

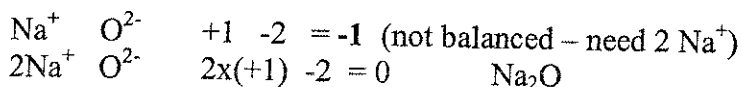
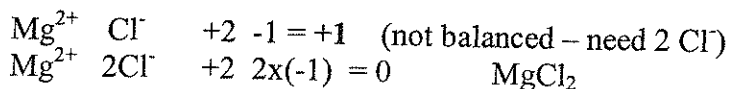
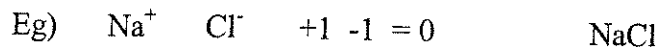
CHEMISTRY: IONIC COMPOUNDS

Charges across the Periodic Table:

	IA	IIA	IIIA	IVA	VA	VIA	VIIA	VIIIA
Element	Na	Mg	Al	Si	P	S	Cl	Ar
Charges	+1	+2	+3	+4	-3	-2	-1	0

I. Making IONIC COMPOUNDS:

In creating an ionic compound, the positive charges from the metal ion must balance the negative charges from the non-metal ion, when the charges are added together.



Practice: Write the compounds formed between ions of the following elements

a) Ca and O

e) K and I

b) Rb and O

f) Fe^{3+} and Cl

c) Al and O

g) Fe^{2+} and Cl

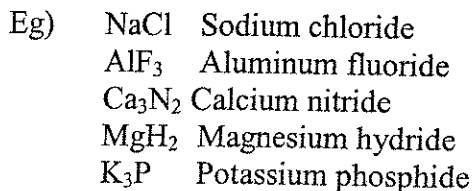
d) Mg and N

h) H and O

2. Naming BINARY Ionic Compounds (involving 2 elements only)

RULES:

1. Metal ion is named first
2. Non-metal ion is named second – ending in “ide”
3. If metal ion is a transition element, use roman numerals in the name to indicate charge on the metal ion.



Practice: Name the following compounds:

a) Na_2S _____

b) SrH_2 _____

c) Al_2S_3 _____

d) BeCl_2 _____

e) RbI _____

f) Ba_3N_2 _____

g) Cs_2O _____

g) Mg_3P_2 _____

Practice:

Write formulas for the following compounds:

- | | |
|----------------------|---------------------|
| a) sodium nitride | b) calcium fluoride |
| c) aluminum selenide | d) hydrogen sulfide |

II. Transition Metal Ions

Transition metals may lose different numbers of electrons. For example, copper atoms may lose one electron to form a Cu^+ ion, OR two electrons to form a Cu^{2+} ion.

This means that there must be a way to name the transition metal ion to indicate the charge on the ion.

RULES: We use roman numerals to name compounds containing transition metal ions.

EXCEPT: Silver always Ag^+ Zinc always Zn^{2+} Aluminum Al^{3+}

Eg) Cu^+ is copper (I) ion Cu^{2+} is copper (II) ion

Eg) Fe^{2+} is iron (II) ion so FeO indicates that Fe^{2+} and O^{2-} are present, so this is named: iron(II) oxide

Sn^{4+} is tin(IV) ion so SnO_2 indicates that Sn^{4+} and 2 ions of O^{2-} are present, so this is named tin (IV) oxide

Practice: Name the following

- a) FeCl_2 _____
- b) Cu_2S _____
- c) PbI_4 _____
- d) SnF_2 _____
- e) ZnBr_2 _____
- f) SnO _____
- g) Cr_2O_3 _____
- h) CoP _____
- i) Ag_2O _____

Practice: Give formulas for the following:

- a) cobalt (II) phosphide _____
- b) copper (II) iodide _____
- c) tin (IV) fluoride _____
- d) chromium (II) nitride _____
- e) gold (III) oxide _____
- f) tin (II) sulfide _____
- g) lead (IV) nitride _____
- h) zinc chloride _____
- i) silver sulfide _____

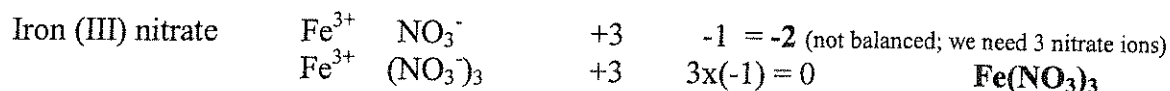
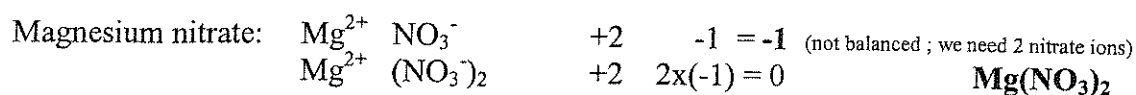
III. Compounds containing POLYATOMIC IONS

Polyatomic ions are ions that are made up of more than one atom.

RULES:

1. When you see more than 2 elements in a compound, **look for the polyatomic ion**.
2. They are used in compounds the same way that any ion would be – **treated as a unit**, where the whole unit is given a specific charge.
3. If more than one polyatomic ion is needed in a compound, **brackets** are used with the subscript after the bracket to indicate the number of polyatomic ions in the compound.
4. The **name** of the compound includes the name of the polyatomic ion

Eg) NO_3^- nitrate ion



Write formulas for the following compounds:

- a) sodium sulfate
- b) calcium sulfate
- c) aluminum phosphate
- d) magnesium carbonate
- e) sodium carbonate
- f) iron (II) carbonate
- g) iron (III) carbonate
- h) aluminum hydroxide
- i) sodium nitrite
- j) strontium chromate
- k) chromium (III) acetate
- l) copper (II) sulfate

Write names for the following compounds:

- | | |
|---------------------------------------|--------------------------------|
| a) $\text{Al}_2(\text{SO}_4)_3$ | g) $\text{Ni}(\text{ClO}_3)_2$ |
| b) $\text{Zn}(\text{OH})_2$ | h) $\text{Ni}(\text{ClO}_3)_2$ |
| c) $\text{Ag}_2\text{Cr}_2\text{O}_7$ | |
| d) CaCO_3 | |
| e) Na_2SO_3 | |
| f) $\text{Sn}(\text{CO}_3)_2$ | |

