# Announcements – Lecture IV – Thursday, May 23rd

a) Add/Drop : Friday, May 24th

b) No Class : Monday, May 27th

c) First Lab : Tuesday, May 28th

**Quiz 2** Last Name: _____ Class No ____

A certain element consists of two stable isotopes:

| | Exact Mass (amu) | Abundance (%) |
|---|---|---|
| #1 | 112.9043 | 4.28 |
| #2 | 114.9041 | 95.72 |

What is the average atomic mass of this element?

Give answer to 6 significant figures

$0.0428(112.9043) + 0.9572(114.9041) = 114.8185086$

114.819 amu

# 8.1 An Introduction to Covalent Bonding
## A: Coulomb's Law

### 8.1a Coulomb's Law – Example _ 1

**Which of the following three salts have the greatest force of attraction?**
***(Assume that the distance is constant)***

1. AlP ✓ Magnitude of the charges
   3A 5A
   $Al^{3+}$ $P^{3-}$
2. NaI
   1A 7A
   $Na^{+}$ $I^{-}$
3. CaO
   2A 6A
   $Ca^{2+}$ $O^{2-}$

### 8.1a Coulomb's Law – Example_ 2

**Which of the following three salts would you expect to be soluble in water?**
***(Assume that the distance is constant)***

1. AlP
2. NaI ✓ Neahest FA
3. CaO

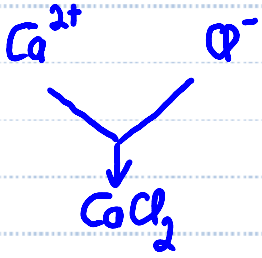
## 2.4 Ions and Ionic Compounds

### a) Formulas and Names – Metal + Nonmetal

**What is the formula and name of the Ionic compound produced by Calcium and Chlorine?**

Calcium ... Group 2A .. +2

Chlorine ... Group 7A ... -1




NAMING:

Cation name comes first

Calcium chloride

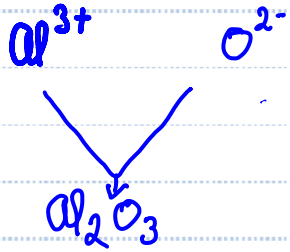
## 2.4 Ions and Ionic Compounds

### a) Formulas and Names – Metal + Nonmetal

**What is the formula and name of the Ionic compound produced by Oxygen and Aluminum?**

Oxygen ... Group 6A ... -2

Aluminum ... Group 3A ... +3

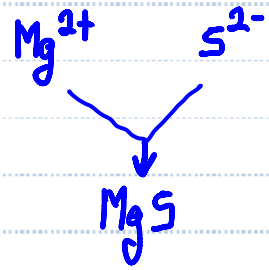



Aluminum oxide

**What is the formula and name of the Ionic compound produced by Magnesium and Sulfur?**

Magnesium ... Group 2A ... +2

Sulfur ... Group 6A ... -2




Magnesium sulfide

## 2.4 Ions and Ionic Compounds

### b) Formulas and Names – Metal + Polyatomic

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

Sodium ... Group 1A ... +1

Phosphate ... $PO_4^{3-}$ ... -3

$Na^+$ $PO_4^{3-}$

$Na_3PO_4$

**Give the correct chemical formula for the ionic compound, calcium chlorate.**

Calcium ... Group 2A ... +2

Chlorate ... $ClO_3^-$ ... -1

$Ca^{2+}$ $ClO_3^-$

$Ca(ClO_3)_2$

Note the use of parenthesis

$Ca(ClO_3)_2$ and not ~~$CaCl_2O_6$~~

## 2.4 Ions and Ionic Compounds

### d) Formulas and Names – Transition Metals

**What is the correct chemical formula for the ionic compound Iron oxide.** ✗

Oxygen ... Group 6A ... -2

Iron ... Group 8B ... ?

→ Ambigious name!

The name should be such so as to indicate the charge that is on the Transition Metal.

**What is the correct name for the ionic compound $Cu(NO_3)_2$**

$Cu(NO_3)_2$

Cu : ?

$2 \times NO_3^-$ : -2

0

$\Rightarrow$ ? = +2

Copper(II) nitrate

Roman numerals used to designate the charge on the transition metal.

Is this always adhered to ... No

in ONL ... No

in this class ... YES

in my exams ... YES

## 3.1 The Mole and Molar Mass

### b) Molar Mass

What is the mass in grams of 1 mole of Li. Av. No = $6.023 \times 10^{23}$

$^{6}Li$: 6.015 amu 7.42%

$^{7}Li$: 7.016 amu 92.58% {1 amu = $1.6605 \times 10^{-24}$g}

$0.0742(6.015) + 0.9258(7.016) =$ **6.942 amu**

$$6.942 \text{ amu} \left| \frac{1.6605 \times 10^{-24} \text{ g}}{1 \text{ amu}} \right. = 1.153 \times 10^{-23} \text{ g per atom}$$

$1.153 \times 10^{-23}$ g $(6.023 \times 10^{23}) =$ **6.942 g per mol** $(6.942 \text{ g.mol}^{-1})$