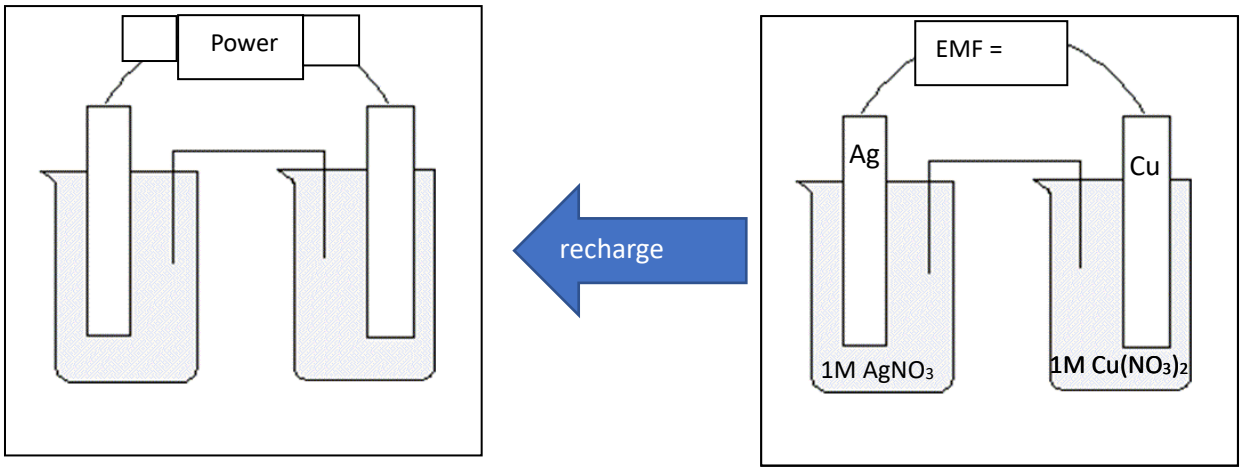
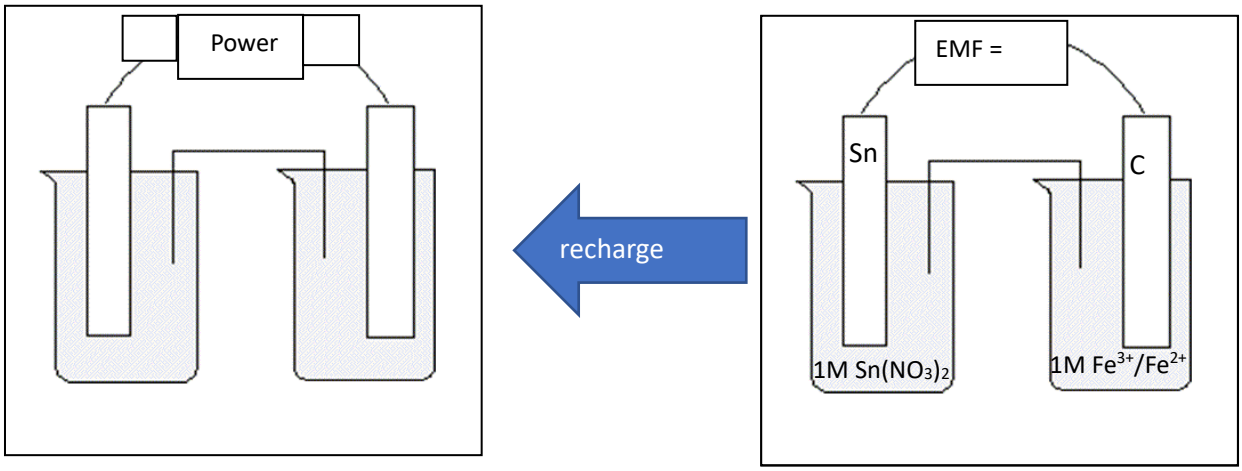
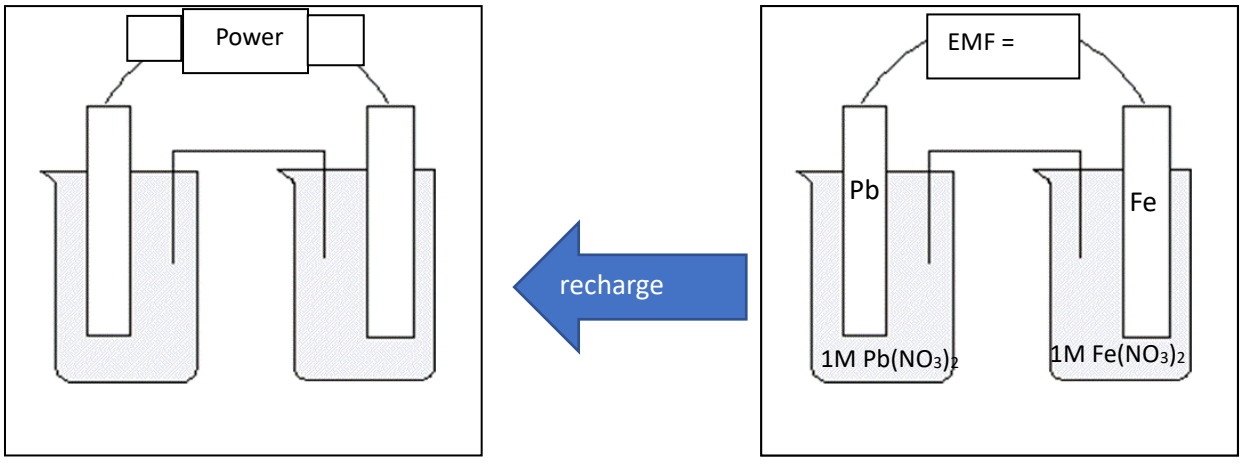
Video worksheet – secondary cells.







1. For each cell above complete the following
    a. When discharging :
        i. clearly label the anode and cathode and give the polarity of each.
        ii. give the cell voltage at standard conditions
        iii. give the half reactions taking place at each electrode
        iv. give the balanced, states included, overall cell reaction taking place
        v. how does the mass of the anode and cathode change?

            Increase decrease unchanged

    b. When recharging:
        i. clearly label the anode and cathode and give the polarity of each.
        ii. indicate the polarity of the power supply terminals
        iii. give the half reactions taking place at each electrode
        iv. give the balanced, states included, overall cell reaction taking place
        v. how does the mass of the anode and cathode change?

            Increase decrease unchanged

2. When a Ni-Cd battery is discharging, the **<u>unbalanced,</u>** overall equation is shown below.
   $NiO_2(s) + H_2O(l) + Cd(s) \rightarrow Ni(OH)_2(s) + Cd(OH)_2(s)$

    a. Give the balanced half equation for the reaction occurring at the cathode during **discharge.**

    c. Give the balanced half equation for the reaction occurring at the negative electrode during **recharge**.

    d. Give the oxidant for the overall reaction during **recharge**.

3. The overall discharge reaction for a lead-acid battery is shown below.

   $Pb(s) + PbO_2(s) + 4H^+(aq) + 2SO_4^{2-}(aq) \rightarrow 2PbSO_4(s) + 2H_2O(l)$

   Solid lead sulfate ($PbSO_4$) is formed at both the anode and cathode.

    a. Give a balanced chemical equation for the reaction at the anode during recharge

    b. Give a balanced chemical equation for the reaction at the anode during discharge

    c. What is the reducing agent during discharge?