

## Electroplating in an Electrolytic Cell

### Purpose

To demonstrate the principles behind an electrolytic cell, and to utilize these principles and demonstrating the effects when an electric current is introduced to this system.

### Materials

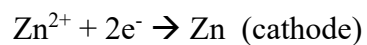
Copper Wire	0.5 M HCl
Zinc Electrode (anode)	Alligator clips
Copper Pennies (cathode)	Power supply
Masking tape	Parafilm

### Procedure

1. Pour 100 mL of 0.5 M HCl into a 250 mL beaker, and place a piece of parafilm over the top of the beaker leaving two open holes on opposite ends of the beaker (this is to keep the two electrodes from touching).
2. Prepare the copper electrode to be plated by straightening the copper wire and wrapping it around securely around 2 pennies. There should be enough extra straight wire such that it protrudes from the top of the beaker and can be easily alligator clipped.
3. Attach the alligator clips accordingly to each electrode (black or darker color for the cathode – copper wire and pennies and vice versa for the anode – zinc plate) and to the power supply.
4. Make sure the switch is off before plugging the power supply into the wall. Plug the power supply into the wall and turn the switch on. The plating will occur immediately resulting in white or grey solid plating onto the surface of the copper pennies.
5. Switch off when a satisfactory amount of zinc has been plated. Unplug the power supply before handling the electrodes.

### Additional Information

1. Do not let the electrodes touch, and if the process is working there should be bubbles at each electrode.
2. Do **NOT** immerse the alligator clips in solution.
3. A Nickel can be plated with copper as well. The setup is reversed where as the Nickels are lined up on the paper clip at the cathode end and the copper electrode is the anode. For this, use a solution of 100 mL 0.1 M CuSO<sub>4</sub> and 15 mL of 0.2-0.5 M HCl.
4. Half Reactions  
$$\text{Zn} \rightarrow \text{Zn}^{2+} + 2\text{e}^- \text{ (anode)}$$

**Disposal**

1. The zinc electrode should be scrubbed with sand paper and used again.
2. The copper pennies can be soaked in dilute acetic acid or hydrochloric acid to strip the zinc off and be used again
3. The HCl can be disposed of down the drain

**References**

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