

## Announcements – Lecture V– Tuesday, Sep 20<sup>th</sup>

### 1. First Lab – Saturday, September 24<sup>th</sup> ... 1-4pm ... ISB 155/160 (A-E)

a) *Read the **Lab Policy** prior to the this lab.*

b) *Print lab prior to coming to lab -- use the '**Print Friendly Version**' located on the top left hand side of the page – this is the version that contains the '**Data Sheet**' that you will hand in upon completing the lab.*

c) *Review the sample quiz on class web site – a short 6 question quiz will be administered at the start of the lab – questions taken from the sample questions.*

### 2.



**iClicker:**

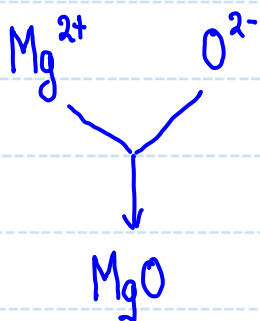
*Choose any letter: A-E*

### 3.6 How Do We Predict Formulas and Name Ionic Compounds.

#### A Binary Compounds

What is the **formula** and **name** of the ionic compound produced by **Magnesium** and **Oxygen**?

Mg : GROUP 2A ... +2  
O : GROUP 6A ... -2

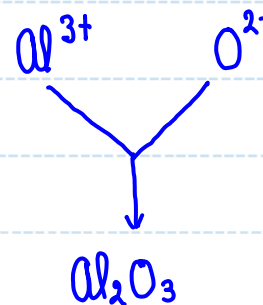


Remember: cation  
placed first and  
named first

Magnesium oxide

**Formula** and **name** for the ionic compound produced by **Oxygen** and **Aluminum**?

O : GROUP 6A ... -2  
Al : GROUP 3A ... +3



Aluminum oxide

### 3.6 How Do We Predict Formulas and Name Ionic Compounds.

#### B Transition Metals

What is the correct chemical formula for the ionic compound Iron oxide?



- a) FeO
  - b) FeO<sub>2</sub>
  - c) Fe<sub>2</sub>O<sub>3</sub>
- ?

The name given is ambiguous ... you have no way to determine the charge on the metal - a transition metal - based on the name given.

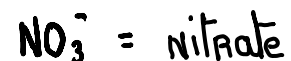
- a) FeO :  $? + (-2) = 0$  ,  $\therefore ? = +2$  Iron (II) oxide
- b) FeO<sub>2</sub> :  $? + 2(-2) = 0$  ,  $\therefore ? = +4$  Iron (IV) oxide
- c) Fe<sub>2</sub>O<sub>3</sub> :  $2? + 3(-2) = 0$  ,  $\therefore ? = +3$  Iron (III) oxide ... Rust.

Use Roman Numerals to indicate the charge on the transition metal.

### 3.6 How Do We Predict Formulas and Name Ionic Compounds.

#### B Transition Metals

What is the **correct name** for the ionic compound  $\text{Cu}(\text{NO}_3)_2$ ?



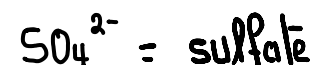
$$\begin{aligned}\text{Cu}(\text{NO}_3)_2 : ? + 2(-1) &= 0 \\ ? &= +2\end{aligned}$$

Copper (II) nitrate

What is the **correct name** for the ionic compound  $\text{CuSO}_4$ ?



- a) Copper(I) sulfate
- b) Copper(I) sulfite
- c) Copper(II) sulfate ✓
- d) Copper(II) sulfite



$$\begin{aligned}\text{CuSO}_4 : ? + (-2) &= 0 \\ ? &= 2\end{aligned}$$

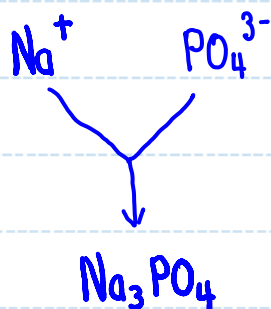
Copper (II) sulfate

### 3.6 How Do We Predict Formulas and Name Ionic Compounds.

#### C Polyatomics

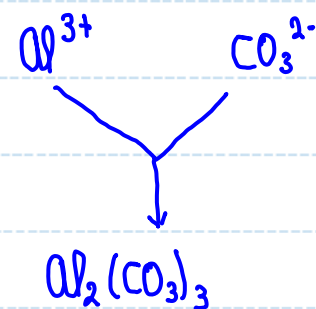
Give the correct chemical formula for the ionic compound, sodium phosphate.

Sodium : Group 1A      +1  
Phosphate :                       $\text{PO}_4^{3-}$



Give the correct chemical formula for the ionic compound, aluminum carbonate.

Aluminum : Group 3A      +3  
Carbonate :                       $\text{CO}_3^{2-}$



Note the use of ( ) when dealing with polyatomics.

$\text{Al}_2(\text{CO}_3)_3$  not  $\text{Al}_2\text{C}_3\text{O}_9$ !

### 4.3 What Is a Mole and How Do We Use It to Calculate Mass Relationships?

What is the mass in grams of 1 mole of Li.

${}^6\text{Li}$ :	6.015 amu	7.42%
${}^7\text{Li}$ :	7.016 amu	92.58%

$$N = 6.0221 \times 10^{23} \text{ mol}^{-1}$$

$$1 \text{ amu} = 1.6606 \times 10^{-24} \text{ g}$$

$$1 \text{ atom} : 0.0742(6.015) + 0.9258(7.016) = \boxed{6.9417 \text{ amu}}$$

$$\frac{6.9417 \text{ amu}}{1 \text{ amu}} \times 1.6606 \times 10^{-24} \text{ g} = 1.1527 \times 10^{-23} \text{ g}$$

$$\begin{aligned} 1 \text{ atom of Li} &: 1.1527 \times 10^{-23} \text{ g} \\ 1 \text{ mol of Li} &: 1.1527 \times 10^{-23} \text{ g} (6.0221 \times 10^{23} \text{ mol}^{-1}) \\ &= \boxed{6.9417 \text{ g} \cdot \text{mol}^{-1}} \end{aligned}$$

### 4.3 What Is a Mole and How Do We Use It to Calculate Mass Relationships. Molar Mass ... (Formula Weight)

Al	Si	P	S
13	14	15	16
26.98	28.09	30.97	32.07

↳ Al: 26.98 g.mol<sup>-1</sup>

↳ S: 32.07 g.mol<sup>-1</sup>



$$4(12.01) + 10(1.01) = \underline{58.14 \text{ g.mol}^{-1}}$$

↳ Molar Mass

$$\text{Reminder: } 58.14 \text{ g.mol}^{-1} = \frac{58.14 \text{ g}}{1 \text{ mol}}$$