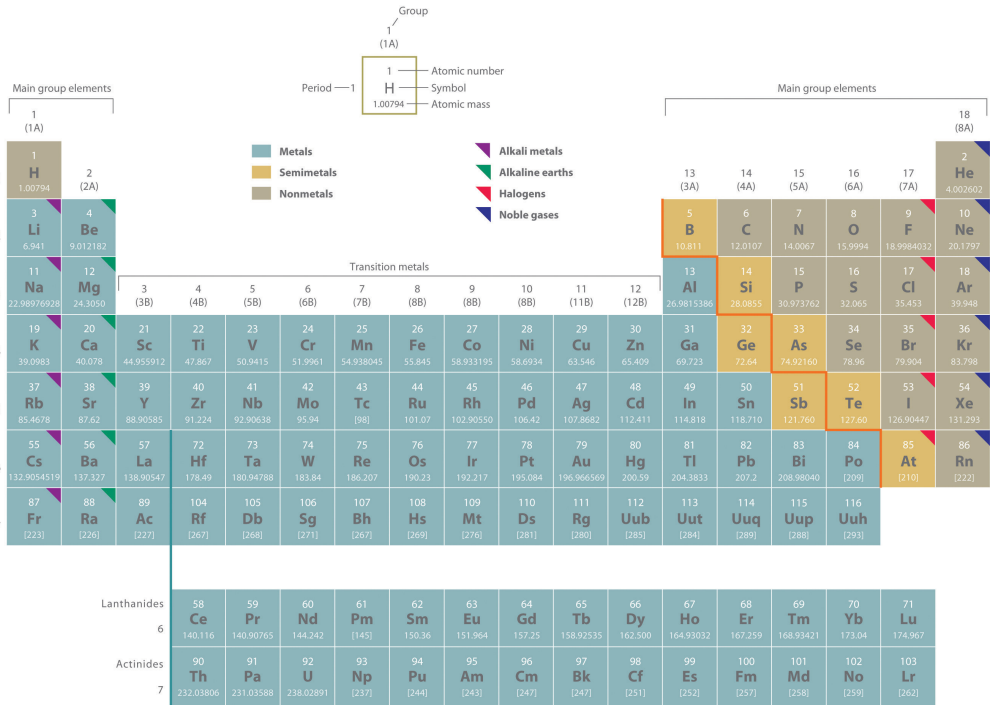
Chapter 32

Appendix H: Periodic Table of Elements



Two systems for numbering periodic groups are shown: 1–18 is the system currently recommended by the Inernational Union of Pure and Applied Chemistry (IUPAC); an older U.S. system, in which letters designate main group elements (A) and transition elements (B), is given parentheses.

An atomic mass in brackets indicates the mass of the longest-lived isotope of an element having no stable isotopes.

Elements with atomic numbers 114 (ununquadium, 289 amu) and 116 (ununhexium, 293 amu) have been recognized by the International Union of Pure and Applied Chemistry (IUPAC). The collaborating scientists from the Joint Institute for Nuclear Research in Dubna, Russia, and Lawrence Livermore National Laboratory in California have been invited to propose names for the new elements. See http://iupac.org/publications/pac/asap/PAC-REP-10-05-01

List of Elements			
Name	Symbol	Atomic Number	Atomic Mass
Actinium	Ac	89	[227]*
Aluminum	Al	13	26.9815386(8)
Americium	Am	95	[243]*
Antimony	Sb	51	121.760(1)
Argon	Ar	18	39.948(1)
Arsenic	As	33	74.92160(2)
Astatine	At	85	[210]*
Barium	Ba	56	137.327(7)
Berkelium	Bk	97	[247]*
Beryllium	Be	4	9.012182(3)
Bismuth	Bi	83	208.98040(1)
Bohrium	Bh	107	[267]*
Boron	B	5	10.811(7)
Bromine	Br	35	79.904(1)
Cadmium	Cd	48	112.411(8)
Calcium	Ca	20	40.078(4)
Californium	Cf	98	[251]*
Carbon	C	6	12.0107(8)
Cerium	Ce	58	140.116(1)
Cesium	Cs	55	132.9054519(2)
Chlorine	Cl	17	35.453(2)
Chromium	Cr	24	51.9961(6)
***Element has no stable isotope. A value enclosed in brackets, e.g. [209], indicates the mass number of the longest-lived isotope of the element. Three such elements (Th, Pa, and U), however, do have a characteristic terrestrial isotopic composition, and an atomic mass is given for them. An uncertainty in the last digit in the Atomic Mass column is shown by the number in parentheses; e.g., 1.00794(7) indicates ±0.00007.**			
†Element 112 named shortly before the release of this text. Other periodic tables in this version of the text may refer to it as Ununbium (Uub).			

List of Elements			
Name	Symbol	Atomic Number	Atomic Mass
Cobalt	Co	27	58.933195(5)
Copernicium†	Cn	112	[285]*
Copper	Cu	29	63.546(3)
Curium	Cm	96	[247]*
Darmstadtium	Ds	110	[281]*
Dubnium	Db	105	[268]*
Dysprosium	Dy	66	162.500(1)
Einsteinium	Es	99	[252]*
Erbium	Er	68	167.259(3)
Europium	Eu	63	151.964(1)
Fermium	Fm	100	[257]*
Fluorine	F	9	18.9984032(5)
Francium	Fr	87	[223]*
Gadolinium	Gd	64	157.25(3)
Gallium	Ga	31	69.723(1)
Germanium	Ge	32	72.64(1)
Gold	Au	79	196.966569(4)
Hafnium	Hf	72	178.49(2)
Hassium	Hs	108	[269]*
Helium	He	2	4.002602(2)
Holmium	Ho	67	164.93032(2)
Hydrogen	H	1	1.00794(7)
***Element has no stable isotope. A value enclosed in brackets, e.g. [209], indicates the mass number of the longest-lived isotope of the element. Three such elements (Th, Pa, and U), however, do have a characteristic terrestrial isotopic composition, and an atomic mass is given for them. An uncertainty in the last digit in the Atomic Mass column is shown by the number in parentheses; e.g., 1.00794(7) indicates ±0.00007.**			
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Name	Symbol	Atomic Number	Atomic Mass
Indium	In	49	114.818(3)
Iodine	I	53	126.90447(3)
Iridium	Ir	77	192.217(3)
Iron	Fe	26	55.845(2)
Krypton	Kr	36	83.798(2)
Lanthanum	La	57	138.90547(7)
Lawrencium	Lr	103	[262]*
Lead	Pb	82	207.2(1)
Lithium	Li	3	6.941(2)
Lutetium	Lu	71	174.967(1)
Magnesium	Mg	12	24.3050(6)
Manganese	Mn	25	54.938045(5)
Meitnerium	Mt	109	[276]*
Mendelevium	Md	101	[258]*
Mercury	Hg	80	200.59(2)
Molybdenum	Mo	42	95.94(2)
Neodymium	Nd	60	144.242(3)
Neon	Ne	10	20.1797(6)
Neptunium	Np	93	[237]*
Nickel	Ni	28	58.6934(2)
Niobium	Nb	41	92.90638(2)
Nitrogen	N	7	14.0067(2)
***Element has no stable isotope. A value enclosed in brackets, e.g. [209], indicates the mass number of the longest-lived isotope of the element. Three such elements (Th, Pa, and U), however, do have a characteristic terrestrial isotopic composition, and an atomic mass is given for them. An uncertainty in the last digit in the Atomic Mass column is shown by the number in parentheses; e.g., 1.00794(7) indicates ±0.00007.**			
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Name	Symbol	Atomic Number	Atomic Mass
Nobelium	No	102	[259]*
Osmium	Os	76	190.23(3)
Oxygen	O	8	15.9994(3)
Palladium	Pd	46	106.42(1)
Phosphorus	P	15	30.973762(2)
Platinum	Pt	78	195.084(9)
Plutonium	Pu	94	[244]*
Polonium	Po	84	[209]*
Potassium	K	19	39.0983(1)
Praseodymium	Pr	59	140.90765(2)
Promethium	Pm	61	[145]*
Protactinium	Pa	91	231.03588(2)*
Radium	Ra	88	[226]*
Radon	Rn	86	[222]*
Rhenium	Re	75	186.207(1)
Rhodium	Rh	45	102.90550(2)
Roentgenium	Rg	111	[280]*
Rubidium	Rb	37	85.4678(3)
Ruthenium	Ru	44	101.07(2)
Rutherfordium	Rf	104	[267]*
Samarium	Sm	62	150.36(2)
Scandium	Sc	21	44.955912(6)
***Element has no stable isotope. A value enclosed in brackets, e.g. [209], indicates the mass number of the longest-lived isotope of the element. Three such elements (Th, Pa, and U), however, do have a characteristic terrestrial isotopic composition, and an atomic mass is given for them. An uncertainty in the last digit in the Atomic Mass column is shown by the number in parentheses; e.g., 1.00794(7) indicates ±0.00007.**			
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Name	Symbol	Atomic Number	Atomic Mass
Seaborgium	Sg	106	[271]*
Selenium	Se	34	78.96(3)
Silicon	Si	14	28.0855(3)
Silver	Ag	47	107.8682(2)
Sodium	Na	11	22.98976928(2)
Strontium	Sr	38	87.62(1)
Sulfur	S	16	32.065(5)
Tantalum	Ta	73	180.94788(2)
Technetium	Tc	43	[98]*
Tellurium	Te	52	127.60(3)
Terbium	Tb	65	158.92535(2)
Thallium	Tl	81	204.3833(2)
Thorium	Th	90	232.03806(2)*
Thulium	Tm	69	168.93421(2)
Tin	Sn	50	118.710(7)
Titanium	Ti	22	47.867(1)
Tungsten	W	74	183.84(1)
Ununhexium	Uuh	116	[293]*
Ununpentium	Uup	115	[288]*
Ununquadium	Uuq	114	[289]*
Ununtrium	Uut	113	[284]*
Uranium	U	92	238.02891(3)*
***Element has no stable isotope. A value enclosed in brackets, e.g. [209], indicates the mass number of the longest-lived isotope of the element. Three such elements (Th, Pa, and U), however, do have a characteristic terrestrial isotopic composition, and an atomic mass is given for them. An uncertainty in the last digit in the Atomic Mass column is shown by the number in parentheses; e.g., 1.00794(7) indicates ±0.00007.**			
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Name	**Symbol**	**Atomic Number**	**Atomic Mass**
Vanadium	V	23	50.9415(1)
Xenon	Xe	54	131.293(6)
Ytterbium	Yb	70	173.04(3)
Yttrium	Y	39	88.90585(2)
Zinc	Zn	30	65.409(4)
Zirconium	Zr	40	91.224(2)
***Element has no stable isotope. A value enclosed in brackets, e.g. [209], indicates the mass number of the longest-lived isotope of the element. Three such elements (Th, Pa, and U), however, do have a characteristic terrestrial isotopic composition, and an atomic mass is given for them. An uncertainty in the last digit in the Atomic Mass column is shown by the number in parentheses; e.g., 1.00794(7) indicates ±0.00007.**			
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Source of data: Atomic weights of the elements 2001 (IUPAC Technical Report) as supplemented by the Table of Standard Atomic Weights 2005 (to be published in Pure and Applied Chemistry) on the IUPAC web site, and "Nuclear Data Sheets for A-266-294" (to be published in Nuclear Data Sheets) at http://www.nndc.bnl.gov/superheavy.pdf.