**Galvanized Steel and Copper Plated Ornaments**

Materials:

* Galvanized Steel square plate (about 3-4 in. square)
* Steel wool
* Water
* Masking tape
* X-acto knife
* Copper (II) chloride in pipettes (an exact molarity is not needed – the higher the molarity, the faster the reaction)

Procedure

* Polish your steel square with steel wool
* Cover the surface of the square with masking tape
* Using a pencil, draw a shape on your plate and cut it out of the tape with the knife. BE CAREFUL!
* Place your name on the remaining masking tape with pencil or sharpie
* Use the pipette to distribute the blue copper solution on to the surface of the metal.
* Let it set for a couple minutes
* CAREFULLY rinse off the liquid from the plate and set it on a paper towel to dry. DO NOT RUB THE PLATE to dry it.
* Remove the tape and your design is revealed.

Concepts:

Double Replacement and Redox Reactions

Galvanized steel is steel that has been coated by zinc to prevent it from rusting. Zinc is a very active metal, and forms a zinc oxide compound with oxygen from the air that protects the steel underneath. This is the dark grey coating you see when you first receive your steel plate. By scrubbing with steel wool, you remove this “tarnish” and reveal pure zinc. Because zinc is so active, it would much rather form a compound. When aqueous copper (II) chloride comes into contact with the solid zinc, the active zinc kicks out the less active copper, and leaves it behind as a solid and forms aqueous zinc chloride.

Zn + CuCl2 🡪 Cu + ZnCl2

Nifty, huh?