

APPENDIX 2

Isotope Masses and Abundances

<i>Isotope</i>	<i>Nominal mass</i>	<i>Mass</i>	<i>Relative abundance</i>
¹ H	1	1.007825032	99.985(1)
² H; D	2	2.014101778	0.015(1)
³ H; T	3	3.016049268	<0.0001
⁴ He	4	4.002603250	~100
⁶ Li	6	6.0151223	7.5(2)
⁷ Li	7	7.0160041	92.5(2)
⁹ Be	9	9.0121822	~100
¹⁰ B	10	10.0129371	19.9(2)
¹¹ B	11	11.0093055	80.1(2)
¹² C	12	12.000000000	98.93(8)
¹³ C	13	13.003354838	1.07(8)
¹⁴ N	14	14.003074007	99.632(7)
¹⁵ N	15	15.00010897	0.368(7)
¹⁶ O	16	15.994914622	99.757(16)
¹⁷ O	17	16.9991315	0.038(1)
¹⁸ O	18	17.999160	0.205(14)
¹⁹ F	19	18.9984032	~100
²⁰ Ne	20	19.992440176	90.48(3)

<i>Isotope</i>	<i>Nominal mass</i>	<i>Mass</i>	<i>Relative abundance</i>
²¹ Ne	21	20.99384674	0.27(1)
²² Ne	22	21.9913855	9.25(3)
²³ Na	23	22.9897697	~100
²⁴ Mg	24	23.9850419	78.99(4)
²⁵ Mg	25	24.9858370	10.00(1)
²⁶ Mg	26	25.9825930	11.01(3)
²⁷ Al	27	26.9815384	~100
²⁸ Si	28	27.97692653	92.22(2)
²⁹ Si	29	28.97649472	4.69(1)
³⁰ Si	30	29.97377022	3.09(1)
³¹ P	31	30.9737615	~100
³² S	32	31.9720707	94.93(31)
³³ S	33	32.9714585	0.76(2)
³⁴ S	34	33.9678668	4.29(28)
³⁶ S	36	35.9670809	0.02(1)
³⁵ Cl	35	34.96885271	75.78(4)
³⁷ Cl	37	36.96590260	24.22(4)
³⁶ Ar	36	35.9675463	0.3365(30)
³⁸ Ar	38	37.9627322	0.0632(5)
⁴⁰ Ar	40	39.962383123	99.6003(30)
³⁹ K	39	38.9637069	93.2581(44)
⁴⁰ K	40	39.9639987	0.0117(1)
⁴¹ K	41	40.9618260	6.7302(44)
⁴⁰ Ca	40	39.9625912	96.941(156)
⁴² Ca	42	41.9586183	0.647(23)
⁴³ Ca	43	42.9587668	0.135(10)

<i>Isotope</i>	<i>Nominal mass</i>	<i>Mass</i>	<i>Relative abundance</i>
⁴⁴ Ca	44	43.955481	2.086(110)
⁴⁶ Ca	46	45.953693	0.004(3)
⁴⁸ Ca	48	47.952533	0.187(21)
⁴⁵ Sc	45	44.955910	~100
⁴⁶ Ti	46	45.952630	8.25(3)
⁴⁷ Ti	47	46.951764	7.44(2)
⁴⁸ Ti	48	47.947947	73.72(3)
⁴⁹ Ti	49	48.947871	5.41(2)
⁵⁰ Ti	50	49.944792	5.18(2)
⁵⁰ V	50	49.947163	0.250(4)
⁵¹ V	51	50.943964	99.750(4)
⁵⁰ Cr	50	49.946050	4.345(13)
⁵² Cr	52	51.940512	83.789(18)
⁵³ Cr	53	52.940653	9.501(17)
⁵⁴ Cr	54	53.938885	2.365(7)
⁵⁵ Mn	55	54.938049	~100
⁵⁴ Fe	54	53.939615	5.845(35)
⁵⁶ Fe	56	55.934942	91.754(36)
⁵⁷ Fe	57	56.935398	2.119(10)
⁵⁸ Fe	58	57.933280	0.282(4)
⁵⁹ Co	59	58.933200	~100
⁵⁸ Ni	58	57.935348	68.0769(89)
⁶⁰ Ni	60	59.930790	26.2231(77)
⁶¹ Ni	61	60.931060	1.1399(6)
⁶² Ni	62	61.928348	3.6345(17)
⁶⁴ Ni	64	63.927969	0.9256(9)

<i>Isotope</i>	<i>Nominal mass</i>	<i>Mass</i>	<i>Relative abundance</i>
⁶³ Cu	63	62.929601	69.17(3)
⁶⁵ Cu	65	64.927794	30.83(3)
⁶⁴ Zn	64	63.929146	48.63(60)
⁶⁶ Zn	66	65.926036	27.90(27)
⁶⁷ Zn	67	66.927131	4.10(13)
⁶⁸ Zn	68	67.924847	18.75(51)
⁷⁰ Zn	70	69.925325	0.62(3)
⁶⁹ Ga	69	68.925581	60.108(9)
⁷¹ Ga	71	70.924707	39.892(9)
⁷⁰ Ge	70	69.924250	20.84(87)
⁷² Ge	72	71.922076	27.54(34)
⁷³ Ge	73	72.923460	7.73(5)
⁷⁴ Ge	74	73.921178	36.28(73)
⁷⁶ Ge	76	75.921403	7.61(38)
⁷⁵ As	75	74.921597	~100
⁷⁴ Se	74	73.922477	0.89(4)
⁷⁶ Se	76	75.919214	9.37(29)
⁷⁷ Se	77	76.919915	7.63(16)
⁷⁸ Se	78	77.917310	23.77(28)
⁸⁰ Se	80	79.916522	49.61(41)
⁸² Se	82	81.916700	8.73(22)
⁷⁹ Br	79	78.918338	50.69(7)
⁸¹ Br	81	80.916291	49.31(7)
⁷⁸ Kr	78	77.92039	0.35(1)
⁸⁰ Kr	80	79.916379	2.28(6)
⁸² Kr	82	81.913485	11.58(14)

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⁸³ Kr	83	82.914137	11.49(6)
⁸⁴ Kr	84	83.911508	57.00(4)
⁸⁶ Kr	86	85.910615	17.30(22)
⁸⁵ Rb	85	84.911792	72.17(2)
⁸⁷ Rb	87	86.909186	27.83(2)
⁸⁴ Sr	84	83.913426	0.56(1)
⁸⁶ Sr	86	85.909265	9.86(1)
⁸⁷ Sr	87	86.908882	7.00(1)
⁸⁸ Sr	88	87.905617	82.58(1)
⁸⁹ Y	89	88.905849	~100
⁹⁰ Zr	90	89.904702	51.45(40)
⁹¹ Zr	91	90.905643	11.22(5)
⁹² Zr	92	91.905039	17.15(8)
⁹⁴ Zr	94	93.906314	17.38(28)
⁹⁶ Zr	96	95.908275	2.80(9)
⁹³ Nb	93	92.906376	~100
⁹² Mo	92	91.906810	14.84(35)
⁹⁴ Mo	94	93.905087	9.25(12)
⁹⁵ Mo	95	94.905841	15.92(13)
⁹⁶ Mo	96	95.904678	16.68(2)
⁹⁷ Mo	97	96.906020	9.55(8)
⁹⁸ Mo	98	97.905407	24.13(31)
¹⁰⁰ Mo	100	99.90748	9.63(23)
⁹⁶ Ru	96	95.90760	5.52(20)
⁹⁸ Ru	98	97.90529	1.88(9)
⁹⁹ Ru	99	98.905939	12.74(26)

<i>Isotope</i>	<i>Nominal mass</i>	<i>Mass</i>	<i>Relative abundance</i>
¹⁰⁰ Ru	100	99.904219	12.60(19)
¹⁰¹ Ru	101	100.905582	17.05(7)
¹⁰² Ru	102	101.904349	31.57(31)
¹⁰⁴ Ru	104	103.905430	18.66(44)
¹⁰³ Rh	103	102.905504	~100
¹⁰² Pd	102	101.905607	1.02(1)
¹⁰⁴ Pd	104	103.904034	11.14(8)
¹⁰⁵ Pd	105	104.905083	22.33(8)
¹⁰⁶ Pd	106	105.903484	27.33(3)
¹⁰⁸ Pd	108	107.903895	26.46(9)
¹¹⁰ Pd	110	109.905153	11.72(9)
¹⁰⁷ Ag	107	106.905093	51.839(8)
¹⁰⁹ Ag	109	108.904756	48.161(8)
¹⁰⁶ Cd	106	105.90646	1.25(6)
¹⁰⁸ Cd	108	107.90418	0.89(3)
¹¹⁰ Cd	110	109.903006	12.49(18)
¹¹¹ Cd	111	110.904182	12.80(12)
¹¹² Cd	112	111.902758	24.13(21)
¹¹³ Cd	113	112.904401	12.22(12)
¹¹⁴ Cd	114	113.903359	28.73(42)
¹¹⁶ Cd	116	115.904756	7.49(18)
¹¹³ In	113	112.904062	4.29(5)
¹¹⁵ In	115	114.903879	95.71(5)
¹¹² Sn	112	111.904822	0.97(1)
¹¹⁴ Sn	114	113.902783	0.65(1)
¹¹⁵ Sn	115	114.903347	0.34(1)

<i>Isotope</i>	<i>Nominal mass</i>	<i>Mass</i>	<i>Relative abundance</i>
¹¹⁶ Sn	116	115.901745	14.45(9)
¹¹⁷ Sn	117	116.902955	7.68(7)
¹¹⁸ Sn	118	117.901608	24.22(9)
¹¹⁹ Sn	119	118.903311	8.59(4)
¹²⁰ Sn	120	119.902199	32.59(9)
¹²² Sn	122	121.903441	4.63(3)
¹²⁴ Sn	124	123.905275	5.79(5)
¹²¹ Sb	121	120.903822	57.21(5)
¹²³ Sb	123	122.904216	42.79(5)
¹²⁰ Te	120	119.90403	0.09(1)
¹²² Te	122	121.903056	2.55(12)
¹²³ Te	123	122.904271	0.89(3)
¹²⁴ Te	124	123.902819	4.74(14)
¹²⁵ Te	125	124.904424	7.07(15)
¹²⁶ Te	126	125.903305	18.84(25)
¹²⁸ Te	128	127.904462	31.74(8)
¹³⁰ Te	130	129.906223	34.08(62)
¹²⁷ I	127	126.904468	~100
¹²⁴ Xe	124	123.905895	0.09(1)
¹²⁶ Xe	126	125.90427	0.09(1)
¹²⁸ Xe	128	127.903531	1.92(3)
¹²⁹ Xe	129	128.904780	26.44(24)
¹³⁰ Xe	130	129.903509	4.08(2)
¹³¹ Xe	131	130.905083	21.18(3)
¹³² Xe	132	131.904155	26.89(6)
¹³⁴ Xe	134	133.905395	10.44(10)

<i>Isotope</i>	<i>Nominal mass</i>	<i>Mass</i>	<i>Relative abundance</i>
¹³⁶ Xe	136	135.90722	8.87(16)
¹³³ Cs	133	132.905447	~100
¹³⁰ Ba	130	129.90631	0.106(1)
¹³² Ba	132	131.905056	0.101(1)
¹³⁴ Ba	134	133.904504	2.417(18)
¹³⁵ Ba	135	134.905684	6.592(12)
¹³⁶ Ba	136	135.904571	7.854(24)
¹³⁷ Ba	137	136.905822	11.232(24)
¹³⁸ Ba	138	137.905242	71.698(42)
¹³⁸ La	138	137.907107	0.090(1)
¹³⁹ La	139	138.906349	99.910(1)
¹³⁶ Ce	136	135.90714	0.19(1)
¹³⁸ Ce	138	137.90599	0.25(1)
¹⁴⁰ Ce	140	139.905435	88.48(10)
¹⁴² Ce	142	141.909241	11.08(10)
¹⁴¹ Pr	141	140.907648	~100
¹⁴² Nd	142	141.907719	27.13(12)
¹⁴³ Nd	143	142.909810	12.18(6)
¹⁴⁴ Nd	144	143.910083	23.80(12)
¹⁴⁵ Nd	145	144.912569	8.30(6)
¹⁴⁶ Nd	146	145.913113	17.19(9)
¹⁴⁸ Nd	148	147.916889	5.76(3)
¹⁵⁰ Nd	150	149.920887	5.64(3)
¹⁴⁴ Sm	144	143.911996	3.1(1)
¹⁴⁷ Sm	147	146.914894	15.0(2)
¹⁴⁸ Sm	148	147.914818	11.3(1)

<i>Isotope</i>	<i>Nominal mass</i>	<i>Mass</i>	<i>Relative abundance</i>
¹⁴⁹ Sm	149	148.917180	13.8(1)
¹⁵⁰ Sm	150	149.917272	7.4(1)
¹⁵² Sm	152	151.919729	26.7(2)
¹⁵⁴ Sm	154	153.922206	22.7(2)
¹⁵¹ Eu	151	150.919846	47.8(1.5)
¹⁵³ Eu	153	152.921227	52.2(15)
¹⁵² Gd	152	151.919789	0.20(1)
¹⁵⁴ Gd	154	153.920862	2.18(3)
¹⁵⁵ Gd	155	154.922619	14.80(5)
¹⁵⁶ Gd	156	155.922120	20.47(4)
¹⁵⁷ Gd	157	156.923957	15.65(3)
¹⁵⁸ Gd	158	157.924101	24.84(12)
¹⁶⁰ Gd	160	159.927051	21.86(4)
¹⁵⁹ Td	159	158.925343	~100
¹⁵⁶ Dy	156	155.92428	0.06(1)
¹⁵⁸ Dy	158	157.924405	0.10(1)
¹⁶⁰ Dy	160	159.925194	2.34(6)
¹⁶¹ Dy	161	160.926930	18.9(2)
¹⁶² Dy	162	161.926795	25.5(2)
¹⁶³ Dy	163	162.928728	24.9(2)
¹⁶⁴ Dy	164	163.929171	28.2(2)
¹⁶⁵ Ho	165	164.930319	~100
¹⁶² Er	162	161.928775	0.14(1)
¹⁶⁴ Er	164	163.929197	1.61(2)
¹⁶⁶ Er	166	165.930290	33.6(2)
¹⁶⁷ Er	167	166.932046	22.95(15)

<i>Isotope</i>	<i>Nominal mass</i>	<i>Mass</i>	<i>Relative abundance</i>
¹⁶⁸ Er	168	167.932368	26.8(2)
¹⁷⁰ Er	170	169.935461	14.9(2)
¹⁶⁹ Tm	169	168.934211	~100
¹⁶⁸ Yb	168	167.933895	0.13(1)
¹⁷⁰ Yb	170	169.934759	3.05(6)
¹⁷¹ Yb	171	170.936323	14.3(2)
¹⁷² Yb	172	171.936378	21.9(3)
¹⁷³ Yb	173	172.938207	16.12(21)
¹⁷⁴ Yb	174	173.938858	31.8(4)
¹⁷⁶ Yb	176	175.942569	12.7(2)
¹⁷⁵ Lu	175	174.940768	97.41(2)
¹⁷⁶ Lu	176	175.942683	2.59(2)
¹⁷⁴ Hf	174	173.940042	0.162(3)
¹⁷⁶ Hf	176	175.941403	5.206(5)
¹⁷⁷ Hf	177	176.943220	18.606(4)
¹⁷⁸ Hf	178	177.943698	27.297(4)
¹⁷⁹ Hf	179	178.945815	13.629(6)
¹⁸⁰ Hf	180	179.946549	35.100(7)
¹⁸⁰ Ta	180	179.947466	0.012(2)
¹⁸¹ Ta	181	180.947996	99.988(2)
¹⁸⁰ W	180	179.946706	0.120(1)
¹⁸² W	182	181.948205	26.498(29)
¹⁸³ W	183	182.950224	14.314(4)
¹⁸⁴ W	184	183.950932	30.642(8)
¹⁸⁶ W	186	185.954362	28.426(37)
¹⁸⁵ Re	185	184.952955	37.40(2)

<i>Isotope</i>	<i>Nominal mass</i>	<i>Mass</i>	<i>Relative abundance</i>
¹⁸⁷ Re	187	186.955751	62.60(2)
¹⁸⁴ Os	184	183.952491	0.020(3)
¹⁸⁶ Os	186	185.953838	1.58(10)
¹⁸⁷ Os	187	186.955748	1.6(1)
¹⁸⁸ Os	188	187.955836	13.3(2)
¹⁸⁹ Os	189	188.958145	16.1(3)
¹⁹⁰ Os	190	189.958445	26.4(4)
¹⁹² Os	192	191.961479	41.0(3)
¹⁹¹ Ir	191	190.960591	37.3(5)
¹⁹³ Ir	193	192.962923	62.7(5)
¹⁹⁰ Pt	190	189.95993	0.01(1)
¹⁹² Pt	192	191.961035	0.79(6)
¹⁹⁴ Pt	194	193.962663	32.9(6)
¹⁹⁵ Pt	195	194.964774	33.8(6)
¹⁹⁶ Pt	196	195.964934	25.3(6)
¹⁹⁸ Pt	198	197.967875	7.2(2)
¹⁹⁷ Au	197	196.966551	~100
¹⁹⁶ Hg	196	195.965814	0.15(1)
¹⁹⁸ Hg	198	197.966752	9.97(8)
¹⁹⁹ Hg	199	198.968262	16.87(10)
²⁰⁰ Hg	200	199.968309	23.10(16)
²⁰¹ Hg	201	200.970285	13.18(8)
²⁰² Hg	202	201.970625	29.86(20)
²⁰⁴ Hg	204	203.973475	6.87(4)
²⁰³ Tl	203	202.972329	29.524(14)
²⁰⁵ Tl	205	204.974412	70.476(14)

<i>Isotope</i>	<i>Nominal mass</i>	<i>Mass</i>	<i>Relative abundance</i>
²⁰⁴ Pb	204	203.973028	1.4(1)
²⁰⁶ Pb	206	205.974449	24.1(1)
²⁰⁷ Pb	207	206.975880	22.1(1)
²⁰⁸ Pb	208	207.976636	52.4(1)
²⁰⁹ Bi	209	208.980384	~100
²³² Th	232	232.038050	~100
²³⁴ U	234	234.040945	0.0055(5)
²³⁵ U	235	235.043922	0.720(1)
²³⁸ U	238	238.050784	99.2745(15)

(Data source: Table of the Isotopes (Revised 1998), Norman E. Holden, Brookhaven National Laboratory, New York U.S.A. Data edited and compiled by Jason W.H. Wong, University of Sydney)