

Name _____

Date _____

Chemical Changes LAB

Copper (Cu) with Silver Nitrate (AgNO₃)



Background Information

In this experiment, you will perform a reaction between copper and silver nitrate solution where silver metal should be produced. You will place the copper wire on a balance for the weight and then place the copper wire into a solution of silver nitrate and observe its behavior. By weighing the wire at the end of the experiment, you will be able to quantitatively investigate any changes that occur. Careful measurements will enable you to determine the mole relationships between the reactants and products.

Hypothesis

MATERIALS

Digital Microscope	Wash Bottle
Personal Computer	Watch Glass
Interactive White Board/Projector	Graduated Cylinder
Electronic Balance	150mL Beaker
Safety Goggles	Large Test Tube
Gloves	Fine Copper Wire (#16)
0.10 M Silver Nitrate (AgNO ₃) Solution	

PROCEDURE**Activity 1**

1. Wear safety goggles and gloves at all times.
2. Obtain 30cm of copper wire.
3. Wrap around a large test tube and leave 7 cm for the handle.
4. Stretch the coil so there is space between each loop.
5. Weigh the copper on the electronic balance.
6. Record its weight to the nearest 0.01 gram.
7. Record and weigh the 150mL beaker to the nearest 0.01 gram.
8. Bend the handle and hook the end of the copper wire on the beaker.
9. Focus with the digital microscope on the beaker.
10. Start recording.
11. Fill 80mL of AgNO_3 solution in a graduated cylinder.
12. Pour the 80mL into the beaker with the wire.
13. Record for 4 minutes.
14. Stop recording and note observations.
15. Cover the beaker with a watch glass and set aside for 24 hours.

Activity 2

1. Wear safety goggles and gloves at all times.
2. Bring beaker back to lab table and record observations.
3. Shake the crystals off the coil into the beaker.
4. Use the wash bottle to rinse off the coil and set aside to dry.
5. Once dry, weigh the coil to the nearest 0.01 gram and record.
6. Let the crystals settle in the beaker.
7. Decant the solution. (Decant means to pour off all liquid from the solid particles.)
8. Add 5mL of AgNO_3 solution and stir until all Cu flakes disappear.
9. Decant the solution.
10. Wash the crystals with 10mL of water and decant solution.
11. Repeat step #10 at least 3 times.

Name _____

Date _____

12. Dry the residue overnight in a laboratory oven.
13. After the crystals have dried, allow the beaker and contents to cool.
14. Record and weigh the mass of the beaker to the nearest 0.01gram.

QUESTIONS

1. Construct a data table of your findings.
 - a. Mass of Cu before immersion in solution _____
 - b. Mass of Cu at the end of the experiment _____
 - c. Mass of Cu used in the experiment _____
 - d. Mass of beaker plus Ag _____
 - e. Mass of beaker _____
 - f. Mass of Ag _____

2. Write the balanced equation for the reaction between Cu and AgNO_3 .

 - a. Does the equation you wrote agree with your hypothesis? _____

3. What type of reaction is this? (exothermic or endothermic) _____

4. Do the observations seem to indicate evidence of a physical change or chemical change for the copper wire? _____

5. Calculate the number of moles of Cu reacted. _____

6. Determine the # of moles of Ag that should have been produced (*theoretical yield*).

Name _____

Date _____

7. Determine the # of moles of Ag actually produced (*actual* yield). _____

8. Calculate the percent yield and percent error in your experiment. _____
