

Polyatomic Ions

ammonium	NH_4^+
hydronium	H_3O^+
hydroxide	OH^-
carbonate	CO_3^{2-}
hydrogen carbonate (bicarbonate)	HCO_3^-
nitrate	NO_3^-
nitrite	NO_2^-
phosphate	PO_4^{3-}
hydrogen phosphate	HPO_4^{2-}
dihydrogen phosphate	H_2PO_4^-
chromate	CrO_4^{2-}
dichromate	$\text{Cr}_2\text{O}_7^{2-}$
acetate	$\text{C}_2\text{H}_3\text{O}_2^-$ (or CH_3COO^-)
sulfate	SO_4^{2-}
sulfite	SO_3^{2-}
hydrogen sulfate (bisulfate)	HSO_4^-
hydrogen sulfite (bisulfite)	HSO_3^-
perchlorate	ClO_4^-
chlorate	ClO_3^-
chlorite	ClO_2^-
hypochlorite	ClO^-
cyanide	CN^-
permanganate	MnO_4^-
thiosulfate	$\text{S}_2\text{O}_3^{2-}$
oxalate	$\text{C}_2\text{O}_4^{2-}$
borate	BO_3^{3-}
citrate	$\text{C}_3\text{H}_5\text{O}(\text{COO}^-)_3$

Electronegativity Values

H 2.1							He
Li 1.0	Be 1.5	B 2.0	C 2.5	N 3.0	O 3.5	F 4.0	Ne
Na 0.9	Mg 1.2	Al 1.5	Si 1.8	P 2.1	S 2.5	Cl 3.0	Ar
K 0.8	Ca 1.0	Ga 1.6	Ge 1.8	As 2.0	Se 2.4	Br 2.8	Kr
Rb 0.8	Sr 1.0	In 1.7	Sn 1.8	Sb 1.9	Te 2.1	I 2.5	Xe
Cs 0.7	Ba 0.9	Tl 1.8	Pb 1.9	Bi 1.9	Po 2.0	At 2.1	Rn

Avogadro's Number: 6.022×10^{23}

$$\text{mass percent (\% m/m)} = \frac{\text{mass of solute}}{\text{mass of solution}} \times 100$$

$$\text{volume percent (\% v/v)} = \frac{\text{volume of solute}}{\text{volume of solution}} \times 100$$

$$\text{mass volume percent (\% m/v)} = \frac{\text{mass of solute (g)}}{\text{volume of solution (mL)}} \times 100$$

$$\text{molarity (M)} = \frac{\text{moles of solute}}{\text{liters of solution}}$$

$$T_K = T_{\text{C}} + 273$$

$$C_1V_1 = C_2V_2$$

$$T_{\text{F}} = (1.8 \times T_{\text{C}}) + 32$$

$$K_w = [\text{H}_3\text{O}^+][\text{OH}^-] = 1.0 \times 10^{-14}$$

$$\text{pH} = -\log [\text{H}_3\text{O}^+]$$

$$[\text{H}_3\text{O}^+] = 10^{-\text{pH}}$$



CHEM& 121/131

1

1A

1

H

hydrogen

1.01

2A

3

Li

lithium

6.94

4

Be

beryllium

9.01

2

11

Na

sodium

22.99

12

Mg

magnesium

24.31

3

19

K

potassium

39.10

20

Ca

calcium

40.08

21

Sc

scandium

44.96

22

Ti

titanium

47.88

23

V

vanadium

50.94

24

Cr

chromium

52.00

25

Mn

manganese

54.94

26

Fe

iron

55.85

27

Co

cobalt

58.93

28

Ni

nickel

58.69

29

Cu

copper

63.55

30

Zn

zinc

65.39

31

Ga

gallium

69.72

32

Ge

germanium

72.61

33

As

arsenic

74.92

34

Se

selenium

78.96

35

Br

bromine

79.90

36

Kr

krypton

83.80

4

37

Rb

rubidium

85.47

38

Sr

strontium

87.62

39

Y

yttrium

88.91

40

Zr

zirconium

91.22

41

Nb

niobium

92.91

42

Mo

molybdenum

95.64

43

Tc

technetium

(99)

44

Ru

ruthenium

101.07

45

Rh

rhodium

102.91

46

Pd

palladium

106.42

47

Ag

silver

107.87

48

Cd

cadmium

112.41

49

In

indium

114.82

50

Sn

tin

118.71

51

Sb

antimony

121.75

52

Te

tellurium

127.60

53

I

iodine

126.90

54

Xe

xenon

131.29

5

55

Cs

cesium

132.91

56

Ba

barium

137.33

57

La

lanthanum

138.91

72

Hf

hafnium

178.49

73

Ta

tantalum

180.95

74

W

tungsten

183.85

75

Re

rhenium

186.21

76

Os

osmium

190.23

77

Ir

iridium

192.22

78

Pt

platinum

195.08

79

Au

gold

196.97

80

Hg

mercury

200.59

81

Tl

thallium

204.38

82

Pb

lead

207.2

83

Bi

bismuth

208.98

84

Po

polonium

(209)

85

At

astatine

(210)

86

Rn

radon

(222)

6

87

Fr

francium

(223)

88

Ra

radium

(226)

89

Ac

actinium

(227)

104

Rf

rutherfordium

(267)

105

Db

dubnium

(268)

106

Sg

seaborgium

(271)

107

Bh

bohrium

(272)

108

Hs

hassium

(270)

109

Mt

meitnerium

(276)

110

Ds

darmstadtium

(281)

111

Rg

roentgenium

(281)

112

Cn

copernicium

(285)

113

Uut

ununtrium

(284)

114

Fl

flerovium

(289)

115

Uup

ununpentium

(288)

116

Lv

livermorium

(293)

117

Uus

ununseptium

(294)

118

Uuo

ununoctium

(294)

1A

1

H

hydrogen

1.01

2A

3

Li

lithium

6.94

4

Be

beryllium

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nickel

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Cu

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Zn

zinc

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31

Ga

gallium

69.72

58 Ce cerium 140.12	59 Pr praseodymium 140.91	60 Nd neodymium 144.24	61 Pm promethium (147)	62 Sm samarium 150.36	63 Eu europium 151.97	64 Gd gadolinium 157.25	65 Tb terbium 158.93	66 Dy dysprosium 162.50	67 Ho holmium 164.93	68 Er erbium 167.26	69 Tm thulium 168.93	70 Yb ytterbium 173.04	71 Lu lutetium 174.97
90 Th thorium (232)	91 Pa protactinium (231)	92 U uranium (238)	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 (260)