EXPERIMENT 6 **Chemistry 110 Lab**

WRITING AND NAMING CHEMICAL FORMULAS

I. INTRODUCTION

So far you have learned what a chemical symbol is. For example, Pb is the symbol for the element lead. Elements are not often found pure in nature. Most elements are chemically combined in a definite ratio with other elements. These types of substances are called compounds. Most of the earth's hydrogen is not in the form H_2, but is in water in the form H_2O. Just as elements have symbols, compounds have formulas. It is very important that a chemistry student learn how to name formulas and learn to write the correct formula from a given name.

The elements in a compound are in a definite or set ratio. Water is always H_2O, never anything else. The ratio is always 2 hydrogens to 1 oxygen. This definite composition is what makes compounds unique from mixtures. In experiment 5 you learned that a mixture of two substances can be in any ratio or proportion.

Chemistry is largely about describing chemical reactions and predicting their results. In order to correctly write a chemical equation we must first learn how to write and name chemical formulas. For example, we may be given a reaction in sentence form: When aqueous silver nitrate reacts with aqueous sodium chloride a precipitate silver chloride is formed and the sodium and nitrate ions remain in solution. It is impractical to leave the reaction in sentence form. Chemists have a short hand version that looks like this:

$$AgNO_{3\,(aq)} + NaCl_{\,(aq)} \rightarrow AgCl_{\,(s)} + NaNO_{3\,(aq)}$$

Before we can successfully write a chemical equation, we must first learn how to write formulas from the names of compounds and how to name formulas.

In this experiment you will:

Write the chemical formulas of given named compounds
Write the names of given compound formulas

II. PROCEDURE

A Writing Formulas of Ionic Compounds

Formulas with two monatomic ions in which there is only one form of the metal ion:

Example:

barium oxide _____BaO_____

potassium chloride _____

aluminum bromide _____

calcium oxide _____

strontium nitride _____

aluminum oxide _____

cadmium phosphide _____

silver fluoride _____

Formulas with two monatomic ions in which there is more than one form of the metal ion

Example:

cuprous fluoride _____CuF_____

ferric chloride _____

copper (I) sulfide _____

nickel (II) oxide _____

iron (II) bromide _____

stannic oxide _____

plumbic iodide _____

lead (II) sulfide _____

gold (III) oxide _____

Formulas with polyatomic ions

Example:

cadmium chlorate $Cd(ClO_3)_2$

calcium carbonate _____

sodium phosphate _____

aluminum sulfate _____

cupric acetate _____

Iron (III) nitrate _____

ammonium oxalate _____

aluminum carbonate _____

B. **Naming Formulas of Ionic Compounds**

Formulas with monatomic Ions

Example:

MgI_2 Magnesium iodide

CaF_2 _____

$CuCl_2$ _____

LiI _____

FeO _____

Pb_3N_2 _____

CdS _____

Formulas with polyatomic ions

Example:

$Fe(C_2H_3O_2)_2$ — Iron (II) Acetate

$Al(OH)_3$ _____

$(NH_4)_2\ CO_3$ _____

$Fe_2(C_2O_4)_3$ _____

Na_3PO_4 _____

$BaSO_4$ _____

$CaHPO_4$ _____

C. Writing Formulas of Acids

Example:

Sulfuric Acid — H_2SO_4

Nitric Acid _____

Carbonic Acid _____

Perchloric acid

Example:

Hydroiodic acid — HI

Hydrobromic acid _____

Hydrofluoric acid _____

Example:

Chlorous acid — $HClO_2$

Nitrous acid _____

Sulfurous acid _____

D. Naming Acids

Example		
HCl	Hydrogen chloride	Hydrochloric acid
H_3PO_4		_____
HCN		_____
$HC_2H_3O_2$		_____
$H_2C_2O_4$		_____
HClO		_____

E. Writing Formulas of Covalent Compounds

Example:	
Carbon dioxide	CO_2
Sulfur hexafluoride	_____
Carbon tetrachloride	_____
diphosphoours pentoxide	_____

F. Naming Covalent Compounds

N_2O	_____
BF_3	_____
Si_2Br_6	_____
P_2I_4	_____

CHEM. 110 LAB REPORT

Name _____ Date _____

Lab Section _____ Initials_____

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For each of the following indicate the type of compound using "A" for acid, "I" for ionic or "C" for covalent.

	Write the formulas of the following compounds.			Write the names of the following compounds.	
___	Sodium nitrite	_____	___	$CaBr_2$	_____
___	Aluminum bisulfite	_____	___	PbS_2O_3	_____
___	Nitrous acid	_____	___	$Cd(NO_3)_2$	_____
___	Ferrous Oxide	_____	___	$Cu(ClO_3)_2$	_____
___	Silver oxalate	_____	___	$PbCr_2O_7$	_____
___	Iodic acid	_____	___	P_2O_5	_____
___	Chlorine monobromide	_____	___	$Al(ClO_3)_3$	_____
___	Stannous phosphate	_____	___	Na_3N	_____
___	Hydrocyanic acid	_____	___	$Sb_2(SO_3)_5$	_____
___	Copper (II) hydroxide	_____	___	$Hg_2(ClO)_2$	_____
___	Sulfurous acid	_____	___	$Mg(OH)_2$	_____
___	Sulfuric acid	_____	___	P_2O_5	_____
___	Phosphorous acid	_____	___	NH_4Cl	_____
___	Periodic acid	_____	___	$FeCl_3$	_____
___	Dichlorine monoxide	_____	___	$FeCl_2$	_____
___	Sulfur hexafluoride	_____	___	HF	_____
___	Ammonium phosphite	_____	___	CdI_2	_____