

<b>Nitrate Solutions</b>	<b>Color before addition of NH<sub>4</sub>OH</b>	<b>Color after addition of NH<sub>4</sub>OH</b>	<b>X(OH) Product Formed With NH<sub>4</sub>OH</b>	<b>UNKNOWN</b>
Al(NO <sub>3</sub> ) <sub>3</sub>				#: _____ Color:
Ni(NO <sub>3</sub> ) <sub>2</sub>				
Fe(NO <sub>3</sub> ) <sub>3</sub>				Identity:
Pb(NO <sub>3</sub> ) <sub>2</sub>				
Cu(NO <sub>3</sub> ) <sub>2</sub>				
Zn(NO <sub>3</sub> ) <sub>2</sub>				
Mg(NO <sub>3</sub> ) <sub>2</sub>				
AgNO <sub>3</sub>				

**Lab: Identification of Metals in Solution**

**Students: Please read the following information given below, and then come to class on your lab day with the following already prepared in your notebooks:**

- 1) Date, 2) Partner, 3) Title, 4) Purpose, 5) Materials, 6) Safety, and
- 7) Procedures/Observations



**The Data table and Questions need to be printed out and brought with you to your lab class. The Data table will be completed in class during the lab, the questions will be done after completion of the experiment. The data table and questions will be due one week after performing the lab in class (your next lab class). No formal lab report is necessary.**

Some metals can be identified, after reactions with certain compounds, by the color of their products.

Double replacement reactions will occur in order to convert metal nitrates into metal hydroxides. Students will then catalog the colors of the metal hydroxide precipitates produced, predict the products that are formed, and use the data collected to determine the identity of an unknown metal nitrate.

Solutions that will be used:

$\text{Al}(\text{NO}_3)_3$	$\text{Pb}(\text{NO}_3)_2$	Unknown metal nitrate - $\text{X}(\text{NO}_3)_x$
$\text{Ni}(\text{NO}_3)_2$	$\text{Cu}(\text{NO}_3)_2$	$\text{NH}_4\text{OH}$
$\text{Fe}(\text{NO}_3)_3$	$\text{Zn}(\text{NO}_3)_2$	
$\text{AgNO}_3$	$\text{Mg}(\text{NO}_3)_2$	

PROCEDURES:

5 drops of each metallic nitrate solution will be placed onto their separate squares on the laminated sheet. Then, obtain the unknown metal nitrate and repeat the above procedure. 3 drops of 15 Molar Ammonium Hydroxide ( $\text{NH}_4\text{OH}$ ) will then be added onto each square on the laminated sheet that already contains the metal nitrates previously added to the squares on the laminated sheet.

SAFETY CONCERNS:

- \* **AMMONIUM HYDROXIDE MUST BE USED IN A WELL-VENTILATED AREA.**
- \* **OPEN WINDOWS NEAR YOUR LAB STATION.**
- \* **DO NOT SNIFF THE DROPPING BOTTLE OR THE REACTION WELL PLATE!!!!!!!!!!!!!!**
- \* **DO NOT WEAR CONTACTS FOR THIS LAB!!!!!!**
- \* **WASH HANDS AFTER THE COMPLETION OF THE LAB.**

Observe and then record, on the data sheet, the color and formula of the new metal hydroxide formed. Once all of the reactions have occurred, determine the identity of the unknown by comparing its results to the other known metal nitrate reactions. Then determine the unknown metal nitrate.

After the first double replacement reactions have occurred, write 8 balanced equations for the reactions performed in this lab.

**Lab: Identification of Metals in Solution**

Name \_\_\_\_\_

Date \_\_\_\_\_

Period \_\_\_\_\_

Lab Group # \_\_\_\_\_

**A. Write the 8 balanced equations for the reactions performed in this lab below.**

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

What type of reaction were all 8 equations examples of? \_\_\_\_\_

**B. Write, balance, and determine the type of the following equations. (Include all States of Matter)**

1. Methane gas reacts with Oxygen gas to form gaseous Carbon Dioxide, gaseous Water, and energy.

Type: \_\_\_\_\_

2. Solid Zinc reacts with Sulfuric Acid to form aqueous Zinc Sulfate and Hydrogen gas.

Type: \_\_\_\_\_

3. Solid Calcium Oxide reacts with water yielding solid Calcium Hydroxide.

Type: \_\_\_\_\_

4. Carbon Monoxide and Oxygen gas yield Carbon Dioxide.

Type: \_\_\_\_\_

5. Solid Potassium Bromide and Chlorine gas yield solid Potassium Chloride and Bromine.

Type: \_\_\_\_\_

6. With the process of electrolysis, Water yields Hydrogen gas and Oxygen gas.

Type: \_\_\_\_\_

7. Solid Silver Nitrate and solid Sodium Chloride react to form solid Silver Chloride and solid Sodium Nitrate.

Type: \_\_\_\_\_

8. Solid Calcium Hydroxide and Sulfuric Acid yield solid Calcium Sulfate and Water.

Type: \_\_\_\_\_