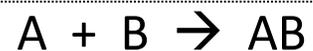


Writing Chemical Reactions

Combination Reactions

Two single atoms yield a single ionic / covalent structure



A = Metal (+ ion) or Non-Metal (covalent)

B = Non-Metal (- ion) or Polyatomic Ion (- ion)

AB = Ionic Compound or Covalent Molecule

2

Writing Chemical Reactions

Metal and Non-Metal Ion Charges

The charge of metals are based on the periodic table

Representative Elements (Metals and Non-Metals)

Group	1A	2A	1B-10B	3A	4A	5A	6A	7A	8A
	1	2	3-12	13	14	15	16	17	18
Ion Charge	+1	+2	Var (+)	+3	+4/-4	-3	-2	-1	0

Transition Metals [Group 1B – 10B (3 - 12)] have variable charges based on the metals Lewis Dot Structures

3

Writing Chemical Reactions

Polyatomic Ions Chart (Formulas and Ion Charges)

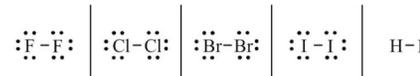
Polyatomic Ion	Ion Formula	Polyatomic Ion	Ion Formula	Polyatomic Ion	Ion Formula
Ammonium	NH ₄ ⁺	Hydronium	H ₃ O ⁺	Carbonate	CO ₃ ²⁻
Nitrate	NO ₃ ¹⁻	Cyanide	CN ¹⁻	Sulfate	SO ₄ ²⁻
Fluorate	FO ₃ ¹⁻	Hydroxide	OH ¹⁻	Chromate	CrO ₄ ²⁻
Chlorate	ClO ₃ ¹⁻	Acetate	C ₂ H ₃ O ₂ ¹⁻	Dichromate	Cr ₂ O ₇ ²⁻
Bromate	BrO ₃ ¹⁻	Permanganate	MnO ₄ ¹⁻	Oxalate	C ₂ O ₄ ²⁻
Iodate	IO ₃ ¹⁻	Bicarbonate	HCO ₃ ¹⁻	Phosphate	PO ₄ ³⁻

4

Writing Chemical Reactions

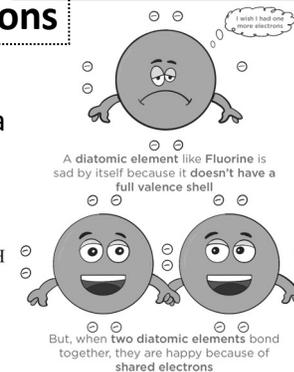
Diatomic Elements

Elements that always appear as a pair of neutral atoms (X₂) in a chemical reaction.



Diatomic Elements

H₂, N₂, O₂, F₂, Cl₂, Br₂, I₂



5

Writing Chemical Reactions

Decomposition Reactions

An ionic compound or molecule decomposes into two separate atoms / ions in the products



AB = Ionic Compound or Covalent Molecule

A = Single Metal/Non-Metal/Ion (+)

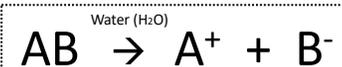
B = Single Non-Metal/Ion (-)

6

Writing Chemical Reactions

Ionization of Ionic Compounds

Ionization occurs when an ionic compound decomposes into ions in an aqueous (*water based*) mixture (*solution*)



Ionization generally occurs during a chemical reaction process (*single or double replacement*) or as part of an aqueous (*water based*) homogenous mixture (*solution*)

7