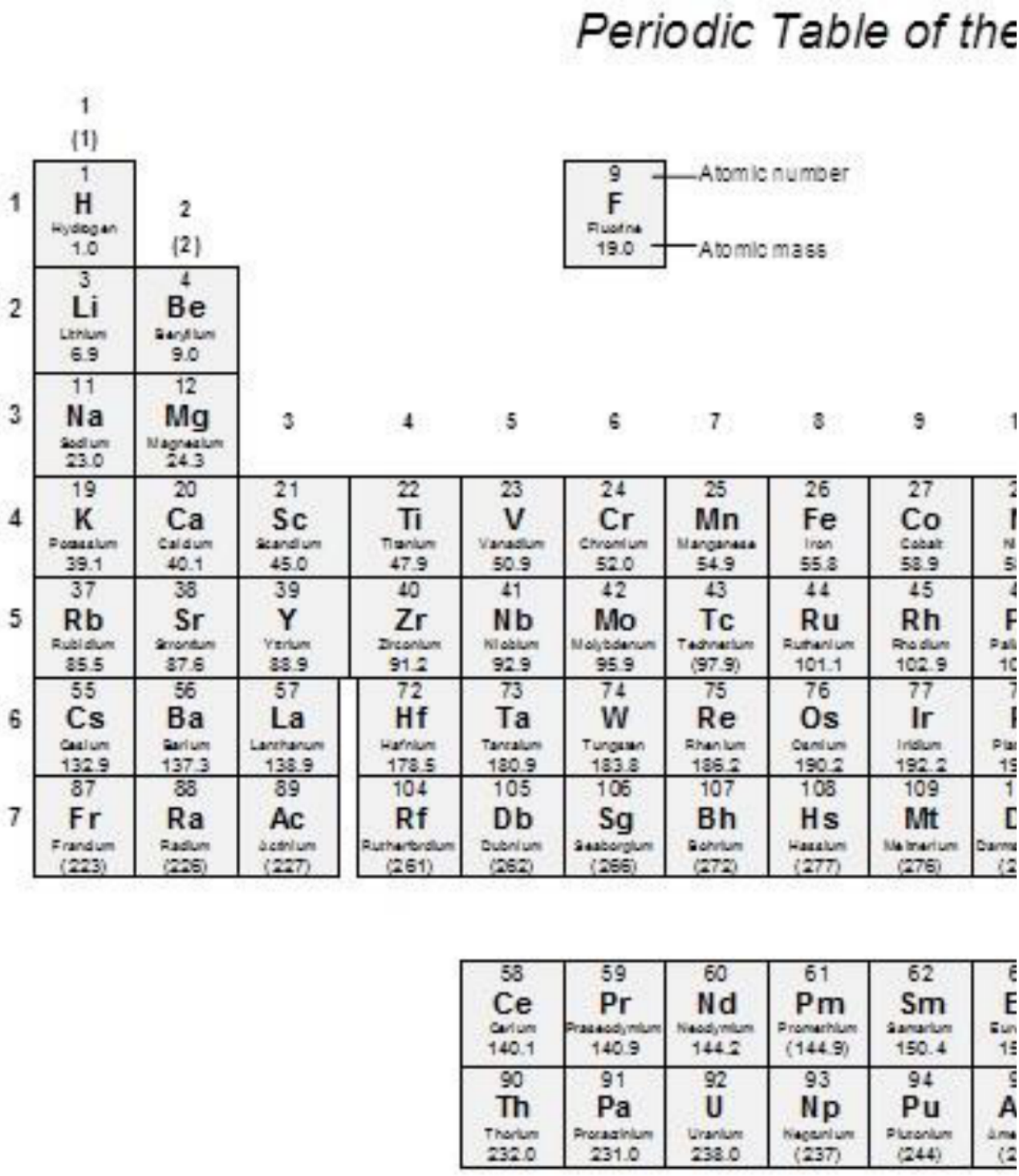
CATS University Foundation Programme

UFP Chemistry Data Booklet

Periodic Table



e Elements

								18 (8 or 0)
			13 (3)	14 (4)	15 (5)	16 (6)	17 (7)	2 **He** Helium 4.0
			5 **B** Boron 10.8	6 **C** Carbon 12.0	7 **N** Nitrogen 14.0	8 **O** Oxygen 16.0	9 **F** Fluorine 19.0	10 **Ne** Neon 20.2
10	11	12	13 **Al** Aluminium 27.0	14 **Si** Silicon 28.1	15 **P** Phosphorus 31.0	16 **S** Sulfur 32.1	17 **Cl** Chlorine 35.5	18 **Ar** Argon 39.9
28 **Ni** ckel 8.7	29 **Cu** Copper 63.5	30 **Zn** Zinc 65.4	31 **Ga** Gallium 69.7	32 **Ge** Germanium 72.6	33 **As** Arsenic 74.9	34 **Se** Selenium 79.0	35 **Br** Bromine 79.9	36 **Kr** Krypton 83.8
46 **Pd** adium 6.4	47 **Ag** Silver 107.9	48 **Cd** Cadmium 112.4	49 **In** Indium 114.8	50 **Sn** Tin 118.7	51 **Sb** Antimony 121.8	52 **Te** Tellurium 127.6	53 **I** Iodine 126.9	54 **Xe** Xenon 131.3
78 **Pt** inum 5.1	79 **Au** Gold 197.0	80 **Hg** Mercury 200.6	81 **Tl** Thallium 204.4	82 **Pb** Lead 207.2	83 **Bi** Bismuth 209.0	84 **Po** Polonium (209)	85 **At** Astatine (210)	86 **Rn** Radon (222)
110 **Ds** radtium 81)	111 **Rg** Roentgenium (280)	112 **Cn** Copernicium (285)	(113)	114 **Fl** Flerovium (289)	(115)	116 **Lv** Livermorium (293)	(117)	(118)

63 **Eu** opium 52.0	64 **Gd** Gadolinium 157.2	65 **Tb** Terbium 158.9	66 **Dy** Dysprosium 162.5	67 **Ho** Holmium 164.9	68 **Er** Erbium 167.3	69 **Tm** Thulium 168.9	70 **Yb** Ytterbium 173.0	71 **Lu** Lutetium 175.0
95 **Am** ericium 43)	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)

Important Constants & Conversion Factors

- Molar volume of a gas = 24.0 $dm^3\ mol^{-1}$ at RTP
- Avogadro constant, $N_A = 6.02 \times 10^{23}\ mol^{-1}$
- Gas constant, $R = 8.314\ J\ mol^{-1}\ K^{-1}$
- Specific heat capacity of water, $c = 4.18\ J\ g^{-1}\ K^{-1}$
- Ionic product of water, $K_w = 1.00 \times 10^{-14}\ mol^2\ dm^{-6}$ at 298 K
- Temperature in K = °C + 273.15
- 1 tonne = 10^6 g

Important Equations

- Ideal Gas Equation: $pV = n\ R\ T$
- Half-life: $t_{½} = \ln 2/k$
- Arrhenius equation: $k = A\ e^{-Ea/RT}$ or $\ln k = -E_a/RT + \ln A$
- Energetics: $q = m\ c\ \Delta T$
- $pH = -\log_{10}[H+]$

Table of Electronegatives

1																	18
H 2.1	2											13	14	15	16	17	
Li 1.0	**Be** 1.5											**B** 2.0	**C** 2.5	**N** 3.0	**O** 3.5	**F** 4.0	
Na 0.9	**Mg** 1.2	3	4	5	6	7	8	9	10	11	12	**Al** 1.5	**Si** 1.8	**P** 2.1	**S** 2.5	**Cl** 3.0	
K 0.8	**Ca** 1.0	**Sc** 1.3	**Ti** 1.5	**V** 1.6	**Cr** 1.6	**Mn** 1.5	**Fe** 1.8	**Co** 1.9	**Ni** 1.9	**Cu** 1.9	**Zn** 1.6	**Ga** 1.6	**Ge** 1.8	**As** 2.0	**Se** 2.4	**Br** 2.8	
Rb 0.8	**Sr** 1.0	**Y** 1.2	**Zr** 1.4	**Nb** 1.6	**Mo** 1.8	**Tc** 1.9	**Ru** 2.2	**Rh** 2.2	**Pd** 2.2	**Ag** 1.9	**Cd** 1.7	**In** 1.7	**Sn** 1.8	**Sb** 1.9	**Te** 2.1	**I** 2.5	
Cs 0.7	**Ba** 0.9	**La** 1.0	**Hf** 1.3	**Ta** 1.5	**W** 1.7	**Re** 1.9	**Os** 2.2	**Ir** 2.2	**Pt** 2.2	**Au** 2.4	**Hg** 1.9	**Tl** 1.8	**Pb** 1.9	**Bi** 1.9	**Po** 2.0	**At** 2.2	
Fr 0.7	**Ra** 0.9																

Table of Characteristic Infrared Absorption Bands

Functional Group	Position of Band (cm^{-1})	Intensity of Absorption
Alkanes:		
C—H	2850 – 2960	Medium – Strong
Haloalkanes:		
C—X [X = I, Br, Cl]	500 – 800	Strong
Alkenes:		
C—H	3020 – 3100	Medium
C=C	1640 – 1680	Medium
Alcohols:		
C—O	1050 – 1150	Strong
O—H	3200 – 3600	Strong, broad
Carbonyl compounds*:		
C=O	1670 – 1780	Strong
Carboxylic acids:		
O—H	2500 – 3100	Strong, very broad

* aldehydes, ketones, carboxylic acids and esters.