**Required Training**  
UC Lab Safety Fundamentals  

**Required PPE**  
Lab coat, safety glasses/goggles, nitrile gloves

**Equipment**  
Crystalizing Dish  

**Chemicals**  
130 mL 0.1N AgNO₃

Copper plate (tree)  

Dropper of conc. H₂SO₄

Paper towel

**Procedure:**

1. Drop 13 drops of conc. H₂SO₄ into a large crystalizing dish filled with 130 mL 0.1 N AgNO₃.
2. Gradually placed the flattened copper plate (cut in the outline of a tree) into the solution.
3. In a short time, the tree will be covered with silver needles.
4. Gently lift the copper plate out and set it on a paper towel.

**Discussion:**

The standard chemical potential of the reactions involved are listed below:

\[
\text{Ag}^{+} + \text{e}^{-} \rightarrow \text{Ag(s)} \quad +0.7996
\]

\[
\text{Cu}^{2+} + 2\text{e}^{-} \rightarrow \text{Cu(s)} \quad +0.340
\]

In sum, the balanced reaction is \(2 \text{Ag}^{+} + \text{Cu} \rightarrow \text{Cu}^{2+} + 2 \text{Ag}\). As a silver ion pulls an electron off of the crystalizing silver, the silver pulls an electron from the copper metal. For every two silver ions crystalized out, one ion of Cu²⁺ is formed in solution.

**Hazards:**

Silver nitrate can stain the skin and clothing—please wear all suggested PPE. Concentrated sulfuric acid is a corrosive and should be handled with care. In the event of a spill, consult with the substance’s SDS.
SOP:

Acutely Toxic – Silver Nitrate
Corrosive – Silver Nitrate, Sulfuric Acid
Oxidizer – Silver Nitrate

**Disposal (by Storeroom):**

Return the solution, in whatever vessel it was provided in, to the dispensary for proper disposal. Please do not dispose of the silver, copper plate, or solution in the general waste stream.