C15 The Electrogravimetric Determination of Copper

Collect

- Platinum gauze and wire
- Stir bar
- Watch glass
- Timer
- DC power supply
- 100 mL beaker

Step 1. Preparation of sample

- Weigh ca. 0.5 g $Cu(SO_4)_2 \cdot 5H_2O$ into 100 mL beaker
- Add ca. 30 mL of deionized water to dissolve it
- Add another 3 mL of 9 M H_2SO_4 and 2 mL of 6 M HNO_3

Step 2. Preparation of electrodes

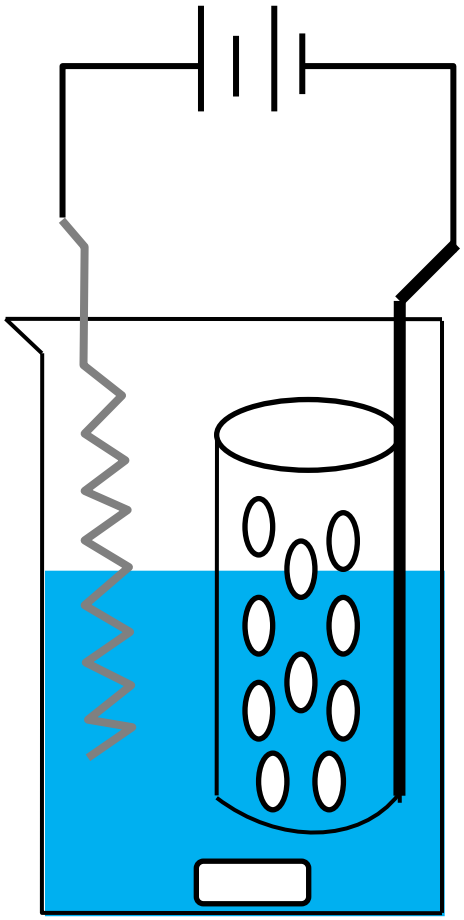
- Immerse the Pt electrodes in 6 M HNO_3 for 5 min. (Operate in fume hood)
- Wash thoroughly with DI water and rinse with ethanol
- Place the electrodes on watch glass and oven-dry at 110 ℃ for 5 min.
- Cool in desiccators and weigh to the nearest 0.1 mg

NOTE : Pt electrode is very expensive. Please handle with care.

Step 3. Set up the apparatus

(+) Electrode

$H_2O_{(l)} \rightarrow 1/2O_{2(g)} + 2H^+_{(aq)} + 2e^-$



(–) Electrode

$Cu^{2+}_{(aq)} + 2e^- \rightarrow Cu_{(s)}$

Stir bar

NOTE : Keep the two electrodes away from each other

Step 4. Electrolysis

DC Power supply

Voltage

Current

Power

- Turn the power on
- Adjust the voltage and current alternatively
- Adjust the current to 1 A
- Turn the magnetic stirring on
- When the blue color of Cu(II) has disappeared, add some distilled water.
- Electrolyze for 15 min at a current of 0.5 A
- Repeat until no further deposition of Cu occurs

Step 5. Determine the mass of Cu

- Wash the Pt gauze electrode with a squirt bottle without turning off the power
- Turn off the power after washing
- Wash the electrode with ethanol and dry with hair-blower
- Cool the electrode and weigh to nearest 0.1 mg
- Calculate the mass% of Cu in the sample
- Immerse the Pt gauze in 6 M HNO_3 to dissolve the Cu and wash with water
- Turn in the Pt electrodes to TA.