**Lab: Stoichiometry - Copper Wire in a Solution of Silver Nitrate**

Problem: How much silver can actually be produced from the reaction of copper wire with a solution of silver (I) nitrate?

Procedure:

Day 1:

1. Obtain a length of copper wire and use a piece of steel wool to polish it.
2. Determine the mass of the copper wire. Coil the copper wire loosely around your pencil or pen so it looks like a spring.
3. Label a clean beaker and determine its mass.
4. Add 20 mL of silver (I) nitrate solution to the clean beaker. Do NOT touch the silver (I) nitrate solution as it can stain your skin and clothes.
5. Add the copper wire to the silver (I) nitrate solution, keep a little bit of the wire out of the solution so you can use it as a handle for removing it later.
6. Observe the reaction for a couple of minutes and record any changes that occur.
7. Set beaker aside in the location your teacher tells you for 30-40 minutes.
8. After retrieving your beaker, carefully shake the copper wire to remove any crystals that have formed. Try to dislodge as much as you can from the wire using a glass stirring rod.
9. Dry the copper wire and determine its mass.
10. Allow the crystals to settle to the bottom of the beaker. Carefully decant the solution into a larger beaker labeled by your teacher. Be sure to keep all the crystals in your beaker.
11. Pour a tiny amount of water into your beaker, and decant again.
12. Place all the beaker with the crystals back to the location your teacher had you place it before to dry overnight.

Day 2:

1. Retrieve your beaker and determine its mass.
2. Give your beaker with the crystals in it to your teacher.

Data:

Mass of copper wire before reaction

Mass of labeled beaker:

Mass of copper wire after reaction:

Mass of labeled beaker + crystals:

Observations:

Analysis: SHOW ALL YOUR WORK AND INCLUDE UNITS!!!!!!!!

1. Write and balance the chemical equation for the reaction that occurred: **Solid copper reacted with silver (I) nitrate solution to produce solid silver and a solution of copper (II) nitrate.**
2. Calculate the change in the mass of the copper wire. This is the mass of copper that reacted.
3. Calculate the mass of the silver crystals produced. This is the actual yield of silver.
4. From the mass of copper that reacted, complete a stoichiometry problem that determines the mass of silver that should be theoretically produced.
5. Calculate the % yield of silver using the equation below:

**% yield = actual yield × 100**

**theoretical yield**