

Name: _____

Date: _____

Unit 3 - Topic 4

Polyatomic Ions

1. Cracking the Polyatomics

- (a) Find the formula for the 'ammonium' ion: _____
- (b) What is its electrical charge? _____
- (c) Why do you think its name ends in 'ium'? (HINT: What kind of name-endings do other positive ions have? Think Na, Mg, K...) _____

- (d) What will the chemical formula of the compound be if ammonium bonds with a:
- chloride ion? _____
 - carbonate ion? _____

2. Cracking the Polyatomics II

- (a) Find the formula for the 'nitrite' ion: _____
- (b) What is its electrical charge? _____
- (c) Why do you think its name does NOT end in 'ide'? _____

- (d) What will the chemical formula of the compound be if nitrite bonds with a:
- iron (III) ion? _____
 - lithium ion? _____

3. Circle the polyatomic ion in each of these formulas:

NaOH

(NH₄)₂S

CaCO₃

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The **stock system** is a set of rules for naming compounds of metals and non metals. The metal always comes first in the name and the formula. Monatomic metal ions, those consisting of only one type of atom, come in two varieties – univalent and polyvalent. For univalent metal ions, those having only one oxidation state, the name of the ion is exactly the same as that of the element that formed it. As a result, both Na and Na^+ are called sodium. For polyvalent metal ions, those having multiple oxidation states, a roman numeral indicates the oxidation state. As a result, Fe^{+2} is called iron II, while Fe^{+3} is called iron III. Polyatomic metal ions, those consisting of more than one type of element such as NH_4^+ , ammonium, are found on *Table E*.

The nonmetal always comes last in the name and in the formula. For monatomic nonmetal ions, delete the last part of the elements name and add "IDE". Thus the element sulfur (S) forms the ion sulfIDE (S^{-2}). Polyatomic nonmetal ions, such as SO_4^{-2} (sulfate) or OH^- (hydroxide) are found on *Table E*.

To write the name from the formula, it is necessary to first check the *Periodic Table* to see if the metal is polyvalent. If it is, you need to figure out the oxidation state of the metal by checking to see which one will make the sum of the oxidation states in the compound add up to zero. To write the formulas from the name, you need to look up the oxidation states of the ions, and apply the crossover rule.



Using the rules above, write the names for the compounds listed below on the left and the formulas for the compounds listed below on the right.

Writing Names	Writing Formulas
1. NaCl _____	11. iron III oxide _____
2. CuSO_4 _____	12. chromium III carbonate _____
3. $(\text{NH}_4)_2\text{S}$ _____	13. calcium sulfide _____
4. BaO _____	14. lead II arsenide _____
5. LiF _____	15. ammonium nitrate _____

Name / Formula	Ionic or Molecular?	Name / Formula
NaBr		
CuOH		
FePO_4		
silicon dioxide		
tin (IV) selenide		
carbon tetrachloride		