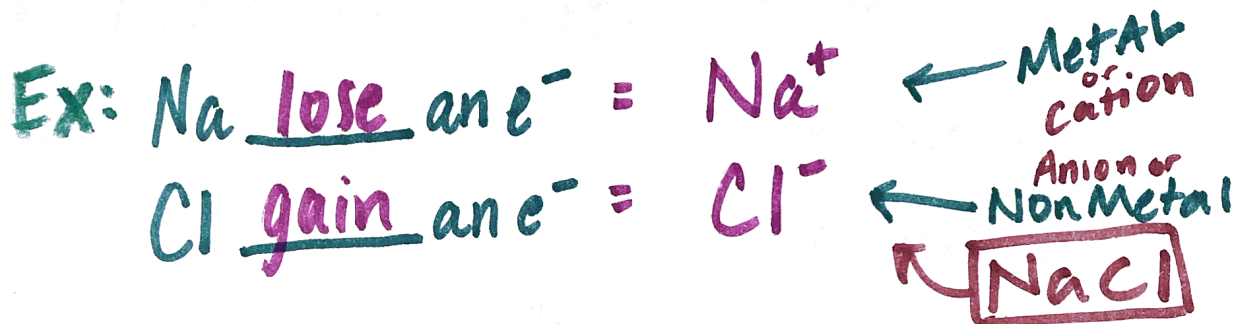


# UNIT 3 - Notes #1

## I) Chemical Bonding

(A) IONIC BONDS - Atoms gain or lose electrons = creates a charge.  
→ Attracted to each other by Coulombic force (electrostatic)



Form IONIC Compounds called SALTS



Properties of Ionic Salts:

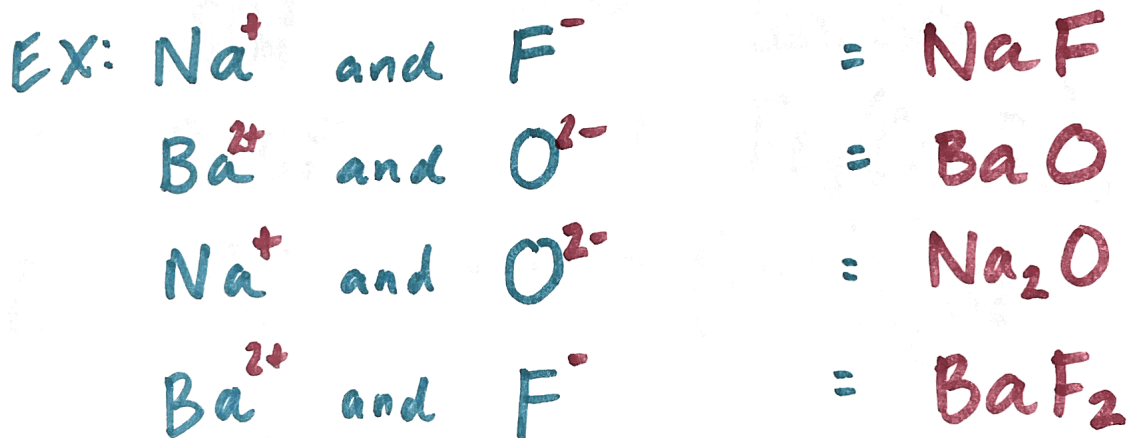
- Very hard (each ion bonded to several ions)
- High Melting Points (many bonds to break)
- Brittle (w/ enough force, like atoms brought close to each other & repel)

# \* Writing Formulas of Ionic Compounds \*

• Chemical Formula: Shows type of each atom  
; how many of each  
Has a neutral charge

• To write IONIC formula, we need:

1. The 2 types of ions
2. The charge of each ion. ←

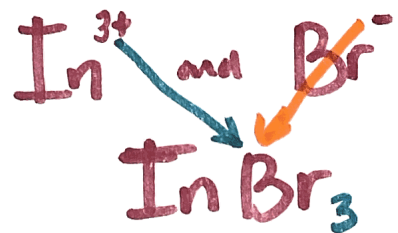
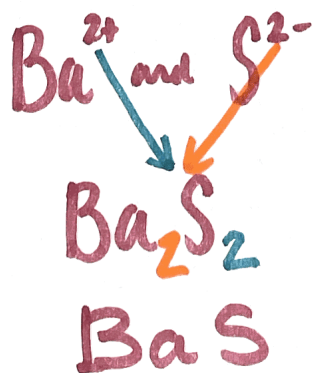
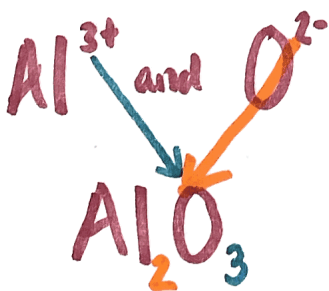


## "Criss-Cross" Rule

Charge on cation becomes subscript of the anion

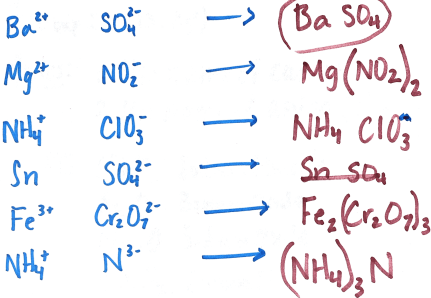
\* → Reduce to lowest ratio

WHY?  
Acct for neutral charge



## Writing Formulas w/ Polyatomic Ions

Parentheses required when you have more than one polyatomic ion.



# Nomenclature of Ionic Compounds

## 1) Single charge Cations w/ Elemental Anions

↑  
(Group I, II, 13,  $\text{Ag}^+$ )

- Rules:
1. Use name of cation
  2. Use name of anion (change ending to -IDE)

EX:  $\text{NaF}$  Sodium Fluoride

$\text{BaO}$  Barium Oxide

$\text{Na}_2\text{O}$  Sodium Oxide

$\text{BaF}_2$  Barium Fluoride

$\text{Zn}_3\text{P}_2$  Zinc Phosphide

## ② Multiple-Charge Cations w/ Elemental Anions

↑ Transition elements (not Ag or Zn)  
Sn<sup>2+</sup>/Sn<sup>4+</sup> Pb<sup>2+</sup>/Pb<sup>4+</sup>

- Rules:
- 1) Charge of Cation
  - 2) Name the Cation
  - 3) Write Roman numeral in ( ) to show charge.
  - 4) Write Anion (w/ ide)

Ex:

FeO  
Fe<sub>2</sub>O<sub>3</sub>  
CuBr  
CuBr<sub>2</sub>

Cobalt (III) chloride  
Tin (IV) oxide  
Tin (II) oxide

# Traditional System of Naming

- Used primarily in historical context
- Still used to name compounds w/ mult-charge cations

## Rules:

- 1) Use Latin root of cation
- 2) Use  $-ic$  ending for higher charge  
 $-ous$  for lower charge
- 3) Use name of anion (w/ide)

## ROOTS (partial list)

Gold (Au) = Aur -

Lead (Pb) = Plumb -

Tin (Sn) = Stann -

Copper (Cu) = Cupr -

Iron (Fe) = Ferr -

IC

$Au^{3+}$

$Pb^{4+}$

$Sn^{4+}$

$Cu^{2+}$

$Fe^{3+}$

ous

$Au^+$

$Pb^{2+}$

$Sn^{2+}$

$Cu^+$

$Fe^{2+}$

## Write Formulas

EX: Cuprous Sulfide



Auric Nitride



Ferrous Fluoride



## Write Names

EX:  $Pb_3P_4 = 3 Pb \ 4 P^{3-}$

Plumbic Phosphide



Plumbous Phosphide

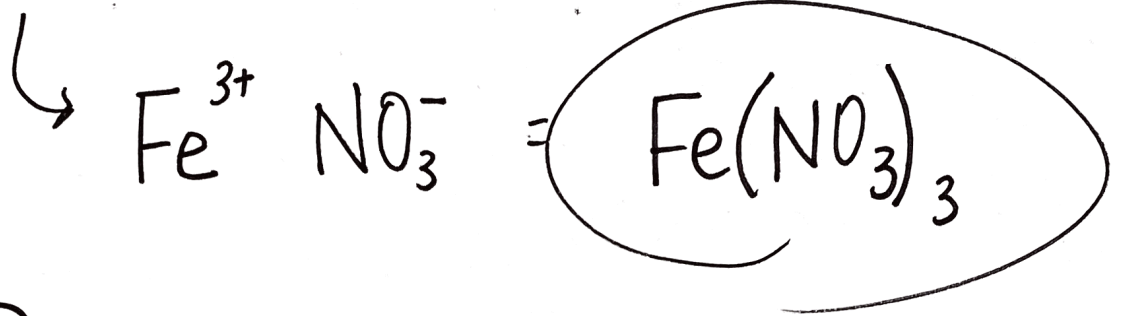


Stannic Chloride

# Summary of Ionic

---

## Iron (III) Nitrate



$(\text{NH}_4)_3\text{P}$  Ammonium Phosphide



## Lead (II) Permanganate

