

Announcements – Lecture IV – Thursday, May 21st

1. Class Web Site: www.chem.umass.edu/genchem
2. Add/Drop: Friday, May 22th
3. No Class: Monday, May 25th , Memorial Day
4. First Lab: Tuesday, May 26th , ISB 155



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

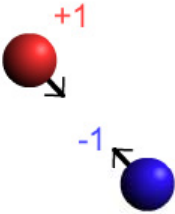
Coulomb's Law

Coulomb's Law

stationary ion
+1

mobile ion
-1

See class web site to interact with this simulation.



Force of Attraction = 3.7×10^{-9} N
Distance = 2.50 Å

FA : Force of Attraction

Magnitude of FA depends on:
a) Magnitude of the charges.
c) Distance between the charges.

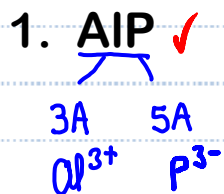


8.1 An Introduction to Covalent Bonding

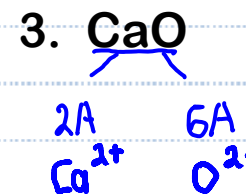
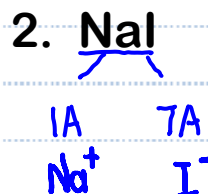
A: Coulomb's Law

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)

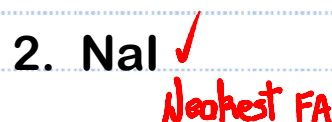


Magnitude of the charges



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)



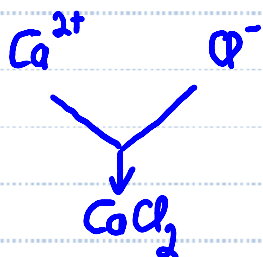
2.4 Ions and Ionic Compounds

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

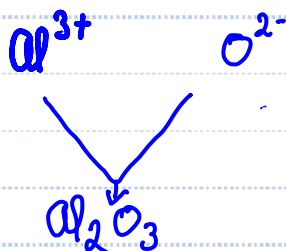
2.4 Ions and Ionic Compounds

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

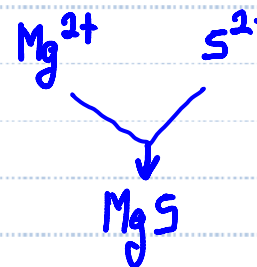


Aluminum oxide

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

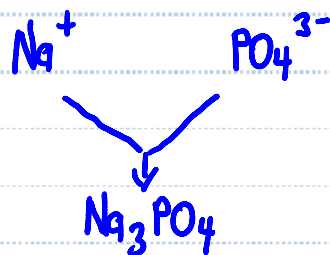
2.4 Ions and Ionic Compounds

b) Formulas and Names – Metal + Polyatomic

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

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

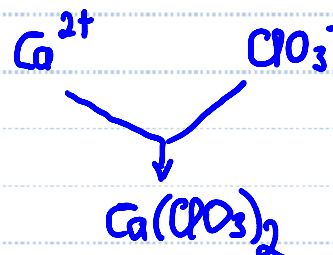
Phosphate ... PO_4^{3-} ... -3



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

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

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



Note the use of parenthesis

$\text{Ca}(\text{ClO}_3)_2$ 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 ... ?

→ Ambiguous 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 $\text{Cu}(\text{NO}_3)_2$?



$$\begin{array}{l} \text{Cu} : \quad ? \\ 2 \times \text{NO}_3^- : \quad \frac{-2}{0} \\ \Rightarrow ? = +2 \end{array}$$

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