

Chem!stry

Name: ()

Class:

Date: / /

Essential Notes on Chemical Formulae

- Valency is defined as the number of electrons that a metal will lose or a non-metal will gain in order to obtain the electronic configuration of a noble gas.
- Valencies of the chemical elements:

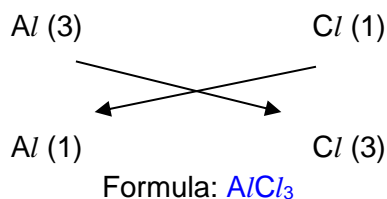
Group number in the Periodic Table	metals			non-metals				
	1	2	13	14	15	16	17	18
Number of electrons lost or gained to obtain the electronic configuration of a noble gas	lose 1	lose 2	lose 3	gain 4	gain 3	gain 2	gain 1	0
Valency of chemical elements in that Group of the Periodic Table (refer to the Periodic Table)	1	2	3	4	3	2	1	0

- Valencies of the common polyatomic ions:

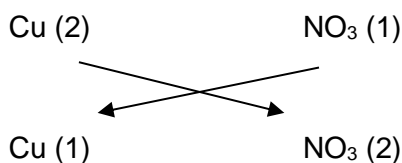
Name	ammonium	hydroxide	nitrate	carbonate	sulfate	phosphate
Formula	NH_4^+	OH^-	NO_3^-	CO_3^{2-}	SO_4^{2-}	PO_4^{3-}
Valency	1	1	1	2	2	3

- Essentially, the formula of a compound is obtained by swapping the valencies of the elements and / or polyatomic ions that are present in the compound, for example:

- Aluminium chloride:

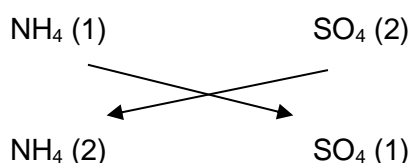


- Copper(II) nitrate – Note: the (II) means “copper with a valency of two” bonded to nitrate:



Formula: $\text{Cu}(\text{NO}_3)_2$ – Note, () are required when there is more than one of the same polyatomic ion.

- Ammonium sulfate:



Formula: $(\text{NH}_4)_2\text{SO}_4$ – Note, () are required when there is more than one of the same polyatomic ion.

Periodic Table of the Chemical Elements (2017)

		Group																																	
1	2											13	14	15	16	17	18																		
		Key atomic number atomic symbol name relative atomic mass																																	
		1 H hydrogen 1.0																																	
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																				
Li lithium 6.9	Be beryllium 9.0	B boron 10.8	C carbon 12.0	N nitrogen 14.0	O oxygen 16.0	F fluorine 19.0	Ne neon 20.2	Na sodium 23.0	Mg magnesium 24.3	Al aluminium 27.0	Si silicon 28.1	P phosphorus 31.0	S sulfur 32.1	Cl chlorine 35.5	Ar argon 39.9																				
11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36										
K potassium 39.1	Ca calcium 40.1	Sc scandium 45.0	Ti titanium 47.9	V vanadium 50.9	Cr chromium 52.0	Mn manganese 54.9	Fe iron 55.8	Co cobalt 58.9	Ni nickel 58.7	Cu copper 63.5	Zn zinc 65.4	Ga gallium 69.7	Ge germanium 72.6	As arsenic 74.9	Se selenium 79.0	Br bromine 79.9	Kr krypton 83.8	Rb rubidium 85.5	Sr strontium 87.6	Y yttrium 88.9	Zr zirconium 91.2	Nb niobium 92.9	Mo molybdenum 95.9	Tc technetium —	Ru ruthenium 101.1	Rh rhodium 102.9	Pd palladium 106.4	Ag silver 107.9	Cd cadmium 112.4	In indium 114.8	Sn tin 118.7	Sb antimony 121.8	Te tellurium 127.6	I iodine 126.9	Xe xenon 131.3
55	56	57-71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89-103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
Cs caesium 132.9	Ba barium 137.3	lanthanoids	Hf hafnium 178.5	Ta tantalum 180.9	W tungsten 183.8	Re rhenium 186.2	Os osmium 190.2	Ir iridium 192.2	Pt platinum 195.1	Au gold 197.0	Hg mercury 200.6	Tl thallium 204.4	Pb lead 207.2	Bi bismuth 209.0	Po polonium —	At astatine —	Rn radon —	Fr francium —	Ra radium —	actinoids	Rf rutherfordium —	Db dubnium —	Sg seaborgium —	Bh bohrium —	Hs hassium —	Mt meitnerium —	Ds darmstadtium —	Rg roentgenium —	Cn copernicium —	Flerovium —	Livermorium —	Oganesson —	—		

lanthanoids	57 La lanthanum 138.9	58 Ce cerium 140.1	59 Pr praseodymium 140.9	60 Nd neodymium 144.2	61 Pm promethium —	62 Sm samarium 150.4	63 Eu europium 152.0	64 Gd gadolinium 157.3	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 173.1	71 Lu lutetium 175.0
actinoids	89 Ac actinium —	90 Th thorium 232.0	91 Pa protactinium 231.0	92 U uranium 238.0	93 Np neptunium —	94 Pu plutonium —	95 Am americium —	96 Cm curium —	97 Bk berkelium —	98 Cf californium —	99 Es einsteinium —	100 Fm fermium —	101 Md mendelevium —	102 No nobelium —	103 Lr lawrencium —