

A.H. Wapstra, G. Audi, and R. Hoekstra 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
¹ H	8.071	¹² O	32.060±0.040	³⁴ Mg	8.440±0.700	³³ Cl	-21.003	⁴³ Sc	-36.187±0.002	⁶⁰ Mn	-52.900±0.100
² H	7.289	¹³ O	23.113±0.010	³⁵ Mg	14.680±0.500	³⁴ Cl	-24.440	⁴⁴ Sc	-37.815±0.002	⁴⁸ Fe	-18.130±0.110
³ H	13.136	¹⁴ O	8.006	²² Al	18.090±0.070	³⁵ Cl	-29.013	⁴⁵ Sc	-41.069±0.001	⁴⁹ Fe	-24.580±0.160
⁴ H	14.950	¹⁵ O	2.855	²³ Al	6.767±0.025	³⁶ Cl	-29.522	⁴⁶ Sc	-41.758±0.001	⁵⁰ Fe	-34.470±0.060
	25.840±0.380	¹⁶ O	-4.737	²⁴ Al	-0.055±0.004	³⁷ Cl	-31.761	⁴⁷ Sc	-44.330±0.002	⁵¹ Fe	-40.217±0.015
³ He	14.931	¹⁷ O	-0.809	²⁵ Al	-8.915	³⁸ Cl	-29.798	⁴⁸ Sc	-44.492±0.005	⁵² Fe	-48.331±0.010
⁴ He	2.424	¹⁸ O	-0.782	²⁶ Al	-12.210	³⁹ Cl	-29.802±0.002	⁴⁹ Sc	-46.558±0.004	⁵³ Fe	-50.943±0.002
⁵ He	11.390±0.050	¹⁹ O	3.332±0.002	²⁷ Al	-17.197	⁴⁰ Cl	-27.530±0.040	⁵⁰ Sc	-44.537±0.016	⁵⁴ Fe	-56.250±0.001
⁶ He	17.592	²⁰ O	3.796±0.001	²⁸ Al	-16.851	⁴¹ Cl	-27.400±0.150	⁵¹ Sc	-43.218±0.020	⁵⁵ Fe	-57.476±0.001
⁷ He	26.110±0.030	²¹ O	8.066±0.015	²⁹ Al	-18.215±0.001	⁴² Cl	-24.420±0.200	⁵² Sc	-40.060±0.300	⁵⁶ Fe	-60.603±0.001
⁸ He	31.598±0.007	²² O	9.440±0.090	³⁰ Al	-15.890±0.040	⁴³ Cl	-23.130±0.060	⁵³ Sc	-38.230±0.510	⁵⁷ Fe	-60.178±0.001
⁹ He	40.810±0.120	²³ O	14.540±0.700	³¹ Al	-15.050±0.070	⁴⁴ Cl	-20.010±0.300	⁴⁰ Ti	-9.063±0.011	⁵⁸ Fe	-62.151±0.001
		²⁴ O	18.790±0.900	³² Al	-11.210±0.300	³¹ Ar	11.660±0.200	⁴¹ Ti	-15.690±0.013	⁵⁹ Fe	-60.661±0.001
⁴ Li	25.120±0.300	¹⁴ F	33.610±0.400	³³ Al	-8.840±0.400	³² Ar	-2.180±0.050	⁴² Ti	-25.121±0.006	⁶⁰ Fe	-61.406±0.004
⁵ Li	11.680±0.050	¹⁵ F	16.770±0.130	³⁴ Al	-3.660±0.500	³³ Ar	-9.380±0.030	⁴³ Ti	-29.320±0.007	⁶¹ Fe	-58.919±0.020
⁶ Li	14.085	¹⁶ F	10.680±0.008	³⁵ Al	-0.660±0.500	³⁴ Ar	-18.379±0.003	⁴⁴ Ti	-37.548±0.001	⁶² Fe	-58.896±0.015
⁷ Li	14.907	¹⁷ F	1.951	³⁶ Al	5.050±0.600	³⁵ Ar	-23.048±0.001	⁴⁵ Ti	-39.006±0.001	⁶³ Fe	-55.190±0.060
⁸ Li	20.945	¹⁸ F	0.873	²³ Si	23.530±0.300	³⁶ Ar	-30.230	⁴⁶ Ti	-44.125±0.001	⁵⁰ Co	-17.980±0.200
⁹ Li	24.954±0.002	¹⁹ F	-1.487	²⁴ Si	10.755±0.019	³⁷ Ar	-30.948	⁴⁷ Ti	-44.931±0.001	⁵¹ Co	-27.420±0.200
¹⁰ Li	33.840±0.250	²⁰ F	-0.017	²⁵ Si	3.827±0.010	³⁸ Ar	-34.715	⁴⁸ Ti	-48.487±0.001	⁵² Co	-34.287±0.022
¹¹ Li	40.900±0.110	²¹ F	-0.047±0.001	²⁶ Si	-7.145±0.003	³⁹ Ar	-33.241±0.005	⁴⁹ Ti	-48.558±0.001	⁵³ Co	-42.639±0.018
⁶ Be	18.374±0.005	²² F	2.830±0.030	²⁷ Si	-12.385	⁴⁰ Ar	-35.039±0.001	⁵⁰ Ti	-51.426±0.001	⁵⁴ Co	-48.007±0.001
⁷ Be	15.768	²³ F	3.350±0.170	²⁸ Si	-21.492	⁴¹ Ar	-33.066±0.001	⁵¹ Ti	-49.726±0.001	⁵⁵ Co	-54.025±0.001
⁸ Be	4.941	²⁴ F	7.780±0.400	²⁹ Si	-21.895	⁴² Ar	-34.420±0.040	⁵² Ti	-49.464±0.007	⁵⁶ Co	-56.037±0.002
⁹ Be	11.347	²⁵ F	10.940±0.600	³⁰ Si	-24.433	⁴³ Ar	-31.980±0.070	⁵³ Ti	-46.830±0.100	⁵⁷ Co	-59.342±0.001
¹⁰ Be	12.607	²⁶ F	17.700±0.900	³¹ Si	-22.950	⁴⁴ Ar	-32.260±0.020	⁵⁴ Ti	-45.530±0.300	⁵⁸ Co	-59.844±0.001
¹¹ Be	20.174±0.006	¹⁶ Ne	23.989±0.020	³² Si	-24.081±0.001	⁴⁵ Ar	-29.720±0.060	⁴² V	-8.220±0.300	⁵⁹ Co	-62.226±0.001
¹² Be	25.077±0.015	¹⁷ Ne	16.480±0.050	³³ Si	-20.492±0.016	⁴⁶ Ar	-29.720±0.040	⁴³ V	-17.920±0.200	⁶⁰ Co	-61.646±0.001
¹³ Be	35.000±0.500	¹⁸ Ne	5.319±0.005	³⁴ Si	-19.958±0.015	⁴⁷ Ar	-25.910±0.100	⁴⁴ V	-23.800±0.100	⁶¹ Co	-62.897±0.001
¹⁴ Be	40.100±0.130	¹⁹ Ne	1.751	³⁵ Si	-14.320±0.050	³³ K	8.000±0.400	⁴⁵ V	-31.875±0.017	⁶² Co	-61.423±0.019
		²⁰ Ne	-7.047±0.001	³⁶ Si	-13.260±0.500	³⁴ K	-1.480±0.300	⁴⁶ V	-37.075±0.001	⁶³ Co	-61.839±0.020
⁷ B	27.870±0.070	²¹ Ne	-5.737±0.001	³⁷ Si	-7.000±0.500	³⁵ K	-11.167±0.020	⁴⁷ V	-42.004±0.001	⁶⁴ Co	-59.791±0.020
⁸ B	22.920±0.001	²² Ne	-8.027±0.001	³⁸ Si	-5.360±0.600	³⁶ K	-17.425±0.008	⁴⁸ V	-44.474±0.002	⁶⁵ Co	-59.160±0.050
⁹ B	12.415±0.001	²³ Ne	-5.156±0.002	²⁵ P	22.080±0.400	³⁷ K	-24.798±0.001	⁴⁹ V	-47.956±0.001	⁵² Ni	-22.640±0.070
¹⁰ B	12.050	²⁴ Ne	-5.950±0.010	²⁶ P	11.260±0.300	³⁸ K	-28.802	⁵⁰ V	-49.219±0.001	⁵³ Ni	-29.380±0.160
¹¹ B	8.668	²⁵ Ne	-2.060±0.040	²⁷ P	-0.750±0.040	³⁹ K	-33.806±0.001	⁵¹ V	-52.199±0.001	⁵⁴ Ni	-39.210±0.050
¹² B	13.369±0.001	²⁶ Ne	0.440±0.070	²⁸ P	-7.161±0.004	⁴⁰ K	-33.534±0.001	⁵² V	-51.438±0.001	⁵⁵ Ni	-45.330±0.011
¹³ B	16.562±0.001	²⁷ Ne	6.410±0.500	²⁹ P	-16.951	⁴¹ K	-35.558±0.001	⁵³ V	-51.846±0.003	⁵⁶ Ni	-53.901±0.011
¹⁴ B	23.664±0.021	²⁸ Ne	10.780±0.800	³⁰ P	-20.200	⁴² K	-35.020±0.001	⁵⁴ V	-49.889±0.015	⁵⁷ Ni	-56.077±0.003
¹⁵ B	28.970±0.022	¹⁸ Na	25.320±0.400	³¹ P	-24.441	⁴³ K	-36.593±0.009	⁵⁵ V	-49.150±0.100	⁵⁸ Ni	-60.225±0.001
¹⁶ B	37.140±0.400	¹⁹ Na	12.928±0.012	³² P	-24.305	⁴⁴ K	-35.810±0.040	⁵⁶ V	-46.110±0.300	⁵⁹ Ni	-61.153±0.001
¹⁷ B	43.310±0.500	²⁰ Na	6.839±0.007	³³ P	-26.338±0.001	⁴⁵ K	-36.614±0.010	⁴⁴ Cr	-13.450±0.030	⁶⁰ Ni	-64.470±0.001
¹⁸ B	52.280±0.860	²¹ Na	-2.189±0.002	³⁴ P	-24.557±0.001	⁴⁶ K	-35.418±0.016	⁴⁵ Cr	-19.410±0.100	⁶¹ Ni	-64.219±0.001
¹⁹ B	59.360±1.030	²² Na	-5.185±0.001	³⁵ P	-24.857±0.001	⁴⁷ K	-35.696±0.008	⁴⁶ Cr	-29.472±0.020	⁶² Ni	-66.745±0.001
⁸ C	35.094±0.024	²³ Na	-9.532	³⁶ P	-20.251±0.013	⁴⁸ K	-32.122±0.024	⁴⁷ Cr	-34.553±0.014	⁶³ Ni	-65.512±0.001
⁹ C	28.913±0.002	²⁴ Na	-8.420	³⁷ P	-19.260±0.300	⁴⁹ K	-30.770±0.300	⁴⁸ Cr	-42.818±0.007	⁶⁴ Ni	-67.098±0.001
¹⁰ C	15.699	²⁵ Na	-9.360±0.001	³⁸ P	-14.160±0.400	⁵⁰ K	-25.520±0.300	⁴⁹ Cr	-45.328±0.002	⁶⁵ Ni	-65.124±0.001
¹¹ C	10.650	²⁶ Na	-6.904±0.016	³⁹ P	-12.500±0.400	³⁵ Ca	4.450±0.060	⁵⁰ Cr	-50.257±0.001	⁶⁶ Ni	-66.029±0.016
¹² C	0.000	²⁷ Na	-5.600±0.040	⁴⁰ P	-7.020±0.500	³⁶ Ca	-6.440±0.040	⁵¹ Cr	-51.447±0.001	⁶⁷ Ni	-63.743±0.019
¹³ C	3.125	²⁸ Na	-1.140±0.140	²⁷ S	18.220±0.200	³⁷ Ca	-13.159±0.022	⁵² Cr	-55.414±0.001	⁶⁸ Ni	-63.483±0.017
¹⁴ C	3.020	²⁹ Na	2.650±0.150	²⁸ S	4.130±0.160	³⁸ Ca	-22.059±0.005	⁵³ Cr	-55.282±0.001	⁶⁹ Ni	-60.460±0.150
¹⁵ C	9.873	³⁰ Na	8.210±0.250	²⁹ S	-3.160±0.050	³⁹ Ca	-27.275±0.002	⁵⁴ Cr	-56.930±0.001	⁵⁴ Cu	-21.210±0.500
¹⁶ C	13.694±0.004	³¹ Na	11.830±0.580	³⁰ S	-14.063±0.003	⁴⁰ Ca	-34.846±0.001	⁵⁵ Cr	-55.105±0.001	⁵⁵ Cu	-31.630±0.300
¹⁷ C	21.035±0.017	³² Na	16.550±0.740	³¹ S	-19.045±0.001	⁴¹ Ca	-35.137±0.001	⁵⁶ Cr	-55.290±0.010	⁵⁶ Cu	-38.584±0.017
¹⁸ C	24.920±0.030	³³ Na	21.470±1.140	³² S	-26.016	⁴² Ca	-38.547±0.001	⁵⁷ Cr	-52.690±0.200	⁵⁷ Cu	-47.350±0.050
¹⁹ C	32.630±0.300	³⁴ Na	26.650±3.570	³³ S	-26.586	⁴³ Ca	-38.408±0.001	⁵⁸ Cr	-52.050±0.300	⁵⁸ Cu	-51.662±0.002
²⁰ C	37.070±0.900	²⁰ Mg	17.570±0.027	³⁴ S	-29.932	⁴⁴ Ca	-41.469±0.001	⁴⁶ Mn	-12.470±0.400	⁵⁹ Cu	-56.353±0.001
¹⁰ N	39.700±0.400	²¹ Mg	10.913±0.016	³⁵ S	-28.846	⁴⁵ Ca	-40.812±0.001	⁴⁷ Mn	-22.650±0.200	⁶⁰ Cu	-58.344±0.002
¹¹ N	24.890±0.140	²² Mg	-0.397±0.001	³⁶ S	-30.664	⁴⁶ Ca	-43.140±0.002	⁴⁸ Mn	-29.211±0.021	⁶¹ Cu	-61.982±0.001
¹² N	17.338±0.001	²³ Mg	-5.473±0.001	³⁷ S	-26.896	⁴⁷ Ca	-42.345±0.002	⁴⁹ Mn	-37.611±0.024	⁶² Cu	-62.797±0.004
¹³ N	5.345	²⁴ Mg	-13.933	³⁸ S	-26.861±0.007	⁴⁸ Ca	-44.214±0.004	⁵⁰ Mn	-42.625±0.001	⁶³ Cu	-65.578±0.001
¹⁴ N	2.863	²⁵ Mg	-13.192	³⁹ S	-23.000±0.200	⁴⁹ Ca	-41.289±0.004	⁵¹ Mn	-48.238±0.001	⁶⁴ Cu	-65.423±0.001
¹⁵ N	0.101	²⁶ Mg	-16.214	⁴⁰ S	-22.520±0.040	⁵⁰ Ca	-39.570±0.009	⁵² Mn	-50.702±0.002	⁶⁵ Cu	-67.262±0.001
¹⁶ N	5.682±0.002	²⁷ Mg	-14.586	⁴¹ S	-17.870±0.300	⁵¹ Ca	-35.010±0.080	⁵³ Mn	-54.686±0.001	⁶⁶ Cu	-66.256±0.001
¹⁷ N	7.871±0.015	²⁸ Mg	-15.019±0.002	⁴² S	-16.420±0.400	⁵² Ca	-32.460±0.580	⁵⁴ Mn	-55.553±0.001	⁶⁷ Cu	-67.303±0.008
¹⁸ N	13.117±0.020	²⁹ Mg	-10.661±0.029	²⁹ Cl	15.050±0.400	³⁸ Sc	-4.460±0.300	⁵⁵ Mn	-57.708±0.001	⁶⁸ Cu	-65.540±0.050
¹⁹ N	15.871±0.019	³⁰ Mg	-9.100±0.210	³⁰ Cl	4.840±0.300	³⁹ Sc	-14.300±0.050	⁵⁶ Mn	-56.907±0.001	⁶⁹ Cu	-65.741±0.008
²⁰ N	21.880±0.300	³¹ Mg	-3.650±0.400	³¹ Cl	-7.060±0.050	⁴⁰ Sc	-20.526±0.004	⁵⁷ Mn	-57.487±0.003	⁷⁰ Cu	-63.390±0.110
²¹ N	25.150±0.600	³² Mg	-1.750±1.580	³² Cl	-13.330±0.008	⁴¹ Sc	-28.643±0.001	⁵⁸ Mn	-55.830±0.030	⁷¹ Cu	-62.920±0.300
²² N	31.730±0.950	³³ Mg	5.010±0.500								

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⁵⁶ Zn	-26.130±0.080	⁷⁰ As	-64.340±0.050	⁸⁴ Kr	-82.430±0.003	⁹² Y	-84.833±0.010	¹⁰² Mo	-83.559±0.021	¹¹³ Rh	-78.740±0.400
⁵⁷ Zn	-32.700±0.120	⁷¹ As	-67.894±0.004	⁸⁵ Kr	-81.477±0.003	⁹³ Y	-84.245±0.011	¹⁰³ Mo	-80.760±0.080	¹¹⁴ Rh	-75.960±0.500
⁵⁸ Zn	-42.210±0.100	⁷² As	-68.228±0.004	⁸⁶ Kr	-83.262±0.005	⁹⁴ Y	-82.348±0.006	¹⁰⁴ Mo	-80.370±0.060	⁹⁴ Pd	-66.270±0.800
⁵⁹ Zn	-47.260±0.040	⁷³ As	-70.955±0.004	⁸⁷ Kr	-80.706±0.005	⁹⁵ Y	-81.214±0.006	¹⁰⁵ Mo	-77.360±0.090	⁹⁵ Pd	-70.150±0.400
⁶⁰ Zn	-54.185±0.011	⁷⁴ As	-70.861±0.002	⁸⁸ Kr	-79.688±0.014	⁹⁶ Y	-78.300±0.040	¹⁰⁶ Mo	-76.270±0.090	⁹⁶ Pd	-76.180±0.150
⁶¹ Zn	-56.343±0.016	⁷⁵ As	-73.035±0.001	⁸⁹ Kr	-76.720±0.050	⁹⁷ Y	-76.270±0.060	¹⁰⁷ Mo	-72.910±0.430	⁹⁷ Pd	-77.800±0.300
⁶² Zn	-61.170±0.010	⁷⁶ As	-72.290±0.001	⁹⁰ Kr	-74.947±0.027	⁹⁸ Y	-72.520±0.160	¹⁰⁸ Mo	-71.460±0.550	⁹⁸ Pd	-81.301±0.022
⁶³ Zn	-62.211±0.002	⁷⁷ As	-73.918±0.002	⁹¹ Kr	-71.370±0.080	⁹⁹ Y	-70.170±0.080	⁸⁸ Tc	-62.330±0.830	⁹⁹ Pd	-82.193±0.016
⁶⁴ Zn	-66.002±0.001	⁷⁸ As	-72.819±0.010	⁹² Kr	-68.650±0.080	¹⁰⁰ Y	-67.290±0.140	⁸⁹ Tc	-68.000±0.400	¹⁰⁰ Pd	-85.221±0.013
⁶⁵ Zn	-65.910±0.001	⁷⁹ As	-73.639±0.006	⁹³ Kr	-64.160±0.120	¹⁰¹ Y	-64.650±0.200	⁹⁰ Tc	-70.970±0.300	¹⁰¹ Pd	-85.430±0.018
⁶⁶ Zn	-68.898±0.001	⁸⁰ As	-72.165±0.024	⁷³ Rb	-46.590±0.620	¹⁰² Y	-61.450±0.400	⁹¹ Tc	-75.990±0.200	¹⁰² Pd	-87.918±0.008
⁶⁷ Zn	-67.879±0.001	⁸¹ As	-72.536±0.006	⁷⁴ Rb	-51.670±0.460	⁸¹ Zr	-58.790±0.300	⁹² Tc	-78.939±0.026	¹⁰³ Pd	-87.471±0.008
⁶⁸ Zn	-70.006±0.001	⁸² As	-70.078±0.025	⁷⁵ Rb	-57.210±0.100	⁸² Zr	-64.180±0.510	⁹³ Tc	-83.607±0.004	¹⁰⁴ Pd	-89.393±0.005
⁶⁹ Zn	-68.417±0.001	⁸³ As	-69.880±0.220	⁷⁶ Rb	-60.530±0.060	⁸³ Zr	-66.350±0.100	⁹⁴ Tc	-84.158±0.005	¹⁰⁵ Pd	-88.416±0.005
⁷⁰ Zn	-69.561±0.003	⁸⁴ As	-66.080±0.300	⁷⁷ Rb	-64.917±0.030	⁸⁴ Zr	-71.430±0.350	⁹⁵ Tc	-86.018±0.006	¹⁰⁶ Pd	-89.907±0.005
⁷¹ Zn	-67.323±0.011	⁸⁵ As	-63.510±0.400	⁷⁸ Rb	-66.980±0.030	⁸⁵ Zr	-73.150±0.100	⁹⁶ Tc	-85.819±0.006	¹⁰⁷ Pd	-88.374±0.006
⁷² Zn	-68.131±0.006	⁸⁶ As	-59.340±0.330	⁷⁹ Rb	-70.839±0.023	⁸⁶ Zr	-77.980±0.200	⁹⁷ Tc	-87.222±0.005	¹⁰⁸ Pd	-89.523±0.004
⁷³ Zn	-65.410±0.040	⁶⁷ Se	-46.860±0.400	⁸⁰ Rb	-72.176±0.018	⁸⁷ Zr	-79.348±0.008	⁹⁸ Tc	-86.429±0.004	¹⁰⁹ Pd	-87.605±0.004
⁷⁴ Zn	-65.708±0.019	⁶⁸ Se	-54.080±0.300	⁸¹ Rb	-75.459±0.021	⁸⁸ Zr	-83.626±0.010	⁹⁹ Tc	-87.324±0.002	¹¹⁰ Pd	-88.345±0.015
⁷⁵ Zn	-62.530±0.090	⁶⁹ Se	-56.300±0.030	⁸² Rb	-76.203±0.017	⁸⁹ Zr	-84.871±0.003	¹⁰⁰ Tc	-86.017±0.002	¹¹¹ Pd	-86.030±0.040
⁷⁶ Zn	-62.290±0.170	⁷⁰ Se	-61.540±0.210	⁸³ Rb	-79.049±0.021	⁹⁰ Zr	-88.770±0.002	¹⁰¹ Tc	-86.337±0.024	¹¹² Pd	-86.333±0.019
⁷⁷ Zn	-58.820±0.280	⁷¹ Se	-63.090±0.200	⁸⁴ Rb	-79.748±0.003	⁹¹ Zr	-87.893±0.002	¹⁰² Tc	-84.569±0.009	¹¹³ Pd	-83.680±0.150
⁷⁸ Zn	-57.660±0.280	⁷² Se	-67.897±0.012	⁸⁵ Rb	-82.164±0.002	⁹² Zr	-88.457±0.002	¹⁰³ Tc	-84.601±0.010	¹¹⁴ Pd	-83.460±0.029
⁷⁹ Zn	-53.820±0.420	⁷³ Se	-68.215±0.011	⁸⁶ Rb	-82.744±0.002	⁹³ Zr	-87.120±0.002	¹⁰⁴ Tc	-82.490±0.050	¹¹⁵ Pd	-80.590±0.300
⁸⁰ Zn	-51.890±0.360	⁷⁴ Se	-72.215±0.001	⁸⁷ Rb	-84.593±0.002	⁹⁴ Zr	-77.790±0.040	¹⁰⁵ Tc	-82.350±0.060	¹¹⁶ Pd	-80.140±0.150
⁶¹ Ga	-47.540±0.400	⁷⁵ Se	-72.171±0.001	⁸⁸ Rb	-82.601±0.004	⁹⁵ Zr	-85.659±0.002	¹⁰⁶ Tc	-79.790±0.060	⁹⁶ Ag	-64.430±0.800
⁶² Ga	-51.999±0.028	⁷⁶ Se	-75.254±0.001	⁸⁹ Rb	-81.709±0.007	⁹⁶ Zr	-85.442±0.003	¹⁰⁷ Tc	-79.160±0.200	⁹⁷ Ag	-70.790±0.400
⁶³ Ga	-56.690±0.100	⁷⁷ Se	-74.601±0.001	⁹⁰ Rb	-79.350±0.013	⁹⁷ Zr	-82.950±0.003	¹⁰⁸ Tc	-76.280±0.360	⁹⁸ Ag	-73.000±0.300
⁶⁴ Ga	-58.837±0.004	⁷⁸ Se	-77.028±0.001	⁹¹ Rb	-77.786±0.010	⁹⁸ Zr	-81.283±0.020	¹⁰⁹ Tc	-74.920±0.300	⁹⁹ Ag	-76.760±0.150
⁶⁵ Ga	-62.654±0.002	⁷⁹ Se	-75.920±0.001	⁹² Rb	-74.811±0.012	⁹⁹ Zr	-77.790±0.040	¹¹⁰ Tc	-71.640±0.640	¹⁰⁰ Ag	-78.170±0.090
⁶⁶ Ga	-63.724±0.003	⁸⁰ Se	-77.762±0.001	⁹³ Rb	-72.688±0.015	¹⁰⁰ Zr	-76.590±0.040	⁹⁰ Ru	-65.470±0.800	¹⁰¹ Ag	-81.190±0.120
⁶⁷ Ga	-66.878±0.001	⁸¹ Se	-76.392±0.001	⁹⁴ Rb	-68.518±0.019	¹⁰¹ Zr	-73.380±0.070	⁹¹ Ru	-68.410±0.400	¹⁰² Ag	-82.080±0.050
⁶⁸ Ga	-67.085±0.002	⁸² Se	-77.596±0.002	⁹⁵ Rb	-65.813±0.024	¹⁰² Zr	-71.770±0.060	⁹² Ru	-74.410±0.300	¹⁰³ Ag	-84.787±0.017
⁶⁹ Ga	-69.322±0.002	⁸³ Se	-75.343±0.004	⁹⁶ Rb	-61.150±0.030	¹⁰³ Zr	-69.290±0.130	⁹³ Ru	-77.270±0.090	¹⁰⁴ Ag	-85.114±0.006
⁷⁰ Ga	-68.905±0.003	⁸⁴ Se	-75.952±0.015	⁹⁷ Rb	-58.290±0.040	¹⁰⁴ Zr	-66.260±0.410	⁹⁴ Ru	-82.569±0.013	¹⁰⁵ Ag	-87.078±0.009
⁷¹ Ga	-70.139±0.001	⁸⁵ Se	-72.420±0.100	⁹⁸ Rb	-54.090±0.060	⁸⁴ Nb	-61.530±0.620	⁹⁵ Ru	-83.451±0.012	¹⁰⁶ Ag	-86.941±0.005
⁷² Ga	-68.589±0.002	⁸⁶ Se	-70.540±0.130	⁹⁹ Rb	-50.860±0.110	⁸⁵ Nb	-66.940±0.400	⁹⁶ Ru	-86.073±0.008	¹⁰⁷ Ag	-88.407±0.005
⁷³ Ga	-69.705±0.006	⁸⁷ Se	-66.710±0.400	⁷⁷ Sr	-57.880±0.150	⁸⁶ Nb	-69.580±0.300	⁹⁷ Ru	-86.113±0.008	¹⁰⁸ Ag	-87.605±0.005
⁷⁴ Ga	-68.060±0.070	⁸⁸ Se	-63.820±0.240	⁷⁸ Sr	-63.450±0.300	⁸⁷ Nb	-74.180±0.060	⁹⁸ Ru	-88.225±0.006	¹⁰⁹ Ag	-88.721±0.003
⁷⁵ Ga	-68.466±0.007	⁶⁹ Br	-46.800±0.500	⁷⁹ Sr	-65.340±0.200	⁸⁸ Nb	-76.430±0.200	⁹⁹ Ru	-87.617±0.002	¹¹⁰ Ag	-87.459±0.003
⁷⁶ Ga	-66.440±0.150	⁷⁰ Br	-51.140±0.360	⁸⁰ Sr	-70.190±0.030	⁸⁹ Nb	-80.580±0.040	¹⁰⁰ Ru	-89.219±0.002	¹¹¹ Ag	-88.217±0.004
⁷⁷ Ga	-66.320±0.200	⁷¹ Br	-56.590±0.300	⁸¹ Sr	-71.470±0.040	⁹⁰ Nb	-82.659±0.005	¹⁰¹ Ru	-87.950±0.002	¹¹² Ag	-86.624±0.017
⁷⁸ Ga	-63.560±0.200	⁷² Br	-59.000±0.200	⁸² Sr	-75.998±0.008	⁹¹ Nb	-86.640±0.003	¹⁰² Ru	-89.099±0.002	¹¹³ Ag	-87.040±0.020
⁷⁹ Ga	-62.720±0.120	⁷³ Br	-63.600±0.230	⁸³ Sr	-76.781±0.021	⁹² Nb	-86.451±0.002	¹⁰³ Ru	-87.260±0.002	¹¹⁴ Ag	-84.960±0.070
⁸⁰ Ga	-59.380±0.300	⁷⁴ Br	-65.301±0.015	⁸⁴ Sr	-80.641±0.004	⁹³ Nb	-87.210±0.002	¹⁰⁴ Ru	-88.093±0.004	¹¹⁵ Ag	-84.950±0.070
⁸¹ Ga	-57.990±0.190	⁷⁵ Br	-69.142±0.014	⁸⁵ Sr	-81.099±0.004	⁹⁴ Nb	-86.368±0.002	¹⁰⁵ Ru	-85.932±0.004	¹¹⁶ Ag	-82.760±0.110
⁸² Ga	-53.380±0.430	⁷⁶ Br	-70.291±0.009	⁸⁶ Sr	-84.518±0.002	⁹⁵ Nb	-86.783±0.002	¹⁰⁶ Ru	-86.326±0.008	¹¹⁷ Ag	-82.250±0.050
⁶³ Ge	-47.310±0.300	⁷⁷ Br	-73.237±0.003	⁸⁷ Sr	-84.875±0.002	⁹⁶ Nb	-85.606±0.004	¹⁰⁷ Ru	-83.710±0.300	¹¹⁸ Ag	-79.580±0.100
⁶⁴ Ge	-54.430±0.250	⁷⁸ Br	-73.455±0.004	⁸⁸ Sr	-87.916±0.002	⁹⁷ Nb	-85.608±0.002	¹⁰⁸ Ru	-83.760±0.230	¹¹⁹ Ag	-78.590±0.070
⁶⁵ Ge	-56.410±0.100	⁷⁹ Br	-76.070±0.002	⁸⁹ Sr	-86.211±0.004	⁹⁸ Nb	-83.528±0.006	¹⁰⁹ Ru	-80.720±0.200	¹²⁰ Ag	-75.770±0.100
⁶⁶ Ge	-61.620±0.030	⁸⁰ Br	-75.891±0.002	⁹⁰ Sr	-85.942±0.002	⁹⁹ Nb	-82.328±0.013	¹¹⁰ Ru	-80.240±0.300	¹²¹ Ag	-74.550±0.190
⁶⁷ Ge	-62.656±0.005	⁸¹ Br	-77.978±0.005	⁹¹ Sr	-83.652±0.009	¹⁰⁰ Nb	-79.929±0.028	¹¹¹ Ru	-77.030±0.400	⁹⁸ Cd	-67.900±0.800
⁶⁸ Ge	-66.978±0.006	⁸² Br	-77.499±0.005	⁹² Sr	-82.923±0.013	¹⁰¹ Nb	-78.950±0.040	¹¹² Ru	-76.030±0.600	⁹⁹ Cd	-69.890±0.500
⁶⁹ Ge	-67.097±0.004	⁸³ Br	-79.010±0.004	⁹³ Sr	-80.160±0.016	¹⁰² Nb	-76.350±0.050	⁹² Rh	-63.140±0.800	¹⁰⁰ Cd	-74.320±0.300
⁷⁰ Ge	-70.561±0.001	⁸⁴ Br	-77.776±0.025	⁹⁴ Sr	-78.836±0.007	¹⁰³ Nb	-75.240±0.090	⁹³ Rh	-69.110±0.400	¹⁰¹ Cd	-75.660±0.180
⁷¹ Ge	-69.906±0.001	⁸⁵ Br	-78.607±0.019	⁹⁵ Sr	-75.050±0.050	¹⁰⁴ Nb	-72.260±0.120	⁹⁴ Rh	-72.940±0.450	¹⁰² Cd	-79.720±0.200
⁷² Ge	-72.583±0.001	⁸⁶ Br	-75.640±0.060	⁹⁶ Sr	-72.880±0.040	¹⁰⁵ Nb	-70.940±0.120	⁹⁵ Rh	-78.340±0.150	¹⁰³ Cd	-80.650±0.016
⁷³ Ge	-71.295±0.001	⁸⁷ Br	-73.856±0.025	⁹⁷ Sr	-68.810±0.070	¹⁰⁶ Nb	-67.290±0.500	⁹⁶ Rh	-79.626±0.013	¹⁰⁴ Cd	-83.977±0.010
⁷⁴ Ge	-73.423±0.001	⁸⁸ Br	-70.720±0.130	⁹⁸ Sr	-66.380±0.060	⁸⁶ Mo	-64.680±0.730	⁹⁷ Rh	-82.590±0.040	¹⁰⁵ Cd	-84.339±0.010
⁷⁵ Ge	-71.858±0.001	⁸⁹ Br	-68.420±0.400	⁹⁹ Sr	-62.150±0.100	⁸⁷ Mo	-67.440±0.310	⁹⁸ Rh	-83.168±0.012	¹⁰⁶ Cd	-87.135±0.006
⁷⁶ Ge	-73.214±0.001	⁹⁰ Br	-64.650±0.120	¹⁰⁰ Sr	-60.200±0.210	⁸⁸ Mo	-72.830±0.300	⁹⁹ Rh	-85.519±0.010	¹⁰⁷ Cd	-86.990±0.007
⁷⁷ Ge	-71.216±0.001	⁷¹ Kr	-46.490±0.420	⁷⁹ Y	-58.140±0.500	⁸⁹ Mo	-75.005±0.015	¹⁰⁰ Rh	-85.590±0.020	¹⁰⁸ Cd	-89.253±0.005
⁷⁸ Ge	-71.863±0.004	⁷² Kr	-53.940±0.240	⁸⁰ Y	-61.190±0.400	⁹⁰ Mo	-80.170±0.006	¹⁰¹ Rh	-87.410±0.017	¹⁰⁹ Cd	-88.507±0.004
⁷⁹ Ge	-69.490±0.090	⁷³ Kr	-56.890±0.140	⁸¹ Y	-65.950±0.070	⁹¹ Mo	-82.208±0.012	¹⁰² Rh	-86.821±0.017	¹¹⁰ Cd	-90.351±0.003
⁸⁰ Ge	-69.380±0.030	⁷⁴ Kr	-62.130±0.060	⁸² Y	-68.180±0.100	⁹² Mo	-86.809±0.004	¹⁰³ Rh	-88.024±0.003	¹¹¹ Cd	-89.254±0.003
⁸¹ Ge	-66.310±0.120	⁷⁵ Kr	-64.214±0.020	⁸³ Y	-72.370±0.060	⁹³ Mo	-86.805±0.004	¹⁰⁴			

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹²¹ Cd	-80.950±0.150	¹⁰⁹ Sb	-76.253±0.019	¹²¹ I	-86.270±0.020	¹³⁴ Cs	-86.906±0.005	¹⁵⁰ La	-57.500±0.610	¹⁴⁸ Nd	-77.418±0.004
¹²² Cd	-80.580±0.210	¹¹⁰ Sb	-77.530±0.200	¹²² I	-86.073±0.006	¹³⁵ Cs	-87.662±0.007	¹²⁶ Ce	-71.070±0.830	¹⁴⁹ Nd	-74.385±0.004
¹²³ Cd	-77.520±0.300	¹¹¹ Sb	-80.840±0.200	¹²³ I	-87.937±0.004	¹³⁶ Cs	-86.354±0.005	¹²⁷ Ce	-72.290±0.610	¹⁵⁰ Nd	-73.693±0.004
¹⁰⁰ In	-63.870±0.710	¹¹² Sb	-81.603±0.023	¹²⁴ I	-87.368±0.004	¹³⁷ Cs	-86.556±0.005	¹²⁸ Ce	-75.870±0.500	¹⁵¹ Nd	-70.956±0.004
¹⁰¹ In	-68.360±0.610	¹¹³ Sb	-84.424±0.024	¹²⁵ I	-88.846±0.002	¹³⁸ Cs	-82.896±0.022	¹²⁹ Ce	-76.480±0.400	¹⁵² Nd	-70.160±0.030
¹⁰² In	-70.580±0.400	¹¹⁴ Sb	-84.680±0.200	¹²⁶ I	-87.916±0.005	¹³⁹ Cs	-80.710±0.007	¹³⁰ Ce	-79.590±0.300	¹⁵³ Nd	-67.170±0.200
¹⁰³ In	-74.607±0.025	¹¹⁵ Sb	-87.004±0.020	¹²⁷ I	-88.982±0.004	¹⁴⁰ Cs	-77.053±0.016	¹³¹ Ce	-79.730±0.410	¹⁵⁴ Nd	-65.860±0.300
¹⁰⁴ In	-76.080±0.200	¹¹⁶ Sb	-86.819±0.006	¹²⁸ I	-87.736±0.004	¹⁴¹ Cs	-74.472±0.016	¹³² Ce	-82.440±0.210	¹⁵⁵ Nd	-62.700±0.500
¹⁰⁵ In	-79.493±0.016	¹¹⁷ Sb	-88.644±0.009	¹²⁹ I	-88.507±0.004	¹⁴² Cs	-70.538±0.020	¹³³ Ce	-82.470±0.200	¹⁵⁶ Nd	-60.570±0.700
¹⁰⁶ In	-80.617±0.013	¹¹⁸ Sb	-87.998±0.004	¹³⁰ I	-86.897±0.010	¹⁴³ Cs	-67.745±0.028	¹³⁴ Ce	-84.750±0.200	¹³² Pm	-61.940±0.860
¹⁰⁷ In	-83.568±0.013	¹¹⁹ Sb	-89.475±0.008	¹³¹ I	-87.457±0.004	¹⁴⁴ Cs	-63.370±0.040	¹³⁵ Ce	-84.641±0.012	¹³³ Pm	-65.620±0.740
¹⁰⁸ In	-84.112±0.029	¹²⁰ Sb	-88.423±0.008	¹³² I	-85.715±0.011	¹⁴⁵ Cs	-60.210±0.050	¹³⁶ Ce	-86.500±0.050	¹³⁴ Pm	-67.050±0.630
¹⁰⁹ In	-86.487±0.006	¹²¹ Sb	-89.591±0.002	¹³³ I	-85.888±0.026	¹⁴⁶ Cs	-55.700±0.080	¹³⁷ Ce	-85.910±0.050	¹³⁵ Pm	-70.220±0.430
¹¹⁰ In	-86.410±0.200	¹²² Sb	-88.327±0.002	¹³⁴ I	-83.990±0.060	¹⁴⁷ Cs	-52.300±0.110	¹³⁸ Ce	-87.574±0.011	¹³⁶ Pm	-71.300±0.410
¹¹¹ In	-88.391±0.006	¹²³ Sb	-89.223±0.002	¹³⁵ I	-83.821±0.023	¹⁴⁸ Cs	-47.580±0.360	¹³⁹ Ce	-86.973±0.013	¹³⁷ Pm	-74.020±0.150
¹¹² In	-87.995±0.005	¹²⁴ Sb	-87.619±0.002	¹³⁶ I	-79.550±0.040	¹¹⁷ Ba	-57.160±0.840	¹⁴⁰ Ce	-88.088±0.004	¹³⁸ Pm	-75.140±0.450
¹¹³ In	-89.368±0.003	¹²⁵ Sb	-88.258±0.003	¹³⁷ I	-76.507±0.029	¹¹⁸ Ba	-62.350±0.490	¹⁴¹ Ce	-85.445±0.004	¹³⁹ Pm	-77.540±0.050
¹¹⁴ In	-88.571±0.003	¹²⁶ Sb	-86.400±0.030	¹³⁸ I	-72.290±0.080	¹¹⁹ Ba	-64.460±0.350	¹⁴² Ce	-84.542±0.004	¹⁴⁰ Pm	-78.380±0.040
¹¹⁵ In	-89.539±0.004	¹²⁷ Sb	-86.705±0.006	¹³⁹ I	-68.880±0.120	¹²⁰ Ba	-69.020±0.410	¹⁴³ Ce	-81.616±0.004	¹⁴¹ Pm	-80.472±0.029
¹¹⁶ In	-88.252±0.005	¹²⁸ Sb	-84.610±0.040	¹⁴⁰ I	-64.250±0.200	¹²¹ Ba	-70.420±0.210	¹⁴⁴ Ce	-80.441±0.004	¹⁴² Pm	-81.090±0.040
¹¹⁷ In	-88.945±0.005	¹²⁹ Sb	-84.624±0.022	¹¹⁰ Xe	-51.970±0.630	¹²² Ba	-74.540±0.310	¹⁴⁵ Ce	-77.110±0.040	¹⁴³ Pm	-82.970±0.004
¹¹⁸ In	-87.232±0.008	¹³⁰ Sb	-82.330±0.070	¹¹¹ Xe	-54.510±0.500	¹²³ Ba	-75.560±0.300	¹⁴⁶ Ce	-75.730±0.070	¹⁴⁴ Pm	-81.425±0.004
¹¹⁹ In	-87.733±0.008	¹³¹ Sb	-82.020±0.070	¹¹² Xe	-60.060±0.540	¹²⁴ Ba	-79.140±0.300	¹⁴⁷ Ce	-72.190±0.060	¹⁴⁵ Pm	-81.278±0.004
¹²⁰ In	-85.800±0.170	¹³² Sb	-79.730±0.080	¹¹³ Xe	-62.090±0.090	¹²⁵ Ba	-79.550±0.250	¹⁴⁸ Ce	-70.430±0.120	¹⁴⁶ Pm	-79.458±0.006
¹²¹ In	-85.841±0.028	¹³³ Sb	-79.020±0.210	¹¹⁴ Xe	-67.180±0.210	¹²⁶ Ba	-82.770±0.200	¹⁴⁹ Ce	-66.800±0.080	¹⁴⁷ Pm	-79.052±0.003
¹²² In	-83.580±0.050	¹³⁴ Sb	-74.020±0.160	¹¹⁵ Xe	-68.670±0.280	¹²⁷ Ba	-82.790±0.100	¹⁵⁰ Ce	-64.990±0.120	¹⁴⁸ Pm	-76.874±0.011
¹²³ In	-83.420±0.030	¹³⁵ Sb	-70.320±0.200	¹¹⁶ Xe	-73.050±0.250	¹²⁸ Ba	-85.470±0.018	¹⁵¹ Ce	-61.660±0.500	¹⁴⁹ Pm	-76.073±0.005
¹²⁴ In	-81.060±0.050	¹³⁶ Sb	-65.050±0.300	¹¹⁷ Xe	-74.200±0.220	¹²⁹ Ba	-85.080±0.011	¹⁵² Ce	-59.760±0.700	¹⁵⁰ Pm	-73.606±0.020
¹²⁵ In	-80.420±0.080	¹⁰⁶ Te	-58.270±0.630	¹¹⁸ Xe	-77.950±0.280	¹³⁰ Ba	-87.291±0.007	¹²⁸ Pr	-66.320±0.900	¹⁵¹ Pm	-73.398±0.006
¹²⁶ In	-77.810±0.080	¹⁰⁷ Te	-60.640±0.500	¹¹⁹ Xe	-78.750±0.140	¹³¹ Ba	-86.714±0.007	¹²⁹ Pr	-70.060±0.700	¹⁵² Pm	-71.270±0.070
¹²⁷ In	-77.010±0.070	¹⁰⁸ Te	-65.820±0.540	¹²⁰ Xe	-81.810±0.050	¹³² Ba	-88.447±0.008	¹³⁰ Pr	-71.290±0.540	¹⁵³ Pm	-70.669±0.016
¹²⁸ In	-74.020±0.170	¹⁰⁹ Te	-67.620±0.070	¹²¹ Xe	-82.510±0.060	¹³³ Ba	-87.570±0.005	¹³¹ Pr	-74.450±0.410	¹⁵⁴ Pm	-68.410±0.110
¹²⁹ In	-73.020±0.170	¹¹⁰ Te	-72.300±0.060	¹²² Xe	-85.050±0.140	¹³⁴ Ba	-88.965±0.005	¹³² Pr	-75.340±0.300	¹⁵⁵ Pm	-67.100±0.200
¹³⁰ In	-70.010±0.200	¹¹¹ Te	-73.470±0.070	¹²³ Xe	-85.258±0.016	¹³⁵ Ba	-87.867±0.005	¹³³ Pr	-78.020±0.220	¹⁵⁶ Pm	-64.370±0.300
¹³¹ In	-68.490±0.140	¹¹² Te	-77.270±0.170	¹²⁴ Xe	-87.659±0.002	¹³⁶ Ba	-88.903±0.005	¹³⁴ Pr	-78.650±0.200	¹⁵⁷ Pm	-62.370±0.500
¹³² In	-63.210±0.510	¹¹³ Te	-78.320±0.200	¹²⁵ Xe	-87.191±0.002	¹³⁷ Ba	-87.732±0.005	¹³⁵ Pr	-80.920±0.150	¹⁵⁸ Pm	-59.410±0.700
¹⁰² Sn	-65.020±0.630	¹¹⁴ Te	-81.760±0.200	¹²⁶ Xe	-89.174±0.007	¹³⁸ Ba	-88.272±0.005	¹³⁶ Pr	-81.370±0.050	¹³⁴ Sm	-62.050±0.880
¹⁰³ Sn	-67.050±0.500	¹¹⁵ Te	-82.360±0.230	¹²⁷ Xe	-88.319±0.005	¹³⁹ Ba	-84.924±0.005	¹³⁷ Pr	-83.200±0.050	¹³⁵ Sm	-63.520±0.780
¹⁰⁴ Sn	-71.680±0.540	¹¹⁶ Te	-85.290±0.100	¹²⁸ Xe	-89.860±0.001	¹⁴⁰ Ba	-83.273±0.012	¹³⁸ Pr	-83.137±0.015	¹³⁶ Sm	-67.260±0.600
¹⁰⁵ Sn	-73.240±0.080	¹¹⁷ Te	-85.110±0.019	¹²⁹ Xe	-88.698±0.001	¹⁴¹ Ba	-79.732±0.021	¹³⁹ Pr	-84.844±0.013	¹³⁷ Sm	-68.100±0.410
¹⁰⁶ Sn	-77.450±0.060	¹¹⁸ Te	-87.653±0.023	¹³⁰ Xe	-89.881±0.001	¹⁴² Ba	-77.847±0.020	¹⁴⁰ Pr	-84.700±0.007	¹³⁸ Sm	-71.540±0.450
¹⁰⁷ Sn	-78.470±0.100	¹¹⁹ Te	-87.182±0.008	¹³¹ Xe	-88.428±0.004	¹⁴³ Ba	-73.979±0.028	¹⁴¹ Pr	-86.026±0.003	¹³⁹ Sm	-72.080±0.120
¹⁰⁸ Sn	-82.050±0.040	¹²⁰ Te	-89.386±0.019	¹³² Xe	-89.292±0.004	¹⁴⁴ Ba	-71.840±0.050	¹⁴² Pr	-83.798±0.003	¹⁴⁰ Sm	-75.380±0.300
¹⁰⁹ Sn	-82.633±0.010	¹²¹ Te	-88.551±0.026	¹³³ Xe	-87.659±0.005	¹⁴⁵ Ba	-68.120±0.070	¹⁴³ Pr	-83.078±0.003	¹⁴¹ Sm	-75.943±0.013
¹¹⁰ Sn	-85.834±0.016	¹²² Te	-90.307±0.002	¹³⁴ Xe	-88.125±0.007	¹⁴⁶ Ba	-65.060±0.080	¹⁴⁴ Pr	-80.760±0.004	¹⁴² Sm	-78.986±0.015
¹¹¹ Sn	-85.943±0.007	¹²³ Te	-89.171±0.001	¹³⁵ Xe	-86.506±0.011	¹⁴⁷ Ba	-61.500±0.100	¹⁴⁵ Pr	-79.636±0.008	¹⁴³ Sm	-79.526±0.005
¹¹² Sn	-88.658±0.004	¹²⁴ Te	-90.525±0.001	¹³⁶ Xe	-86.429±0.007	¹⁴⁸ Ba	-58.130±0.610	¹⁴⁶ Pr	-76.760±0.060	¹⁴⁴ Sm	-81.975±0.004
¹¹³ Sn	-88.330±0.004	¹²⁵ Te	-89.024±0.002	¹³⁷ Xe	-82.383±0.007	¹⁴⁹ Ba	-54.300±0.900	¹⁴⁷ Pr	-75.470±0.040	¹⁴⁵ Sm	-80.660±0.004
¹¹⁴ Sn	-90.560±0.003	¹²⁶ Te	-90.067±0.002	¹³⁸ Xe	-80.110±0.040	¹²⁴ La	-70.240±0.700	¹⁴⁸ Pr	-72.490±0.220	¹⁴⁶ Sm	-81.000±0.005
¹¹⁵ Sn	-90.034±0.003	¹²⁷ Te	-88.286±0.004	¹³⁹ Xe	-75.690±0.060	¹²⁵ La	-73.810±0.600	¹⁴⁹ Pr	-70.988±0.011	¹⁴⁷ Sm	-79.276±0.003
¹¹⁶ Sn	-91.526±0.003	¹²⁸ Te	-88.992±0.003	¹⁴⁰ Xe	-72.990±0.060	¹²⁶ La	-75.050±0.400	¹⁵⁰ Pr	-68.000±0.080	¹⁴⁸ Sm	-79.346±0.003
¹¹⁷ Sn	-90.399±0.002	¹²⁹ Te	-87.006±0.004	¹⁴¹ Xe	-68.320±0.090	¹²⁷ La	-77.990±0.220	¹⁵¹ Pr	-66.760±0.300	¹⁴⁹ Sm	-77.146±0.003
¹¹⁸ Sn	-91.654±0.002	¹³⁰ Te	-87.348±0.004	¹⁴² Xe	-65.500±0.100	¹²⁸ La	-78.820±0.400	¹⁵² Pr	-64.160±0.300	¹⁵⁰ Sm	-77.060±0.003
¹¹⁹ Sn	-90.068±0.002	¹³¹ Te	-85.206±0.004	¹¹³ Cs	-51.810±0.540	¹²⁹ La	-81.360±0.050	¹⁵³ Pr	-62.370±0.500	¹⁵¹ Sm	-74.587±0.003
¹²⁰ Sn	-91.103±0.002	¹³² Te	-85.222±0.012	¹¹⁴ Cs	-54.740±0.510	¹³⁰ La	-81.590±0.200	¹⁵⁴ Pr	-59.110±0.710	¹⁵² Sm	-74.773±0.003
¹²¹ Sn	-89.203±0.002	¹³³ Te	-82.970±0.080	¹¹⁵ Cs	-59.650±0.500	¹³¹ La	-83.750±0.100	¹²⁹ Nd	-62.880±0.890	¹⁵³ Sm	-72.569±0.003
¹²² Sn	-89.946±0.002	¹³⁴ Te	-82.430±0.110	¹¹⁶ Cs	-62.290±0.290	¹³² La	-83.740±0.050	¹³⁰ Nd	-66.990±0.850	¹⁵⁴ Sm	-72.465±0.003
¹²³ Sn	-87.820±0.002	¹³⁵ Te	-77.870±0.090	¹¹⁷ Cs	-66.260±0.180	¹³³ La	-85.520±0.100	¹³¹ Nd	-68.230±0.810	¹⁵⁵ Sm	-70.201±0.003
¹²⁴ Sn	-88.237±0.001	¹³⁶ Te	-74.460±0.050	¹¹⁸ Cs	-68.270±0.130	¹³⁴ La	-85.252±0.026	¹³² Nd	-71.940±0.630	¹⁵⁶ Sm	-69.374±0.010
¹²⁵ Sn	-85.898±0.002	¹³⁷ Te	-69.480±0.300	¹¹⁹ Cs	-72.240±0.100	¹³⁵ La	-86.667±0.011	¹³³ Nd	-72.570±0.450	¹⁵⁷ Sm	-66.870±0.200
¹²⁶ Sn	-86.021±0.011	¹³⁸ Te	-66.110±0.200	¹²⁰ Cs	-73.820±0.080	¹³⁶ La	-86.030±0.070	¹³⁴ Nd	-75.950±0.360	¹⁵⁸ Sm	-65.400±0.200
¹²⁷ Sn	-83.504±0.025	¹⁰⁸ I	-52.750±0.660	¹²¹ Cs	-77.110±0.060	¹³⁷ La	-87.130±0.050	¹³⁵ Nd	-76.220±0.340	¹⁵⁹ Sm	-62.370±0.400
¹²⁸ Sn	-83.330±0.050	¹⁰⁹ I	-57.710±0.540	¹²² Cs	-78.140±0.060	¹³⁸ La	-86.531±0.005	¹³⁶ Nd	-79.160±0.060	¹⁶⁰ Sm	-60.350±0.700
¹²⁹ Sn	-80.620±0.120	¹¹⁰ I	-60.520±0.500	¹²³ Cs	-81.070±0.040	¹³⁹ La	-87.238±0.004	¹³⁷ Nd	-79.700±0.070	¹³⁶ Eu	-57.000±0.900
¹³⁰ Sn	-80.130±0.080	¹¹¹ I	-65.070±0.400	¹²⁴ Cs	-81.740±0.040</						

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁴⁷ Eu	-77.555±0.004	¹⁴⁶ Dy	-62.860±0.250	¹⁷⁰ Er	-60.117±0.003	¹⁶⁰ Lu	-50.460±0.280	¹⁷⁸ Ta	-50.530±0.100	¹⁶³ Os	-16.620±0.680
¹⁴⁸ Eu	-76.239±0.018	¹⁴⁷ Dy	-64.330±0.110	¹⁷¹ Er	-57.727±0.003	¹⁶¹ Lu	-52.600±0.220	¹⁷⁹ Ta	-50.365±0.006	¹⁶⁴ Os	-20.780±0.500
¹⁴⁹ Eu	-76.455±0.005	¹⁴⁸ Dy	-68.000±0.060	¹⁷² Er	-56.491±0.005	¹⁶² Lu	-52.860±0.230	¹⁸⁰ Ta	-48.939±0.003	¹⁶⁵ Os	-21.870±0.460
¹⁵⁰ Eu	-74.800±0.007	¹⁴⁹ Dy	-67.900±0.200	¹⁷³ Er	-53.660±0.200	¹⁶³ Lu	-54.770±0.220	¹⁸¹ Ta	-54.444±0.003	¹⁶⁶ Os	-25.740±0.200
¹⁵¹ Eu	-74.663±0.003	¹⁵⁰ Dy	-69.324±0.012	¹⁴⁷ Tm	-36.710±0.840	¹⁶⁴ Lu	-54.740±0.140	¹⁸² Ta	-46.436±0.003	¹⁶⁷ Os	-26.710±0.310
¹⁵² Eu	-72.899±0.003	¹⁵¹ Dy	-68.764±0.005	¹⁴⁸ Tm	-39.880±0.860	¹⁶⁵ Lu	-56.260±0.080	¹⁸³ Ta	-45.299±0.003	¹⁶⁸ Os	-30.130±0.060
¹⁵³ Eu	-73.378±0.003	¹⁵² Dy	-70.127±0.006	¹⁴⁹ Tm	-44.510±0.730	¹⁶⁶ Lu	-56.110±0.160	¹⁸⁴ Ta	-42.844±0.026	¹⁶⁹ Os	-30.880±0.220
¹⁵⁴ Eu	-71.748±0.003	¹⁵³ Dy	-69.152±0.005	¹⁵⁰ Tm	-47.010±0.620	¹⁶⁷ Lu	-57.470±0.100	¹⁸⁵ Ta	-41.402±0.014	¹⁷⁰ Os	-33.933±0.018
¹⁵⁵ Eu	-71.829±0.003	¹⁵⁴ Dy	-70.399±0.009	¹⁵¹ Tm	-51.220±0.400	¹⁶⁸ Lu	-57.090±0.060	¹⁸⁶ Ta	-38.620±0.060	¹⁷¹ Os	-34.550±0.300
¹⁵⁶ Eu	-70.096±0.007	¹⁵⁵ Dy	-69.166±0.012	¹⁵² Tm	-51.850±0.400	¹⁶⁹ Lu	-58.078±0.005	¹⁵⁸ W	-24.380±0.730	¹⁷² Os	-37.190±0.200
¹⁵⁷ Eu	-69.472±0.006	¹⁵⁶ Dy	-70.536±0.007	¹⁵³ Tm	-54.240±0.210	¹⁷⁰ Lu	-57.311±0.019	¹⁵⁹ W	-25.720±0.670	¹⁷³ Os	-37.460±0.310
¹⁵⁸ Eu	-67.220±0.080	¹⁵⁷ Dy	-69.434±0.007	¹⁵⁴ Tm	-54.700±0.160	¹⁷¹ Lu	-57.834±0.004	¹⁶⁰ W	-29.690±0.500	¹⁷⁴ Os	-39.950±0.250
¹⁵⁹ Eu	-66.058±0.009	¹⁵⁸ Dy	-70.418±0.004	¹⁵⁵ Tm	-56.730±0.060	¹⁷² Lu	-56.741±0.004	¹⁶¹ W	-30.620±0.450	¹⁷⁵ Os	-39.920±0.290
¹⁶⁰ Eu	-63.550±0.200	¹⁵⁹ Dy	-69.176±0.003	¹⁵⁶ Tm	-56.980±0.070	¹⁷³ Lu	-56.886±0.004	¹⁶² W	-34.300±0.200	¹⁷⁶ Os	-42.080±0.240
¹⁶¹ Eu	-61.770±0.400	¹⁶⁰ Dy	-69.682±0.003	¹⁵⁷ Tm	-58.890±0.210	¹⁷⁴ Lu	-55.575±0.004	¹⁶³ W	-35.110±0.310	¹⁷⁷ Os	-41.870±0.300
¹⁶² Eu	-59.080±0.600	¹⁶¹ Dy	-68.064±0.003	¹⁵⁸ Tm	-58.900±0.200	¹⁷⁵ Lu	-55.171±0.002	¹⁶⁴ W	-38.380±0.060	¹⁷⁸ Os	-43.540±0.210
		¹⁶² Dy	-68.189±0.003	¹⁵⁹ Tm	-60.670±0.200	¹⁷⁶ Lu	-53.394±0.002	¹⁶⁵ W	-39.030±0.220	¹⁷⁹ Os	-42.970±0.240
¹³⁸ Gd	-56.640±0.920	¹⁶³ Dy	-66.389±0.003	¹⁶⁰ Tm	-60.460±0.300	¹⁷⁷ Lu	-52.394±0.002	¹⁶⁶ W	-41.898±0.018	¹⁸⁰ Os	-44.380±0.180
¹³⁹ Gd	-58.470±0.710	¹⁶⁴ Dy	-65.976±0.003	¹⁶¹ Tm	-62.100±0.200	¹⁷⁸ Lu	-50.338±0.024	¹⁶⁷ W	-42.350±0.300	¹⁸¹ Os	-43.530±0.250
¹⁴⁰ Gd	-62.480±0.670	¹⁶⁵ Dy	-63.621±0.003	¹⁶² Tm	-61.550±0.040	¹⁷⁹ Lu	-49.110±0.040	¹⁶⁸ W	-44.840±0.200	¹⁸² Os	-44.542±0.025
¹⁴¹ Gd	-63.540±0.400	¹⁶⁶ Dy	-62.593±0.003	¹⁶³ Tm	-62.738±0.006	¹⁸⁰ Lu	-46.690±0.070	¹⁶⁹ W	-44.940±0.310	¹⁸³ Os	-43.510±0.100
¹⁴² Gd	-67.390±0.400	¹⁶⁷ Dy	-59.940±0.060	¹⁶⁴ Tm	-61.990±0.020	¹⁵⁴ Hf	-33.420±0.730	¹⁷⁰ W	-47.240±0.250	¹⁸⁴ Os	-44.259±0.003
¹⁴³ Gd	-68.470±0.300	¹⁶⁸ Dy	-58.500±0.400	¹⁶⁵ Tm	-62.938±0.004	¹⁵⁵ Hf	-34.600±0.670	¹⁷¹ W	-47.080±0.280	¹⁸⁵ Os	-42.813±0.003
¹⁴⁴ Gd	-71.950±0.300			¹⁶⁶ Tm	-61.894±0.012	¹⁵⁶ Hf	-38.180±0.500	¹⁷² W	-48.970±0.270	¹⁸⁶ Os	-43.003±0.003
¹⁴⁵ Gd	-72.950±0.040	¹⁴⁴ Ho	-45.650±0.900	¹⁶⁷ Tm	-62.550±0.004	¹⁵⁷ Hf	-38.960±0.450	¹⁷³ W	-48.690±0.220	¹⁸⁷ Os	-41.224±0.003
¹⁴⁶ Gd	-76.099±0.011	¹⁴⁵ Ho	-50.000±0.760	¹⁶⁸ Tm	-61.319±0.004	¹⁵⁸ Hf	-42.400±0.200	¹⁷⁴ W	-50.150±0.300	¹⁸⁸ Os	-41.142±0.003
¹⁴⁷ Gd	-75.367±0.004	¹⁴⁶ Ho	-52.160±0.720	¹⁶⁹ Tm	-61.280±0.003	¹⁵⁹ Hf	-43.050±0.300	¹⁷⁵ W	-49.590±0.200	¹⁸⁹ Os	-38.993±0.003
¹⁴⁸ Gd	-76.278±0.004	¹⁴⁷ Ho	-56.280±0.600	¹⁷⁰ Tm	-59.802±0.003	¹⁶⁰ Hf	-46.080±0.060	¹⁷⁶ W	-50.680±0.200	¹⁹⁰ Os	-38.714±0.003
¹⁴⁹ Gd	-75.135±0.005	¹⁴⁸ Ho	-58.380±0.300	¹⁷¹ Tm	-59.217±0.003	¹⁶¹ Hf	-46.480±0.210	¹⁷⁷ W	-49.730±0.300	¹⁹¹ Os	-36.401±0.003
¹⁵⁰ Gd	-75.771±0.007	¹⁴⁹ Ho	-61.910±0.210	¹⁷² Tm	-57.382±0.006	¹⁶² Hf	-49.178±0.017	¹⁷⁸ W	-50.440±0.100	¹⁹² Os	-35.892±0.004
¹⁵¹ Gd	-74.199±0.004	¹⁵⁰ Ho	-62.210±0.160	¹⁷³ Tm	-56.265±0.005	¹⁶³ Hf	-49.380±0.360	¹⁷⁹ W	-49.306±0.016	¹⁹³ Os	-33.405±0.004
¹⁵² Gd	-74.718±0.003	¹⁵¹ Ho	-63.720±0.060	¹⁷⁴ Tm	-53.870±0.040	¹⁶⁴ Hf	-51.790±0.230	¹⁸⁰ W	-49.647±0.005	¹⁹⁴ Os	-32.442±0.004
¹⁵³ Gd	-72.893±0.003	¹⁵² Ho	-63.750±0.060	¹⁷⁵ Tm	-52.300±0.050	¹⁶⁵ Hf	-51.670±0.370	¹⁸¹ W	-48.256±0.005	¹⁹⁵ Os	-29.700±0.500
¹⁵⁴ Gd	-73.717±0.003	¹⁵³ Ho	-65.023±0.007	¹⁷⁶ Tm	-49.700±0.200	¹⁶⁶ Hf	-53.790±0.300	¹⁸² W	-48.250±0.003	¹⁹⁶ Os	-28.300±0.040
¹⁵⁵ Gd	-72.081±0.003	¹⁵⁴ Ho	-64.647±0.009			¹⁶⁷ Hf	-53.470±0.220	¹⁸³ W	-46.369±0.003	¹⁶⁶ Ir	-13.540±0.530
¹⁵⁶ Gd	-72.546±0.003	¹⁵⁵ Ho	-66.064±0.023	¹⁴⁹ Yb	-33.910±0.950	¹⁶⁸ Hf	-55.290±0.120	¹⁸⁴ W	-45.709±0.003	¹⁶⁷ Ir	-17.360±0.420
¹⁵⁷ Gd	-70.834±0.003	¹⁵⁶ Ho	-65.600±0.280	¹⁵⁰ Yb	-39.320±0.730	¹⁶⁹ Hf	-54.810±0.080	¹⁸⁵ W	-43.393±0.003	¹⁶⁸ Ir	-18.670±0.420
¹⁵⁸ Gd	-70.701±0.003	¹⁵⁷ Ho	-66.890±0.050	¹⁵¹ Yb	-41.960±0.670	¹⁷⁰ Hf	-56.210±0.200	¹⁸⁶ W	-42.515±0.003	¹⁶⁹ Ir	-22.210±0.230
¹⁵⁹ Gd	-68.572±0.003	¹⁵⁸ Ho	-66.200±0.030	¹⁵² Yb	-46.640±0.500	¹⁷¹ Hf	-55.430±0.200	¹⁸⁷ W	-39.910±0.003	¹⁷⁰ Ir	-23.530±0.190
¹⁶⁰ Gd	-67.953±0.003	¹⁵⁹ Ho	-67.338±0.004	¹⁵³ Yb	-47.270±0.450	¹⁷² Hf	-56.390±0.050	¹⁸⁸ W	-38.673±0.004	¹⁷¹ Ir	-26.420±0.110
¹⁶¹ Gd	-65.517±0.003	¹⁶⁰ Ho	-66.391±0.011	¹⁵⁴ Yb	-50.220±0.200	¹⁷³ Hf	-55.290±0.100	¹⁸⁹ W	-35.480±0.200	¹⁷² Ir	-27.490±0.440
¹⁶² Gd	-64.240±0.110	¹⁶¹ Ho	-67.207±0.004	¹⁵⁵ Yb	-50.700±0.300	¹⁷⁴ Hf	-55.851±0.003	¹⁹⁰ W	-34.310±0.160	¹⁷³ Ir	-30.230±0.320
¹⁶³ Gd	-61.590±0.400	¹⁶² Ho	-66.050±0.005	¹⁵⁶ Yb	-53.410±0.060	¹⁷⁵ Hf	-54.488±0.003	¹⁶¹ Re	-21.170±0.640	¹⁷⁴ Ir	-31.010±0.680
¹⁶⁴ Gd	-59.280±0.600	¹⁶³ Ho	-66.386±0.003	¹⁵⁷ Yb	-53.630±0.210	¹⁷⁶ Hf	-54.582±0.003	¹⁶² Re	-22.670±0.530	¹⁷⁵ Ir	-33.490±0.570
		¹⁶⁴ Ho	-64.990±0.003	¹⁵⁸ Yb	-56.022±0.016	¹⁷⁷ Hf	-52.892±0.002	¹⁶³ Re	-26.330±0.410	¹⁷⁶ Ir	-34.000±0.370
¹⁴⁰ Tb	-51.780±0.900	¹⁶⁵ Ho	-64.907±0.003	¹⁵⁹ Yb	-55.900±0.210	¹⁷⁸ Hf	-52.446±0.002	¹⁶⁴ Re	-27.510±0.410	¹⁷⁷ Ir	-36.100±0.500
¹⁴¹ Tb	-55.580±0.700	¹⁶⁶ Ho	-63.079±0.003	¹⁶⁰ Yb	-58.160±0.200	¹⁷⁹ Hf	-50.475±0.002	¹⁶⁵ Re	-30.910±0.220	¹⁷⁸ Ir	-36.350±0.290
¹⁴² Tb	-57.390±0.610	¹⁶⁷ Ho	-62.291±0.006	¹⁶¹ Yb	-57.900±0.200	¹⁸⁰ Hf	-49.791±0.002	¹⁶⁶ Re	-32.130±0.180	¹⁷⁹ Ir	-38.050±0.440
¹⁴³ Tb	-60.970±0.400	¹⁶⁸ Ho	-60.260±0.100	¹⁶² Yb	-59.850±0.200	¹⁸¹ Hf	-47.416±0.002	¹⁶⁷ Re	-34.910±0.100	¹⁸⁰ Ir	-37.840±0.300
¹⁴⁴ Tb	-62.750±0.400	¹⁶⁹ Ho	-58.805±0.020	¹⁶³ Yb	-59.370±0.100	¹⁸² Hf	-46.062±0.007	¹⁶⁸ Re	-35.880±0.440	¹⁸¹ Ir	-39.360±0.320
¹⁴⁵ Tb	-66.200±0.300	¹⁷⁰ Ho	-56.250±0.050	¹⁶⁴ Yb	-60.990±0.100	¹⁸³ Hf	-43.290±0.030	¹⁶⁹ Re	-38.600±0.320	¹⁸² Ir	-38.950±0.230
¹⁴⁶ Tb	-67.860±0.150			¹⁶⁵ Yb	-60.175±0.020	¹⁸⁴ Hf	-41.500±0.040	¹⁷⁰ Re	-39.040±0.680	¹⁸³ Ir	-40.110±0.200
¹⁴⁷ Tb	-70.880±0.060	¹⁴⁶ Er	-45.060±0.840	¹⁶⁶ Yb	-61.589±0.008			¹⁷¹ Re	-41.440±0.570	¹⁸⁴ Ir	-39.540±0.250
¹⁴⁸ Tb	-70.680±0.050	¹⁴⁷ Er	-47.330±0.710	¹⁶⁷ Yb	-60.596±0.005	¹⁵⁶ Ta	-26.230±0.900	¹⁷² Re	-41.660±0.370	¹⁸⁵ Ir	-40.210±0.200
¹⁴⁹ Tb	-71.499±0.005	¹⁴⁸ Er	-52.000±0.600	¹⁶⁸ Yb	-61.575±0.004	¹⁵⁷ Ta	-30.030±0.640	¹⁷³ Re	-43.650±0.500	¹⁸⁶ Ir	-39.172±0.020
¹⁵⁰ Tb	-71.113±0.009	¹⁴⁹ Er	-54.950±0.900	¹⁶⁹ Yb	-60.371±0.004	¹⁵⁸ Ta	-31.370±0.530	¹⁷⁴ Re	-43.670±0.350	¹⁸⁷ Ir	-39.720±0.100
¹⁵¹ Tb	-71.633±0.005	¹⁵⁰ Er	-58.120±0.200	¹⁷⁰ Yb	-60.770±0.003	¹⁵⁹ Ta	-34.820±0.410	¹⁷⁵ Re	-45.280±0.480	¹⁸⁸ Ir	-38.333±0.007
¹⁵² Tb	-70.770±0.070	¹⁵¹ Er	-58.460±0.300	¹⁷¹ Yb	-59.314±0.003	¹⁶⁰ Ta	-35.850±0.410	¹⁷⁶ Re	-44.980±0.280	¹⁸⁹ Ir	-38.462±0.013
¹⁵³ Tb	-71.322±0.005	¹⁵² Er	-60.640±0.060	¹⁷² Yb	-59.262±0.003	¹⁶¹ Ta	-38.980±0.220	¹⁷⁷ Re	-46.330±0.200	¹⁹⁰ Ir	-36.710±0.200
¹⁵⁴ Tb	-70.150±0.050	¹⁵³ Er	-60.670±0.200	¹⁷³ Yb	-57.558±0.003	¹⁶² Ta	-40.060±0.170	¹⁷⁸ Re	-45.780±0.210	¹⁹¹ Ir	-36.715±0.004
¹⁵⁵ Tb	-71.261±0.012	¹⁵⁴ Er	-62.622±0.012	¹⁷⁴ Yb	-56.951±0.003	¹⁶³ Ta	-42.600±0.090	¹⁷⁹ Re	-46.620±0.050	¹⁹² Ir	-34.843±0.004
¹⁵⁶ Tb	-70.102±0.005	¹⁵⁵ Er	-62.220±0.050	¹⁷⁵ Yb	-54.702±0.003	¹⁶⁴ Ta	-43.320±0.440	¹⁸⁰ Re	-45.840±0.030	¹⁹³ Ir	-34.544±0.004
¹⁵⁷ Tb	-70.772±0.003	¹⁵⁶ Er	-64.100±0.200	¹⁷⁶ Yb	-53.501±0.003	¹⁶⁵ Ta	-45.850±0.220	¹⁸¹ Re	-46.460±0.100	¹⁹⁴ Ir	-32.539±0.004
¹⁵⁸ Tb	-69.480±0.003	¹⁵⁷ Er	-63.420±0.090	¹⁷⁷ Yb	-50.996±0.003	¹⁶⁶ Ta	-46.310±0.340	¹⁸² Re	-45.450±0.100	¹⁹⁵ Ir	-31.700±0.004
¹⁵⁹ Tb	-69.542±0.003	¹⁵⁸ Er	-65.300±0.100	¹⁷⁸ Yb	-49.705±0.010	¹⁶⁷ Ta	-48.470±0.320	¹⁸³ Re	-45		

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
¹⁷⁵ Pt	-25.950±0.300	¹⁹⁰ Hg	-31.410±0.150	²⁰⁶ Pb	-23.809±0.004	²⁰¹ At	-10.740±0.170	²⁰⁵ Ra	5.760±0.240	²¹⁵ Pa	17.680±0.120
¹⁷⁶ Pt	-28.880±0.200	¹⁹¹ Hg	-30.690±0.090	²⁰⁷ Pb	-22.476±0.004	²⁰² At	-10.770±0.150	²⁰⁶ Ra	3.520±0.150	²¹⁶ Pa	17.680±0.100
¹⁷⁷ Pt	-29.390±0.310	¹⁹² Hg	-32.060±0.100	²⁰⁸ Pb	-21.772±0.004	²⁰³ At	-12.290±0.100	²⁰⁷ Ra	3.470±0.170	²¹⁷ Pa	17.020±0.090
¹⁷⁸ Pt	-31.950±0.250	¹⁹³ Hg	-31.090±0.100	²⁰⁹ Pb	-17.638±0.004	²⁰⁴ At	-11.900±0.070	²⁰⁸ Ra	1.660±0.140	²¹⁸ Pa	18.600±0.090
¹⁷⁹ Pt	-32.200±0.290	¹⁹⁴ Hg	-32.255±0.023	²¹⁰ Pb	-14.752±0.004	²⁰⁵ At	-13.030±0.050	²⁰⁹ Ra	1.810±0.170	²¹⁹ Pa	18.500±0.210
¹⁸⁰ Pt	-34.400±0.240	¹⁹⁵ Hg	-31.070±0.050	²¹¹ Pb	-10.494±0.003	²⁰⁶ At	-12.490±0.060	²¹⁰ Ra	0.420±0.100	²²⁰ Pa	20.190±0.200
¹⁸¹ Pt	-34.310±0.300	¹⁹⁶ Hg	-31.852±0.005	²¹² Pb	-7.571±0.004	²⁰⁷ At	-13.290±0.040	²¹¹ Ra	0.800±0.070	²²¹ Pa	20.310±0.200
¹⁸² Pt	-36.170±0.210	¹⁹⁷ Hg	-30.566±0.005	²¹³ Pb	-3.240±0.100	²⁰⁸ At	-12.560±0.040	²¹² Ra	-0.230±0.100	²²² Pa	21.940±0.070
¹⁸³ Pt	-35.700±0.240	¹⁹⁸ Hg	-30.979±0.004	²¹⁴ Pb	-0.188±0.002	²⁰⁹ At	-12.902±0.008	²¹³ Ra	0.311±0.030	²²³ Pa	22.310±0.070
¹⁸⁴ Pt	-37.360±0.180	¹⁹⁹ Hg	-29.572±0.004	¹⁸⁶ Bi	-3.380±0.580	²¹⁰ At	-11.995±0.009	²¹⁴ Ra	0.075±0.011	²²⁴ Pa	23.780±0.070
¹⁸⁵ Pt	-36.510±0.200	²⁰⁰ Hg	-29.529±0.004	¹⁸⁷ Bi	-6.100±0.530	²¹¹ At	-11.674±0.005	²¹⁵ Ra	2.509±0.008	²²⁵ Pa	24.310±0.060
¹⁸⁶ Pt	-37.790±0.030	²⁰¹ Hg	-27.688±0.004	¹⁸⁸ Bi	-7.330±0.460	²¹² At	-8.640±0.005	²¹⁶ Ra	3.269±0.009	²²⁶ Pa	26.015±0.012
¹⁸⁷ Pt	-36.820±0.200	²⁰² Hg	-27.370±0.004	¹⁸⁹ Bi	-9.800±0.460	²¹³ At	-6.603±0.013	²¹⁷ Ra	5.864±0.010	²²⁷ Pa	26.824±0.010
¹⁸⁸ Pt	-37.827±0.006	²⁰³ Hg	-25.292±0.004	¹⁹⁰ Bi	-10.690±0.280	²¹⁴ At	-3.403±0.006	²¹⁸ Ra	6.627±0.012	²²⁸ Pa	28.856±0.006
¹⁸⁹ Pt	-36.491±0.011	²⁰⁴ Hg	-24.716±0.004	¹⁹¹ Bi	-12.990±0.430	²¹⁵ At	-1.269±0.007	²¹⁹ Ra	9.363±0.012	²²⁹ Pa	29.887±0.009
¹⁹⁰ Pt	-37.331±0.006	²⁰⁵ Hg	-22.312±0.006	¹⁹² Bi	-13.520±0.230	²¹⁶ At	2.231±0.005	²²⁰ Ra	10.250±0.011	²³⁰ Pa	32.168±0.004
¹⁹¹ Pt	-35.701±0.006	²⁰⁶ Hg	-20.969±0.020	¹⁹³ Bi	-15.720±0.350	²¹⁷ At	4.383±0.008	²²¹ Ra	12.938±0.007	²³¹ Pa	33.422±0.002
¹⁹² Pt	-36.303±0.004	²⁰⁷ Hg	-16.270±0.150	¹⁹⁴ Bi	-16.040±0.210	²¹⁸ At	8.090±0.013	²²² Ra	14.303±0.006	²³² Pa	35.924±0.009
¹⁹³ Pt	-34.487±0.004	¹⁷⁹ Tl	-8.020±0.150	¹⁹⁵ Bi	-17.930±0.310	²¹⁹ At	10.520±0.080	²²³ Ra	17.232±0.002	²³³ Pa	37.485±0.002
¹⁹⁴ Pt	-34.787±0.004	¹⁸⁰ Tl	-9.300±0.530	¹⁹⁶ Bi	-17.970±0.700	²²⁰ At	14.290±0.100	²²⁴ Ra	18.804±0.004	²³⁴ Pa	40.334±0.005
¹⁹⁵ Pt	-32.821±0.004	¹⁸¹ Tl	-12.350±0.440	¹⁹⁷ Bi	-19.640±0.170	¹⁹⁸ Rn	-1.240±0.210	²²⁵ Ra	21.988±0.003	²³⁵ Pa	42.330±0.050
¹⁹⁶ Pt	-32.671±0.004	¹⁸² Tl	-13.500±0.610	¹⁹⁸ Bi	-19.540±0.150	¹⁹⁹ Rn	-1.560±0.220	²²⁶ Ra	23.662±0.002	²³⁶ Pa	45.340±0.200
¹⁹⁷ Pt	-30.446±0.004	¹⁸³ Tl	-16.210±0.530	¹⁹⁹ Bi	-20.920±0.100	²⁰⁰ Rn	-4.040±0.180	²²⁷ Ra	27.172±0.002	²³⁷ Pa	47.640±0.100
¹⁹⁸ Pt	-29.932±0.005	¹⁸⁴ Tl	-17.030±0.460	²⁰⁰ Bi	-20.400±0.080	²⁰¹ Rn	-4.160±0.220	²²⁸ Ra	28.936±0.004	²³⁸ Pa	50.910±0.300
¹⁹⁹ Pt	-27.432±0.019	¹⁸⁵ Tl	-19.490±0.460	²⁰¹ Bi	-21.470±0.050	²⁰² Rn	-6.320±0.150	²²⁹ Ra	32.660±0.110	²²⁶ U	27.170±0.030
²⁰⁰ Pt	-26.627±0.021	¹⁸⁶ Tl	-20.080±0.290	²⁰² Bi	-20.800±0.060	²⁰³ Rn	-6.230±0.160	²³⁰ Ra	34.660±0.360	²²⁷ U	28.970±0.110
²⁰¹ Pt	-23.750±0.050	¹⁸⁷ Tl	-22.200±0.430	²⁰³ Bi	-21.580±0.040	²⁰⁴ Rn	-8.040±0.140	²⁰⁹ Ac	8.890±0.170	²²⁸ U	29.209±0.016
¹⁷³ Au	-12.890±0.240	¹⁸⁸ Tl	-22.430±0.220	²⁰⁴ Bi	-20.730±0.040	²⁰⁵ Rn	-7.760±0.160	²¹⁰ Ac	8.620±0.160	²²⁹ U	31.181±0.009
¹⁷⁴ Au	-14.330±0.190	¹⁸⁹ Tl	-24.450±0.350	²⁰⁵ Bi	-21.084±0.008	²⁰⁶ Rn	-9.160±0.100	²¹¹ Ac	7.080±0.110	²³⁰ U	31.600±0.006
¹⁷⁵ Au	-17.210±0.110	¹⁹⁰ Tl	-24.490±0.200	²⁰⁶ Bi	-20.052±0.009	²⁰⁷ Rn	-8.670±0.070	²¹² Ac	7.240±0.080	²³¹ U	33.780±0.050
¹⁷⁶ Au	-18.520±0.440	¹⁹¹ Tl	-26.190±0.310	²⁰⁷ Bi	-20.079±0.004	²⁰⁸ Rn	-9.690±0.100	²¹³ Ac	6.100±0.070	²³² U	34.587±0.004
¹⁷⁷ Au	-21.370±0.320	¹⁹² Tl	-25.950±0.200	²⁰⁸ Bi	-18.894±0.004	²⁰⁹ Rn	-8.973±0.029	²¹⁴ Ac	6.380±0.070	²³³ U	36.915±0.003
¹⁷⁸ Au	-22.530±0.680	¹⁹³ Tl	-27.450±0.200	²⁰⁹ Bi	-18.282±0.004	²¹⁰ Rn	-9.623±0.011	²¹⁵ Ac	5.970±0.060	²³⁴ U	38.141±0.002
¹⁷⁹ Au	-24.990±0.570	¹⁹⁴ Tl	-27.070±0.180	²¹⁰ Bi	-14.815±0.004	²¹¹ Rn	-8.780±0.008	²¹⁶ Ac	8.060±0.040	²³⁵ U	40.915±0.002
¹⁸⁰ Au	-25.750±0.460	¹⁹⁵ Tl	-28.270±0.140	²¹¹ Bi	-11.873±0.006	²¹² Rn	-8.682±0.005	²¹⁷ Ac	8.685±0.013	²³⁶ U	42.441±0.002
¹⁸¹ Au	-27.920±0.500	¹⁹⁶ Tl	-27.500±0.130	²¹² Bi	-8.142±0.004	²¹³ Rn	-5.722±0.008	²¹⁸ Ac	10.820±0.050	²³⁷ U	45.387±0.002
¹⁸² Au	-28.390±0.290	¹⁹⁷ Tl	-28.400±0.050	²¹³ Bi	-5.244±0.008	²¹⁴ Rn	-4.343±0.010	²¹⁹ Ac	11.540±0.050	²³⁸ U	47.305±0.002
¹⁸³ Au	-30.170±0.430	¹⁹⁸ Tl	-27.520±0.080	²¹⁴ Bi	-1.218±0.012	²¹⁵ Rn	-1.193±0.008	²²⁰ Ac	13.730±0.050	²³⁹ U	50.570±0.002
¹⁸⁴ Au	-30.130±0.310	¹⁹⁹ Tl	-28.140±0.100	²¹⁵ Bi	1.710±0.090	²¹⁶ Rn	0.331±0.008	²²¹ Ac	14.500±0.050	²⁴⁰ U	52.711±0.005
¹⁸⁵ Au	-31.750±0.320	²⁰⁰ Tl	-27.073±0.007	²¹⁶ Bi	5.960±0.100	²¹⁷ Rn	6.634±0.005	²²² Ac	16.603±0.006	²²⁹ Np	33.740±0.080
¹⁸⁶ Au	-31.570±0.300	²⁰¹ Tl	-27.205±0.016	¹⁹² Po	-8.030±0.240	²¹⁸ Rn	5.199±0.004	²²³ Ac	17.817±0.008	²³⁰ Np	35.220±0.050
¹⁸⁷ Au	-32.900±0.210	²⁰² Tl	-26.006±0.015	¹⁹³ Po	-8.280±0.290	²¹⁹ Rn	8.828±0.003	²²⁴ Ac	20.204±0.005	²³¹ Np	35.620±0.050
¹⁸⁸ Au	-32.530±0.100	²⁰³ Tl	-25.784±0.004	¹⁹⁴ Po	-11.010±0.210	²²⁰ Rn	10.590±0.004	²²⁵ Ac	21.626±0.008	²³² Np	37.280±0.100
¹⁸⁹ Au	-33.640±0.200	²⁰⁴ Tl	-24.369±0.004	¹⁹⁵ Po	-11.120±0.220	²²¹ Rn	14.420±0.100	²²⁶ Ac	24.303±0.004	²³³ Np	38.010±0.110
¹⁹⁰ Au	-32.889±0.016	²⁰⁵ Tl	-23.846±0.004	¹⁹⁶ Po	-13.500±0.180	²²² Rn	16.367±0.002	²²⁷ Ac	25.848±0.002	²³⁴ Np	39.952±0.009
¹⁹¹ Au	-33.870±0.050	²⁰⁶ Tl	-22.278±0.004	¹⁹⁷ Po	-13.450±0.210	²⁰¹ Fr	3.770±0.350	²²⁸ Ac	28.890±0.004	²³⁵ Np	41.039±0.002
¹⁹² Au	-32.787±0.016	²⁰⁷ Tl	-21.049±0.006	¹⁹⁸ Po	-15.510±0.150	²⁰² Fr	3.100±0.210	²²⁹ Ac	30.900±0.110	²³⁶ Np	43.370±0.050
¹⁹³ Au	-33.430±0.100	²⁰⁸ Tl	-16.774±0.004	¹⁹⁹ Po	-15.280±0.160	²⁰³ Fr	0.970±0.320	²³⁰ Ac	33.760±0.200	²³⁷ Np	44.868±0.002
¹⁹⁴ Au	-32.295±0.012	²⁰⁹ Tl	-13.652±0.010	²⁰⁰ Po	-17.010±0.140	²⁰⁴ Fr	0.650±0.690	²³¹ Ac	35.910±0.100	²³⁸ Np	47.451±0.002
¹⁹⁵ Au	-32.594±0.004	²¹⁰ Tl	-9.262±0.012	²⁰¹ Po	-16.570±0.150	²⁰⁵ Fr	-1.270±0.170	²³² Ac	39.240±0.200	²³⁹ Np	49.306±0.002
¹⁹⁶ Au	-31.166±0.005	¹⁸² Pb	-6.874±0.028	²⁰² Po	-17.970±0.100	²⁰⁶ Fr	-1.420±0.150	²¹² Th	12.040±0.140	²⁴⁰ Np	52.321±0.014
¹⁹⁷ Au	-31.165±0.004	¹⁸³ Pb	-7.720±0.310	²⁰³ Po	-17.350±0.070	²⁰⁷ Fr	-2.960±0.100	²¹³ Th	12.080±0.170	²⁴¹ Np	54.260±0.070
¹⁹⁸ Au	-29.606±0.004	¹⁸⁴ Pb	-11.000±0.200	²⁰⁴ Po	-18.370±0.100	²⁰⁸ Fr	-2.710±0.070	²¹⁴ Th	10.670±0.100	²⁴² Np	57.410±0.200
¹⁹⁹ Au	-29.119±0.004	¹⁸⁵ Pb	-11.580±0.310	²⁰⁵ Po	-17.555±0.030	²⁰⁹ Fr	-3.830±0.050	²¹⁵ Th	10.890±0.070	²⁴³ Np	59.922±0.011
²⁰⁰ Au	-27.280±0.050	¹⁸⁶ Pb	-14.630±0.250	²⁰⁶ Po	-18.205±0.010	²¹⁰ Fr	-3.400±0.050	²¹⁶ Th	10.270±0.100	²³¹ Pu	38.390±0.150
²⁰¹ Au	-26.413±0.015	¹⁸⁷ Pb	-14.920±0.290	²⁰⁷ Po	-17.169±0.007	²¹¹ Fr	-4.200±0.040	²¹⁷ Th	12.160±0.030	²³² Pu	38.349±0.019
²⁰² Au	-24.420±0.170	¹⁸⁸ Pb	-17.780±0.240	²⁰⁸ Po	-17.492±0.004	²¹² Fr	-3.600±0.040	²¹⁸ Th	12.348±0.014	²³³ Pu	40.020±0.050
²⁰³ Au	-23.153±0.016	¹⁸⁹ Pb	-17.820±0.300	²⁰⁹ Po	-16.390±0.004	²¹³ Fr	-3.572±0.009	²¹⁹ Th	14.450±0.050	²³⁴ Pu	40.335±0.008
²⁰⁴ Au	-20.720±0.200	¹⁹⁰ Pb	-20.420±0.210	²¹⁰ Po	-15.977±0.004	²¹⁴ Fr	-0.983±0.010	²²⁰ Th	14.647±0.022	²³⁵ Pu	42.160±0.050
¹⁷⁵ Hg	-8.210±0.310	¹⁹¹ Pb	-20.300±0.220	²¹¹ Po	-12.457±0.004	²¹⁵ Fr	0.292±0.008	²²¹ Th	16.917±0.011	²³⁶ Pu	42.879±0.004
¹⁷⁶ Hg	-11.890±0.060	¹⁹² Pb	-22.580±0.180	²¹² Po	-10.394±0.004	²¹⁶ Fr	2.960±0.013	²²² Th	17.182±0.013	²³⁷ Pu	45.090±0.006
¹⁷⁷ Hg	-12.950±0.230	¹⁹³ Pb	-22.280±0.210	²¹³ Po	-6.676±0.005	²¹⁷ Fr	4.293±0.015	²²³ Th	19.357±0.028	²³⁸ Pu	46.160±0.002
¹⁷⁸ Hg	-16.321±0.019	¹⁹⁴ Pb	-24.250±0.150	²¹⁴ Po	-4.493±0.004	²¹⁸ Fr	7.036±0.006	²²⁴ Th	19.980±0.013	²³⁹ Pu	48.584±0.002
¹⁷⁹ Hg	-17.090±0.300	¹⁹⁵ Pb	-23.780±0.160	²¹⁵ Po	-0.542±0.003	²¹⁹ Fr	8.609±0.008	²²⁵ Th	22.283±0.009	²⁴⁰ Pu	50.122±0.002
¹⁸⁰ Hg	-20.200±0.200	¹⁹⁶ Pb	-25.420±0.140	²¹⁶ Po	1.760±0.004	²²⁰ Fr	11.456±0.005	²²			

Isotope	Mass Excess	Isotope	Mass Excess	Isotope	Mass Excess
²³⁶ Am	46.010±0.140	²⁵² Es	77.290±0.050	²⁶⁴ Hs	119.710±0.800
²³⁷ Am	46.640±0.150	²⁵³ Es	79.007±0.002	²⁶⁵ Hs	121.080±0.260
²³⁸ Am	48.420±0.050	²⁵⁴ Es	81.994±0.006	²⁶⁶ Mt	128.350±0.360
²³⁹ Am	49.385±0.003	²⁵⁵ Es	84.083±0.011		
²⁴⁰ Am	51.498±0.013	²⁵⁶ Es	87.160±0.220		
²⁴¹ Am	52.931±0.002	²⁴³ Fm	69.360±0.260		
²⁴² Am	55.463±0.002	²⁴⁴ Fm	69.040±0.280		
²⁴³ Am	57.169±0.002	²⁴⁵ Fm	70.040±0.280		
²⁴⁴ Am	59.877±0.002	²⁴⁶ Fm	70.120±0.040		
²⁴⁵ Am	61.891±0.002	²⁴⁷ Fm	71.530±0.150		
²⁴⁶ Am	64.990±0.018	²⁴⁸ Fm	71.888±0.014		
²⁴⁷ Am	67.230±0.100	²⁴⁹ Fm	73.510±0.100		
²⁴⁸ Am	70.590±0.200	²⁵⁰ Fm	74.060±0.021		
²³⁵ Cm	48.020±0.250	²⁵¹ Fm	75.978±0.009		
²³⁶ Cm	47.870±0.200	²⁵² Fm	76.814±0.005		
²³⁷ Cm	49.150±0.210	²⁵³ Fm	79.339±0.005		
²³⁸ Cm	49.380±0.040	²⁵⁴ Fm	80.900±0.004		
²³⁹ Cm	51.090±0.100	²⁵⁵ Fm	83.788±0.005		
²⁴⁰ Cm	51.702±0.005	²⁵⁶ Fm	85.482±0.007		
²⁴¹ Cm	53.700±0.006	²⁵⁷ Fm	88.585±0.007		
²⁴² Cm	54.800±0.002	²⁴⁷ Md	76.060±0.360		
²⁴³ Cm	57.177±0.002	²⁴⁸ Md	77.100±0.210		
²⁴⁴ Cm	58.449±0.002	²⁴⁹ Md	77.270±0.290		
²⁴⁵ Cm	60.998±0.002	²⁵⁰ Md	78.580±0.300		
²⁴⁶ Cm	62.614±0.003	²⁵¹ Md	79.050±0.200		
²⁴⁷ Cm	65.528±0.004	²⁵² Md	80.620±0.210		
²⁴⁸ Cm	67.388±0.005	²⁵³ Md	81.240±0.210		
²⁴⁹ Cm	70.746±0.005	²⁵⁴ Md	83.490±0.140		
²⁵⁰ Cm	72.985±0.011	²⁵⁵ Md	84.835±0.007		
²⁵¹ Cm	76.642±0.023	²⁵⁶ Md	87.550±0.050		
²³⁷ Bk	53.190±0.290	²⁵⁷ Md	89.010±0.200		
²³⁸ Bk	54.070±0.290	²⁵⁸ Md	91.840±0.300		
²³⁹ Bk	54.270±0.290	²⁵¹ No	82.760±0.150		
²⁴⁰ Bk	55.600±0.100	²⁵² No	82.857±0.018		
²⁴¹ Bk	56.100±0.200	²⁵³ No	84.330±0.230		
²⁴² Bk	57.800±0.200	²⁵⁴ No	84.711±0.024		
²⁴³ Bk	58.683±0.005	²⁵⁵ No	86.848±0.013		
²⁴⁴ Bk	60.700±0.050	²⁵⁶ No	87.793±0.017		
²⁴⁵ Bk	61.809±0.002	²⁵⁷ No	90.220±0.030		
²⁴⁶ Bk	64.110±0.100	²⁵⁸ No	91.430±0.200		
²⁴⁷ Bk	65.484±0.006	²⁵⁹ No	94.018±0.011		
²⁴⁸ Bk	68.107±0.020	²⁵³ Lr	88.630±0.290		
²⁴⁹ Bk	69.842±0.002	²⁵⁴ Lr	89.750±0.340		
²⁵⁰ Bk	72.951±0.006	²⁵⁵ Lr	90.080±0.230		
²⁵¹ Bk	75.222±0.011	²⁵⁶ Lr	91.930±0.230		
²⁵² Bk	78.530±0.200	²⁵⁷ Lr	92.670±0.210		
²³⁹ Cf	58.250±0.250	²⁵⁸ Lr	94.750±0.140		
²⁴⁰ Cf	58.020±0.200	²⁵⁹ Lr	95.840±0.050		
²⁴¹ Cf	59.180±0.260	²⁶⁰ Lr	98.130±0.070		
²⁴² Cf	59.320±0.040	²⁵⁵ Rf	94.290±0.220		
²⁴³ Cf	60.910±0.140	²⁵⁶ Rf	94.234±0.029		
²⁴⁴ Cf	61.460±0.005	²⁵⁷ Rf	95.900±0.230		
²⁴⁵ Cf	63.380±0.006	²⁵⁸ Rf	96.340±0.200		
²⁴⁶ Cf	64.087±0.002	²⁵⁹ Rf	98.280±0.040		
²⁴⁷ Cf	66.130±0.008	²⁶⁰ Rf	99.020±0.200		
²⁴⁸ Cf	67.237±0.004	²⁶¹ Rf	101.150±0.110		
²⁴⁹ Cf	69.717±0.002	²⁵⁷ Ha	100.360±0.290		
²⁵⁰ Cf	71.167±0.003	²⁵⁸ Ha	101.620±0.340		
²⁵¹ Cf	74.129±0.005	²⁵⁹ Ha	102.110±0.300		
²⁵² Cf	76.030±0.005	²⁶⁰ Ha	103.620±0.240		
²⁵³ Cf	79.296±0.007	²⁶¹ Ha	104.170±0.220		
²⁵⁴ Cf	81.338±0.012	²⁶² Ha	105.970±0.150		
²⁴¹ Es	63.830±0.330	²⁵⁹ Sg	106.590±0.240		
²⁴² Es	64.620±0.310	²⁶⁰ Sg	106.580±0.040		
²⁴³ Es	64.710±0.290	²⁶¹ Sg	108.140±0.250		
²⁴⁴ Es	65.970±0.140	²⁶² Sg	108.460±0.360		
²⁴⁵ Es	66.380±0.200	²⁶³ Sg	110.090±0.060		
²⁴⁶ Es	67.940±0.230	²⁶¹ Ns	113.330±0.360		
²⁴⁷ Es	68.550±0.040	²⁶² Ns	114.650±0.350		
²⁴⁸ Es	70.290±0.060	²⁶³ Ns	114.830±0.590		
²⁴⁹ Es	71.110±0.050	²⁶⁴ Ns	116.150±0.550		
²⁵⁰ Es	73.270±0.100				
²⁵¹ Es	74.506±0.006				