360	²⁰² Fr	2.800±0.690	²²⁰ Ra	10.500±0.460
¹⁹⁴ Pb	-24.740±0.650	²¹¹ Bi	-11.920±0.370	²²³ Po	26.620±0.720	²⁴¹ At	104.370±1.500	²⁰³ Fr	0.770±0.580	²²¹ Ra	13.130±0.320
¹⁹⁵ Pb	-24.470±0.690	²¹² Bi	-7.990±0.360	²²⁴ Po	29.700±0.720	²⁴² At	110.610±1.630	²⁰⁴ Fr	0.090±0.700	²²² Ra	14.430±0.350
¹⁹⁶ Pb	-26.050±0.740	²¹³ Bi	-5.420±0.450	²²⁵ Po	34.400±0.760	¹⁸² Rn	47.810±1.650 †	²⁰⁵ Fr	-1.530±0.580	²²³ Ra	17.440±0.370
¹⁹⁷ Pb	-25.420±0.720	²¹⁴ Bi	-1.160±0.410	²²⁶ Po	37.730±0.740	¹⁸³ Rn	44.720±1.600 †	²⁰⁶ Fr	-1.660±0.430	²²⁴ Ra	18.890±0.340
¹⁹⁸ Pb	-26.430±0.720	²¹⁵ Bi	1.500±0.380	²²⁷ Po	42.800±0.780	¹⁸⁴ Rn	40.080±1.620 †	²⁰⁷ Fr	-2.970±0.440	²²⁵ Ra	21.980±0.260
¹⁹⁹ Pb	-25.650±0.660	²¹⁶ Bi	5.580±0.500	²²⁸ Po	46.450±0.880	¹⁸⁵ Rn	37.140±1.610 †	²⁰⁸ Fr	-2.880±0.370	²²⁶ Ra	23.580±0.320
²⁰⁰ Pb	-26.470±0.670	²¹⁷ Bi	8.550±0.560	²²⁹ Po	51.620±0.910	¹⁸⁶ Rn	32.540±1.590 †	²⁰⁹ Fr	-4.050±0.360	²²⁷ Ra	27.030±0.280
²⁰¹ Pb	-25.160±0.540	²¹⁸ Bi	12.780±0.600	²³⁰ Po	55.530±0.990	¹⁸⁷ Rn	29.820±1.540 †	²¹⁰ Fr	-3.600±0.340	²²⁸ Ra	28.940±0.330
²⁰² Pb	-25.870±0.610	²¹⁹ Bi	16.000±0.690	²³¹ Po	60.830±1.020	¹⁸⁸ Rn	25.620±1.460 †	²¹¹ Fr	-4.310±0.310		

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
²⁴¹ Ra	76.780±0.840	²¹² Th	12.340±0.400	²⁴⁵ Pa	75.050±0.560	²³¹ Np	35.600±0.270	²²⁴ Am	43.480±0.870	²²³ Bk	60.370±1.220 †
²⁴² Ra	80.820±0.840	²¹³ Th	12.310±0.440	²⁴⁶ Pa	80.000±0.650	²³² Np	37.300±0.200	²²⁵ Am	42.520±0.800	²²⁴ Bk	59.910±1.110 †
²⁴³ Ra	86.610±0.910	²¹⁴ Th	10.970±0.460	²⁴⁷ Pa	83.990±0.820	²³³ Np	38.000±0.220	²²⁶ Am	43.050±0.660	²²⁵ Bk	58.280±1.050 †
²⁴⁴ Ra	91.190±1.070	²¹⁵ Th	11.000±0.390	²⁴⁸ Pa	88.800±1.030	²³⁴ Np	39.970±0.200	²²⁷ Am	42.210±0.570	²²⁶ Bk	57.850±0.970 †
²⁴⁵ Ra	96.830±1.270	²¹⁶ Th	10.120±0.400	²⁰¹ U	60.010±1.570 †	²³⁵ Np	41.070±0.260	²²⁸ Am	42.710±0.590	²²⁷ Bk	56.400±0.920 †
¹⁹⁸ Ac	31.740±1.270 †	²¹⁷ Th	12.000±0.470	²⁰² U	55.320±1.430 †	²³⁶ Np	43.430±0.200	²²⁹ Am	42.190±0.510	²²⁸ Bk	56.390±0.870 †
¹⁹⁹ Ac	28.070±1.160 †	²¹⁸ Th	12.210±0.470	²⁰³ U	52.650±1.300 †	²³⁷ Np	44.870±0.200	²³⁰ Am	42.850±0.460	²²⁹ Bk	54.980±0.740 †
²⁰⁰ Ac	25.900±1.030 †	²¹⁹ Th	14.180±0.490	²⁰⁴ U	48.420±1.250 †	²³⁸ Np	47.410±0.200	²³¹ Am	42.440±0.410	²³⁰ Bk	54.830±0.720
²⁰¹ Ac	22.870±1.060 †	²²⁰ Th	14.490±0.440	²⁰⁵ U	46.420±1.160 †	²³⁹ Np	49.290±0.200	²³² Am	43.300±0.350	²³¹ Bk	53.600±0.650
²⁰² Ac	21.010±0.900 †	²²¹ Th	16.610±0.420	²⁰⁶ U	42.600±1.090 †	²⁴⁰ Np	52.250±0.200	²³³ Am	43.130±0.330	²³² Bk	53.760±0.560
²⁰³ Ac	18.030±0.850 †	²²² Th	17.020±0.350	²⁰⁷ U	41.070±1.050 †	²⁴¹ Np	54.250±0.200	²³⁴ Am	44.350±0.310	²³³ Bk	52.820±0.550
²⁰⁴ Ac	16.660±0.810 †	²²³ Th	19.220±0.330	²⁰⁸ U	37.770±0.950 †	²⁴² Np	57.420±0.200	²³⁵ Am	44.570±0.290	²³⁴ Bk	53.190±0.490
²⁰⁵ Ac	14.330±0.700 †	²²⁴ Th	19.850±0.280	²⁰⁹ U	36.410±0.940 †	²⁴³ Np	59.860±0.200	²³⁶ Am	46.060±0.210	²³⁵ Bk	52.550±0.400
²⁰⁶ Ac	13.410±0.680 †	²²⁵ Th	22.240±0.280	²¹⁰ U	33.490±0.880 †	²⁴⁴ Np	63.390±0.210	²³⁷ Am	46.650±0.230	²³⁶ Bk	53.280±0.380
²⁰⁷ Ac	11.320±0.570 †	²²⁶ Th	23.070±0.340	²¹¹ U	32.430±0.770 †	²⁴⁵ Np	66.020±0.260	²³⁸ Am	48.520±0.210	²³⁷ Bk	52.990±0.360
²⁰⁸ Ac	10.770±0.490	²²⁷ Th	25.670±0.330	²¹² U	29.770±0.740 †	²⁴⁶ Np	70.080±0.310	²³⁹ Am	49.490±0.200	²³⁸ Bk	54.000±0.330
²⁰⁹ Ac	8.940±0.450	²²⁸ Th	26.720±0.250	²¹³ U	29.060±0.650 †	²⁴⁷ Np	73.010±0.410	²⁴⁰ Am	51.610±0.220	²³⁹ Bk	54.110±0.300
²¹⁰ Ac	8.700±0.340	²²⁹ Th	29.610±0.270	²¹⁴ U	26.770±0.630	²⁴⁸ Np	77.490±0.510	²⁴¹ Am	53.010±0.200	²⁴⁰ Bk	55.560±0.240
²¹¹ Ac	7.050±0.330	²³⁰ Th	30.860±0.220	²¹⁵ U	26.240±0.610	²⁴⁹ Np	81.010±0.620	²⁴² Am	55.550±0.240	²⁴¹ Bk	56.050±0.200
²¹² Ac	6.980±0.350	²³¹ Th	33.790±0.260	²¹⁶ U	24.200±0.530	²⁵⁰ Np	85.410±0.750	²⁴³ Am	57.140±0.240	²⁴² Bk	57.750±0.200
²¹³ Ac	5.970±0.370	²³² Th	35.420±0.260	²¹⁷ U	23.650±0.550	²⁰⁸ Pu	62.440±1.340 †	²⁴⁴ Am	59.790±0.200	²⁴³ Bk	58.740±0.200
²¹⁴ Ac	6.180±0.340	²³³ Th	38.690±0.240	²¹⁸ U	22.100±0.600	²⁰⁹ Pu	60.390±1.290 †	²⁴⁵ Am	61.750±0.200	²⁴⁴ Bk	60.760±0.210
²¹⁵ Ac	5.810±0.390	²³⁴ Th	40.690±0.240	²¹⁹ U	23.420±0.600	²¹⁰ Pu	56.760±1.200 †	²⁴⁶ Am	64.830±0.230	²⁴⁵ Bk	61.870±0.200
²¹⁶ Ac	7.760±0.460	²³⁵ Th	44.150±0.250	²²⁰ U	23.060±0.580	²¹¹ Pu	54.910±1.180 †	²⁴⁷ Am	66.960±0.210	²⁴⁶ Bk	64.070±0.220
²¹⁷ Ac	8.570±0.450	²³⁶ Th	46.590±0.320	²²¹ U	24.220±0.670	²¹² Pu	51.480±1.110 †	²⁴⁸ Am	70.550±0.220	²⁴⁷ Bk	65.530±0.220
²¹⁸ Ac	10.500±0.480	²³⁷ Th	50.380±0.380	²²² U	24.030±0.640	²¹³ Pu	50.120±1.020 †	²⁴⁹ Am	73.010±0.330	²⁴⁸ Bk	68.140±0.210
²¹⁹ Ac	11.420±0.370	²³⁸ Th	52.930±0.410	²²³ U	25.700±0.530	²¹⁴ Pu	47.170±0.960 †	²⁵⁰ Am	77.080±0.300	²⁴⁹ Bk	69.810±0.220
²²⁰ Ac	13.740±0.510	²³⁹ Th	56.860±0.460	²²⁴ U	25.450±0.470	²¹⁵ Pu	45.940±0.880 †	²⁵¹ Am	80.170±0.410	²⁵⁰ Bk	72.980±0.250
²²¹ Ac	14.450±0.280	²⁴⁰ Th	59.850±0.450	²²⁵ U	27.020±0.420	²¹⁶ Pu	42.960±0.800 †	²⁵² Am	84.010±0.570	²⁵¹ Bk	75.010±0.270
²²² Ac	16.790±0.330	²⁴¹ Th	64.180±0.530	²²⁶ U	27.030±0.350	²¹⁷ Pu	41.850±0.850 †	²¹² Cm	77.500±1.460 †	²⁵² Bk	78.520±0.220
²²³ Ac	17.950±0.350	²⁴² Th	67.420±0.520	²²⁷ U	28.930±0.310	²¹⁸ Pu	39.140±0.830 †	²¹³ Cm	75.350±1.450 †	²⁵³ Bk	81.110±0.320
²²⁴ Ac	20.430±0.360	²⁴³ Th	72.310±0.580	²²⁸ U	29.210±0.280	²¹⁹ Pu	38.030±0.810	²¹⁴ Cm	71.630±1.370 †	²⁵⁴ Bk	84.550±0.540
²²⁵ Ac	21.780±0.300	²⁴⁴ Th	75.830±0.630	²²⁹ U	31.260±0.260	²²⁰ Pu	35.920±0.810	²¹⁵ Cm	69.760±1.290 †	²¹⁶ Cf	93.470±1.630 †
²²⁶ Ac	24.350±0.330	²⁴⁵ Th	81.140±0.730	²³⁰ U	31.650±0.280	²²¹ Pu	36.420±0.890	²¹⁶ Cm	66.110±1.190 †	²¹⁷ Cf	91.030±1.590 †
²²⁷ Ac	25.980±0.330	²⁴⁶ Th	85.280±0.880	²³¹ U	33.820±0.220	²²² Pu	35.560±0.850	²¹⁷ Cm	64.310±1.170 †	²¹⁸ Cf	86.710±1.560 †
²²⁸ Ac	28.850±0.220	²⁴⁷ Th	90.410±1.080	²³² U	34.570±0.210	²²³ Pu	36.280±0.820	²¹⁸ Cm	60.660±1.140 †	²¹⁹ Cf	84.350±1.510 †
²²⁹ Ac	30.780±0.280	²⁰⁶ Pa	32.870±0.940 †	²³³ U	36.980±0.220	²²⁴ Pu	35.420±0.740	²¹⁹ Cm	58.980±1.160 †	²²⁰ Cf	80.130±1.450 †
²³⁰ Ac	33.750±0.320	²⁰⁷ Pa	30.080±0.840 †	²³⁴ U	38.120±0.240	²²⁵ Pu	36.470±0.620	²²⁰ Cm	55.710±1.120 †	²²¹ Cf	77.640±1.550 †
²³¹ Ac	35.850±0.230	²⁰⁸ Pa	28.730±0.860 †	²³⁵ U	40.920±0.220	²²⁶ Pu	35.600±0.530	²²¹ Cm	53.780±1.190 †	²²² Cf	73.860±1.460 †
²³² Ac	39.180±0.290	²⁰⁹ Pa	26.130±0.750 †	²³⁶ U	42.440±0.200	²²⁷ Pu	36.680±0.470	²²² Cm	51.170±1.120 †	²²³ Cf	71.500±1.370 †
²³³ Ac	41.610±0.320	²¹⁰ Pa	25.250±0.680 †	²³⁷ U	45.380±0.200	²²⁸ Pu	36.140±0.490	²²³ Cm	51.230±1.040 †	²²⁴ Cf	68.210±1.320 †
²³⁴ Ac	45.110±0.330	²¹¹ Pa	22.920±0.650 †	²³⁸ U	47.340±0.200	²²⁹ Pu	37.480±0.390	²²⁴ Cm	49.700±0.980	²²⁵ Cf	67.650±1.210 †
²³⁵ Ac	47.990±0.350	²¹² Pa	22.170±0.530 †	²³⁹ U	50.640±0.200	²³⁰ Pu	37.100±0.370	²²⁵ Cm	49.790±0.920	²²⁶ Cf	65.500±1.130 †
²³⁶ Ac	51.850±0.430	²¹³ Pa	20.210±0.530 †	²⁴⁰ U	52.770±0.200	²³¹ Pu	38.430±0.300	²²⁶ Cm	48.310±0.840	²²⁷ Cf	65.110±1.080 †
²³⁷ Ac	54.800±0.480	²¹⁴ Pa	19.860±0.530 †	²⁴¹ U	56.230±0.270	²³² Pu	38.320±0.220	²²⁷ Cm	48.880±0.730	²²⁸ Cf	63.080±1.080 †
²³⁸ Ac	58.810±0.530	²¹⁵ Pa	18.330±0.510 †	²⁴² U	58.800±0.240	²³³ Pu	39.970±0.220	²²⁸ Cm	47.460±0.710	²²⁹ Cf	63.080±0.920
²³⁹ Ac	62.150±0.540	²¹⁶ Pa	17.850±0.400	²⁴³ U	62.720±0.270	²³⁴ Pu	40.220±0.250	²²⁹ Cm	47.980±0.620	²³⁰ Cf	61.000±0.880
²⁴⁰ Ac	66.610±0.580	²¹⁷ Pa	16.910±0.510	²⁴⁴ U	65.440±0.320	²³⁵ Pu	42.170±0.250	²³⁰ Cm	46.780±0.590	²³¹ Cf	60.810±0.830
²⁴¹ Ac	70.140±0.650	²¹⁸ Pa	18.180±0.510	²⁴⁵ U	69.850±0.380	²³⁶ Pu	42.820±0.210	²³¹ Cm	47.410±0.520	²³² Cf	59.110±0.740
²⁴² Ac	75.150±0.670	²¹⁹ Pa	18.430±0.500	²⁴⁶ U	72.930±0.450	²³⁷ Pu	45.100±0.200	²³² Cm	46.530±0.450	²³³ Cf	59.210±0.690
²⁴³ Ac	79.070±0.700	²²⁰ Pa	19.800±0.500	²⁴⁷ U	77.730±0.550	²³⁸ Pu	46.140±0.200	²³³ Cm	47.330±0.460	²³⁴ Cf	57.840±0.650
²⁴⁴ Ac	84.470±0.870	²²¹ Pa	19.900±0.600	²⁴⁸ U	81.400±0.730	²³⁹ Pu	48.610±0.200	²³⁴ Cm	46.730±0.380	²³⁵ Cf	58.180±0.590
²⁴⁵ Ac	88.960±0.900	²²² Pa	21.720±0.420	²⁴⁹ U	86.060±0.870	²⁴⁰ Pu	50.150±0.200	²³⁵ Cm	47.910±0.340	²³⁶ Cf	57.090±0.520
²⁴⁶ Ac	94.240±1.150	²²³ Pa	21.990±0.430	²¹⁰ Np	46.130±1.080 †	²⁴¹ Pu	52.970±0.200	²³⁶ Cm	47.690±0.310	²³⁷ Cf	57.750±0.490
¹⁹² Th	67.430±1.970 †	²²⁴ Pa	23.660±0.370	²¹¹ Np	43.030±1.000 †	²⁴² Pu	54.680±0.200	²³⁷ Cm	49.110±0.290	²³⁸ Cf	57.050±0.440
¹⁹³ Th	63.780±1.850 †	²²⁵ Pa	24.190±0.370	²¹² Np	41.640±0.890 †	²⁴³ Pu	57.730±0.200	²³⁸ Cm	49.280±0.280	²³⁹ Cf	57.990±0.380
¹⁹⁴ Th	58.730±1.770 †	²²⁶ Pa	26.060±0.290	²¹³ Np	39.010±0.860 †	²⁴⁴ Pu	59.780±0.200	²³⁹ Cm	51.090±0.240	²⁴⁰ Cf	57.750±0.320
¹⁹⁵ Th	55.190±1.570 †	²²⁷ Pa	26.920±0.310	²¹⁴ Np	37.970±0.760 †	²⁴⁵ Pu	63.210±0.200	²⁴⁰ Cm	51.710±0.200	²⁴¹ Cf	59.080±0.290
¹⁹⁶ Th	50.340±1.540 †	²²⁸ Pa	28.940±0.250	²¹⁵ Np	35.500±0.740 †	²⁴⁶ Pu	65.500±0.220	²⁴¹ Cm	53.690±0.200	²⁴² Cf	59.270±0.200
¹⁹⁷ Th	47.200±1.520 †	²²⁹ Pa	30.010±0.300	²¹⁶ Np	34.460±0.680 †	²⁴⁷ Pu	69.400±0.270	²⁴² Cm	54.810±0.200	²⁴³ Cf	60.850±0.200
¹⁹⁸ Th	42.650±1.490 †	²³⁰ Pa	32.220±0.280	²¹⁷ Np	32.350±0.700 †	²⁴⁸ Pu	72.010±0.380	²⁴³ Cm	57.230±0.200	²⁴⁴ Cf	61.450±0.210
¹⁹⁹ Th	40.010±1.290 †	²³¹ Pa	33.440±0.260	²¹⁸ Np	31.200±0.680 †	²⁴⁹ Pu	76.340±0.430	²⁴⁴ Cm	58.420±0.200	²⁴⁵ Cf	63.380±0.220
²⁰⁰ Th	35.970±1.250 †	²³² Pa	35.910±0.230	²¹⁹ Np	29.690±0.730 †	²⁵⁰ Pu	79.600±0.510	²⁴⁵ Cm	60.980±0.200	²⁴⁶ Cf	64.130±0.230
²⁰¹ Th											

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
²²⁷ Es	75.050±1.230 †	²³⁸ Md	77.130±0.810 †	²⁵⁸ Lr	94.530±0.330	²⁶¹ Sg	108.260±0.300
²²⁸ Es	74.070±1.240 †	²⁴⁰ Md	76.960±0.740 †	²⁵⁹ Lr	95.860±0.200	²⁶² Sg	108.410±0.200
²²⁹ Es	72.060±1.140 †	²⁴¹ Md	75.710±0.700	²⁶⁰ Lr	97.990±0.280	²⁶³ Sg	110.090±0.200
²³⁰ Es	71.390±1.060 †	²⁴² Md	75.880±0.570				
²³¹ Es	69.270±0.970 †	²⁴³ Md	75.100±0.500	²³³ Rf	121.010±1.890 †	²⁵¹ Ns	118.180±1.230 †
²³² Es	68.620±0.900 †	²⁴⁴ Md	75.610±0.460	²³⁴ Rf	117.320±1.820 †	²⁵² Ns	117.480±1.170 †
²³³ Es	66.860±0.850 †	²⁴⁵ Md	75.210±0.430	²³⁵ Rf	115.620±1.680 †	²⁵³ Ns	116.090±1.100 †
²³⁴ Es	66.520±0.770 †	²⁴⁶ Md	75.940±0.380	²³⁶ Rf	112.070±1.620 †	²⁵⁴ Ns	115.820±1.110 †
²³⁵ Es	65.120±0.740	²⁴⁷ Md	75.950±0.350	²³⁷ Rf	110.360±1.570 †	²⁵⁵ Ns	114.590±1.050 †
²³⁶ Es	65.010±0.700	²⁴⁸ Md	77.060±0.360	²³⁸ Rf	107.210±1.480 †	²⁵⁶ Ns	114.570±1.010 †
²³⁷ Es	63.850±0.630	²⁴⁹ Md	77.190±0.310	²³⁹ Rf	105.850±1.380 †	²⁵⁷ Ns	113.640±0.880 †
²³⁸ Es	64.110±0.590	²⁵⁰ Md	78.520±0.240	²⁴⁰ Rf	103.100±1.310 †	²⁵⁸ Ns	113.900±0.780 †
²³⁹ Es	63.330±0.530	²⁵¹ Md	79.080±0.280	²⁴¹ Rf	101.950±1.250 †	²⁵⁹ Ns	113.370±0.650 †
²⁴⁰ Es	63.930±0.470	²⁵² Md	80.720±0.300	²⁴² Rf	99.550±1.110 †	²⁶⁰ Ns	114.270±0.430 †
²⁴¹ Es	63.550±0.430	²⁵³ Md	81.450±0.370	²⁴³ Rf	98.840±1.020 †	²⁶¹ Ns	113.940±0.320
²⁴² Es	64.590±0.310	²⁵⁴ Md	83.660±0.290	²⁴⁴ Rf	96.780±0.970 †	²⁶² Ns	114.900±0.220
²⁴³ Es	64.660±0.220	²⁵⁵ Md	84.760±0.210	²⁴⁵ Rf	96.350±0.930	²⁶³ Ns	115.440±0.200
²⁴⁴ Es	65.840±0.200	²⁵⁶ Md	87.480±0.200	²⁴⁶ Rf	94.730±0.870	²⁶⁴ Ns	116.740±0.200
²⁴⁵ Es	66.350±0.200	²⁵⁷ Md	89.080±0.230	²⁴⁷ Rf	94.650±0.810		
²⁴⁶ Es	67.930±0.230	²⁵⁸ Md	91.550±0.370	²⁴⁸ Rf	93.420±0.790	²⁴⁰ Hs	154.570±2.490 †
²⁴⁷ Es	68.530±0.220			²⁴⁹ Rf	93.540±0.710	²⁴¹ Hs	151.910±2.390 †
²⁴⁸ Es	70.270±0.240	²²⁸ No	107.660±1.870 †	²⁵⁰ Rf	92.810±0.600	²⁴² Hs	147.920±2.260 †
²⁴⁹ Es	71.260±0.270	²²⁹ No	106.050±1.710 †	²⁵¹ Rf	93.350±0.530	²⁴³ Hs	145.660±2.160 †
²⁵⁰ Es	73.460±0.290	²³⁰ No	102.690±1.670 †	²⁵² Rf	92.650±0.490	²⁴⁴ Hs	141.980±2.130 †
²⁵¹ Es	74.690±0.390	²³¹ No	101.020±1.610 †	²⁵³ Rf	93.310±0.430	²⁴⁵ Hs	139.940±2.080 †
²⁵² Es	77.300±0.340	²³² No	97.830±1.540 †	²⁵⁴ Rf	93.080±0.460	²⁴⁶ Hs	136.570±2.000 †
²⁵³ Es	78.840±0.300	²³³ No	96.600±1.440 †	²⁵⁵ Rf	94.180±0.380	²⁴⁷ Hs	134.880±1.930 †
²⁵⁴ Es	81.950±0.200	²³⁴ No	93.520±1.340 †	²⁵⁶ Rf	94.230±0.380	²⁴⁸ Hs	131.910±1.870 †
²⁵⁵ Es	84.100±0.310	²³⁵ No	92.340±1.250 †	²⁵⁷ Rf	95.750±0.390	²⁴⁹ Hs	130.500±1.760 †
²⁵⁶ Es	87.160±0.480	²³⁶ No	89.670±1.190 †	²⁵⁸ Rf	96.000±0.380	²⁵⁰ Hs	128.000±1.620 †
		²³⁷ No	88.780±1.140 †	²⁵⁹ Rf	98.150±0.300	²⁵¹ Hs	127.030±1.500 †
		²³⁸ No	86.450±1.100 †	²⁶⁰ Rf	99.130±0.250	²⁵² Hs	124.820±1.450 †
²²² Fm	101.240±1.820 †	²³⁹ No	85.790±1.030 †	²⁶¹ Rf	101.010±0.200	²⁵³ Hs	124.010±1.370 †
²²³ Fm	98.310±1.770 †	²⁴⁰ No	83.810±0.920			²⁵⁴ Hs	122.320±1.370 †
²²⁴ Fm	93.860±1.660 †	²⁴¹ No	83.510±0.880	²⁴² Ha	111.490±1.390 †	²⁵⁵ Hs	121.920±1.300 †
²²⁵ Fm	90.870±1.600 †	²⁴² No	81.960±0.750	²⁴³ Ha	108.960±1.290 †	²⁵⁶ Hs	120.440±1.260
²²⁶ Fm	86.970±1.500 †	²⁴³ No	82.020±0.670	²⁴⁴ Ha	107.850±1.240 †	²⁵⁷ Hs	120.110±1.160
²²⁷ Fm	85.920±1.390 †	²⁴⁴ No	80.830±0.630	²⁴⁵ Ha	105.700±1.180 †	²⁵⁸ Hs	118.900±1.040
²²⁸ Fm	83.220±1.390 †	²⁴⁵ No	81.260±0.580	²⁴⁶ Ha	104.920±1.130 †	²⁵⁹ Hs	119.180±0.880
²²⁹ Fm	82.270±1.300 †	²⁴⁶ No	80.500±0.530	²⁴⁷ Ha	103.150±1.080 †	²⁶⁰ Hs	118.290±0.610
²³⁰ Fm	79.580±1.280 †	²⁴⁷ No	81.090±0.480	²⁴⁸ Ha	102.750±1.020 †	²⁶¹ Hs	118.940±0.540
²³¹ Fm	78.870±1.150 †	²⁴⁸ No	80.780±0.480	²⁴⁹ Ha	101.370±0.940 †	²⁶² Hs	118.030±0.370
²³² Fm	76.290±1.060 †	²⁴⁹ No	81.740±0.420	²⁵⁰ Ha	101.230±0.810 †	²⁶³ Hs	119.380±0.200
²³³ Fm	75.570±1.010 †	²⁵⁰ No	81.610±0.330	²⁵¹ Ha	100.340±0.720 †	²⁶⁴ Hs	119.540±0.200
²³⁴ Fm	73.380±0.930	²⁵¹ No	82.770±0.260	²⁵² Ha	100.470±0.680	²⁶⁵ Hs	120.990±0.200
²³⁵ Fm	73.010±0.840	²⁵² No	82.930±0.250	²⁵³ Ha	99.680±0.630		
²³⁶ Fm	71.160±0.840	²⁵³ No	84.470±0.310	²⁵⁴ Ha	100.040±0.660	²⁵⁶ Mt	131.560±1.520 †
²³⁷ Fm	70.970±0.800	²⁵⁴ No	84.900±0.320	²⁵⁵ Ha	99.660±0.570	²⁵⁷ Mt	129.770±1.420 †
²³⁸ Fm	69.410±0.720	²⁵⁵ No	86.970±0.290	²⁵⁶ Ha	100.520±0.520	²⁵⁸ Mt	129.160±1.320 †
²³⁹ Fm	69.600±0.670	²⁵⁶ No	87.820±0.280	²⁵⁷ Ha	100.260±0.480	²⁵⁹ Mt	127.960±1.140 †
²⁴⁰ Fm	68.470±0.590	²⁵⁷ No	90.240±0.240	²⁵⁸ Ha	101.500±0.500	²⁶⁰ Mt	127.880±0.840 †
²⁴¹ Fm	68.940±0.560	²⁵⁸ No	91.560±0.220	²⁵⁹ Ha	101.770±0.330	²⁶¹ Mt	126.750±0.730 †
²⁴² Fm	68.270±0.420	²⁵⁹ No	94.040±0.340	²⁶⁰ Ha	103.560±0.250	²⁶² Mt	126.820±0.620 †
²⁴³ Fm	69.180±0.340			²⁶¹ Ha	104.290±0.200	²⁶³ Mt	126.300±0.360 †
²⁴⁴ Fm	68.860±0.290	²³⁶ Lr	101.730±1.400 †	²⁶² Ha	105.590±0.250	²⁶⁴ Mt	127.270±0.200 †
²⁴⁵ Fm	69.960±0.270	²³⁷ Lr	98.990±1.340 †			²⁶⁵ Mt	127.570±0.200 †
²⁴⁶ Fm	70.110±0.260	²³⁸ Lr	97.690±1.260 †	²⁴⁰ Sg	127.000±1.830 †		
²⁴⁷ Fm	71.540±0.260	²³⁹ Lr	95.290±1.210 †	²⁴¹ Sg	125.160±1.750 †		
²⁴⁸ Fm	71.820±0.270	²⁴⁰ Lr	94.280±1.120 †	²⁴² Sg	121.990±1.650 †		
²⁴⁹ Fm	73.410±0.280	²⁴¹ Lr	92.170±1.050 †	²⁴³ Sg	120.430±1.570 †		
²⁵⁰ Fm	74.140±0.260	²⁴² Lr	91.580±0.930 †	²⁴⁴ Sg	117.510±1.510 †		
²⁵¹ Fm	76.180±0.340	²⁴³ Lr	89.910±0.830 †	²⁴⁵ Sg	116.320±1.460 †		
²⁵² Fm	77.010±0.370	²⁴⁴ Lr	89.570±0.800 †	²⁴⁶ Sg	113.820±1.380 †		
²⁵³ Fm	79.520±0.370	²⁴⁵ Lr	88.300±0.760 †	²⁴⁷ Sg	112.880±1.330 †		
²⁵⁴ Fm	80.750±0.280	²⁴⁶ Lr	88.380±0.690	²⁴⁸ Sg	110.790±1.280 †		
²⁵⁵ Fm	83.720±0.250	²⁴⁷ Lr	87.460±0.640	²⁴⁹ Sg	110.240±1.170 †		
²⁵⁶ Fm	85.630±0.300	²⁴⁸ Lr	87.730±0.620	²⁵⁰ Sg	108.600±1.040 †		
²⁵⁷ Fm	88.380±0.400	²⁴⁹ Lr	87.270±0.550	²⁵¹ Sg	108.290±0.940 †		
		²⁵⁰ Lr	87.970±0.460	²⁵² Sg	107.000±0.890		
²³¹ Md	89.290±1.400 †	²⁵¹ Lr	87.670±0.380	²⁵³ Sg	107.040±0.830		
²³² Md	88.110±1.280 †	²⁵² Lr	88.430±0.350	²⁵⁴ Sg	105.940±0.850		
²³³ Md	85.470±1.210 †	²⁵³ Lr	88.500±0.280	²⁵⁵ Sg	106.170±0.800		
²³⁴ Md	84.320±1.130 †	²⁵⁴ Lr	89.740±0.330	²⁵⁶ Sg	105.550±0.730		
²³⁵ Md	82.090±1.030 †	²⁵⁵ Lr	90.030±0.320	²⁵⁷ Sg	106.090±0.630		
²³⁶ Md	81.280±0.990 †	²⁵⁶ Lr	91.860±0.320	²⁵⁸ Sg	105.550±0.580		
²³⁷ Md	79.350±0.970 †	²⁵⁷ Lr	92.400±0.300	²⁵⁹ Sg	106.800±0.480		
²³⁸ Md	78.760±0.910 †			²⁶⁰ Sg	106.720±0.280		