1	2																
1 **H** hydrogen 1.0080 ± 0.0002																	2 **He** helium 4.0026 ± 0.0002
3 ***Li*** lithium 6.94 ± 0.06	4 **Be** beryllium 9.0122 ± 0.0001											5 **B** boron 10.81 ± 0.02	6 ***C*** carbon 12.011 ± 0.001	7 ***N*** nitrogen 14.007 ± 0.001	8 ***O*** oxygen 15.999 ± 0.001	9 ***F*** fluorine 18.998 ± 0.001	10 ***Ne*** neon 20.180 ± 0.001
11 ***Na*** sodium 22.990 ± 0.001	12 **Mg** magnesium 24.305 ± 0.002											13 **Al** aluminium 26.982 ± 0.001	14 ***Si*** silicon 28.085 ± 0.001	15 ***P*** phosphorus 30.974 ± 0.001	16 ***S*** sulfur 32.06 ± 0.02	17 ***Cl*** chlorine 35.45 ± 0.01	18 ***Ar*** argon 39.948 ± 0.001
19 ***K*** potassium 39.098 ± 0.001	20 ***Ca*** calcium 40.078 ± 0.004	21 ***Sc*** scandium 44.956 ± 0.001	22 ***Ti*** titanium 47.867 ± 0.001	23 ***V*** vanadium 50.942 ± 0.001	24 ***Cr*** chromium 51.996 ± 0.001	25 ***Mn*** manganese 54.938 ± 0.001	26 ***Fe*** iron 55.845 ± 0.002	27 ***Co*** cobalt 58.933 ± 0.001	28 ***Ni*** nickel 58.693 ± 0.001	29 ***Cu*** copper 63.546 ± 0.001	30 ***Zn*** zinc 65.38 ± 0.01	31 ***Ga*** gallium 69.723 ± 0.001	32 ***Ge*** germanium 72.630 ± 0.001	33 ***As*** arsenic 74.922 ± 0.001	34 ***Se*** selenium 78.971 ± 0.001	35 ***Br*** bromine 79.904 ± 0.001	36 ***Kr*** krypton 83.798 ± 0.002
37 ***Rb*** rubidium 85.468 ± 0.001	38 ***Sr*** strontium 87.62 ± 0.01	39 ***Y*** yttrium 88.906 ± 0.001	40 ***Zr*** zirconium 91.224 ± 0.002	41 ***Nb*** niobium 92.906 ± 0.001	42 ***Mo*** molybdenum 95.95 ± 0.01	43 ***Tc*** technetium [98]	44 ***Ru*** ruthenium 101.07 ± 0.02	45 ***Rh*** rhodium 102.91 ± 0.001	46 ***Pd*** palladium 106.42 ± 0.01	47 ***Ag*** silver 107.87 ± 0.01	48 ***Cd*** cadmium 112.41 ± 0.01	49 ***In*** indium 114.82 ± 0.01	50 ***Sn*** tin 118.71 ± 0.01	51 ***Sb*** antimony 121.76 ± 0.01	52 ***Te*** tellurium 127.60 ± 0.03	53 ***I*** iodine 126.90 ± 0.001	54 ***Xe*** xenon 131.29 ± 0.002
55 ***Cs*** caesium 132.91 ± 0.01	56 ***Ba*** barium 137.33 ± 0.01	57-71 lanthanoids	72 ***Hf*** hafnium 178.49 ± 0.01	73 ***Ta*** tantalum 180.95 ± 0.01	74 ***W*** tungsten 183.84 ± 0.01	75 ***Re*** rhenium 186.21 ± 0.01	76 ***Os*** osmium 190.23 ± 0.03	77 ***Ir*** iridium 192.22 ± 0.03	78 ***Pt*** platinum 195.08 ± 0.03	79 ***Au*** gold 196.97 ± 0.001	80 ***Hg*** mercury 200.59 ± 0.01	81 ***Tl*** thallium 204.38 ± 0.01	82 ***Pb*** lead 207.2 ± 0.1	83 ***Bi*** bismuth 208.98 ± 0.001	84 ***Po*** polonium [209]	85 ***At*** astatine [210]	86 ***Rn*** radon [222]
87 ***Fr*** francium [223]	88 ***Ra*** radium [226]	89-103 actinoids	104 ***Rf*** rutherfordium [267]	105 ***Db*** dubnium [268]	106 ***Sg*** seaborgium [269]	107 ***Bh*** bohrium [270]	108 ***Hs*** hassium [269]	109 ***Mt*** meitnerium [278]	110 ***Ds*** darmstadtium [281]	111 ***Rg*** roentgenium [282]	112 ***Cn*** copernicium [285]	113 ***Nh*** nihonium [286]	114 ***Fl*** flerovium [289]	115 ***Mc*** moscovium [290]	116 ***Lv*** livermorium [293]	117 ***Ts*** tennessine [294]	118 ***Og*** oganesson [294]

Key:

atomic number
Symbol
name
abridged standard
atomic weight

57 ***La*** lanthanum 138.91 ± 0.01	58 ***Ce*** cerium 140.12 ± 0.01	59 ***Pr*** praseodymium 140.91 ± 0.001	60 ***Nd*** neodymium 144.24 ± 0.01	61 ***Pm*** promethium [145]	62 ***Sm*** samarium 150.36 ± 0.02	63 ***Eu*** europium 151.96 ± 0.01	64 ***Gd*** gadolinium 157.25 ± 0.01	65 ***Tb*** terbium 158.93 ± 0.001	66 ***Dy*** dysprosium 162.50 ± 0.01	67 ***Ho*** holmium 164.93 ± 0.001	68 ***Er*** erbium 167.26 ± 0.01	69 ***Tm*** thulium 168.93 ± 0.001	70 ***Yb*** ytterbium 173.05 ± 0.01	71 ***Lu*** lutetium 174.97 ± 0.001
89 ***Ac*** actinium [227]	90 ***Th*** thorium 232.04 ± 0.01	91 ***Pa*** protactinium 231.04 ± 0.01	92 ***U*** uranium 238.03 ± 0.01	93 ***Np*** neptunium [237]	94 ***Pu*** plutonium [244]	95 ***Am*** americium [243]	96 ***Cm*** curium [247]	97 ***Bk*** berkelium [247]	98 ***Cf*** californium [251]	99 ***Es*** einsteinium [252]	100 ***Fm*** fermium [257]	101 ***Md*** mendelevium [258]	102 ***No*** nobelium [259]	103 ***Lr*** lawrencium [262]

INTERNATIONAL UNION OF
PURE AND APPLIED CHEMISTRY

CHIU ENTERPRISES

H – nonmetal
Mg – metal, brittle soft
Mo – metal, brittle hard
Cu – metal, ductile malleable soft
Ti – metal, ductile malleable hard
Tc – synthetic/very rare/unstable

– light metal
– heavy metal
– low-melting metal
– refractory metal
– noble metal
– rare-earth metal
– metalloid

6	7	8	9	10	11	12
24 **Cr** chromium 51.996 ± 0.001	25 **Mn** manganese 54.938 ± 0.001	26 *Fe* iron 55.845 ± 0.002	27 ***Co*** cobalt 58.933 ± 0.001	28 ***Ni*** nickel 58.693 ± 0.001	29 *Cu* copper 63.546 ± 0.003	30 Zn zinc 65.38 ± 0.02
42 **Mo** molybdenum 95.95 ± 0.01	43 Tc technetium [97]	44 **Ru** ruthenium 101.07 ± 0.02	45 **Rh** rhodium 102.91 ± 0.01	46 *Pd* palladium 106.42 ± 0.01	47 *Ag* silver 107.87 ± 0.01	48 *Cd* cadmium 112.41 ± 0.01
74 **W** tungsten 183.84 ± 0.01	75 ***Re*** rhenium 186.21 ± 0.01	76 **Os** osmium 190.23 ± 0.03	77 **Ir** iridium 192.22 ± 0.01	78 *Pt* platinum 195.08 ± 0.02	79 *Au* gold 196.97 ± 0.01	80 *Hg* mercury 200.59 ± 0.01
106 Sg seaborgium [269]	107 Bh bohrium [270]	108 Hs hassium [269]	109 Mt meitnerium [277]	110 Ds darmstadtium [281]	111 Rg roentgenium [282]	112 Cn copernicium [285]

59 *Pr* praseodymium 140.91 ± 0.01	60 *Nd* neodymium 144.24 ± 0.01	61 Pm promethium [145]	62 *Sm* samarium 150.36 ± 0.02	63 *Eu* europium 151.96 ± 0.01	64 *Gd* gadolinium 157.25 ± 0.03	65 *Tb* terbium 158.93 ± 0.01
91 Pa protactinium 231.04 ± 0.01	92 ***U*** uranium 238.03 ± 0.01	93 *Np* neptunium [237]	94 **Pu** plutonium [244]	95 Am americium [243]	96 Cm curium [247]	97 Bk berkelium [247]

13	14	15	16	17	18
					2 He helium 4.0026 ± 0.0001
5 B boron 10.81 ± 0.02	6 C carbon 12.011 ± 0.002	7 N nitrogen 14.007 ± 0.001	8 O oxygen 15.999 ± 0.001	9 F fluorine 18.998 ± 0.001	10 Ne neon 20.180 ± 0.001
13 *Al* aluminium 26.982 ± 0.001	14 Si silicon 28.085 ± 0.001	15 P phosphorus 30.974 ± 0.001	16 S sulfur 32.06 ± 0.02	17 Cl chlorine 35.45 ± 0.01	18 Ar argon 39.95 ± 0.16
31 Ga gallium 69.723 ± 0.001	32 Ge germanium 72.630 ± 0.008	33 As arsenic 74.922 ± 0.001	34 Se selenium 78.971 ± 0.008	35 Br bromine 79.904 ± 0.003	36 Kr krypton 83.798 ± 0.002
49 *In* indium 114.82 ± 0.01	50 *Sn* tin 118.71 ± 0.01	51 Sb antimony 121.76 ± 0.01	52 Te tellurium 127.60 ± 0.03	53 I iodine 126.90 ± 0.01	54 Xe xenon 131.29 ± 0.01
81 *Tl* thallium 204.38 ± 0.01	82 *Pb* lead 207.2 ± 1.1	83 Bi bismuth 208.98 ± 0.01	84 *Po* polonium [209]	85 At astatine [210]	86 Rn radon [222]
113 Nh nihonium [286]	114 Fl flerovium [290]	115 Mc moscovium [290]	116 Lv livermorium [293]	117 Ts tennessine [294]	118 Og oganesson [294]

66 *Dy* dysprosium 162.50 ± 0.01	67 *Ho* holmium 164.93 ± 0.01	68 *Er* erbium 167.26 ± 0.01	69 *Tm* thulium 168.93 ± 0.01	70 *Yb* ytterbium 173.05 ± 0.02	71 *Lu* lutetium 174.97 ± 0.01
98 Cf californium [251]	99 Es einsteinium [252]	100 Fm fermium [257]	101 Md mendelevium [258]	102 No nobelium [259]	103 Lr lawrencium [262]