

## Chem12 Electrolysis : Quiz 2 - 60

1) Molten  $\text{ZnCl}_2$  is electrolyzed using inert electrodes. Give the anode and cathode reactions and the minimum voltage required for the reaction to proceed.

2) Give the anode and cathode reactions when the following are electrolyzed. (All concentrations are 1.0 M)

a)  $\text{NaI}(\text{aq})$

b)  $\text{NiBr}_2(\text{aq})$

c)  $\text{NiF}_2(\text{aq})$

3) Name any ionic compound that will allow the decomposition of water into oxygen gas and hydrogen gas during electrolysis at inert electrodes.

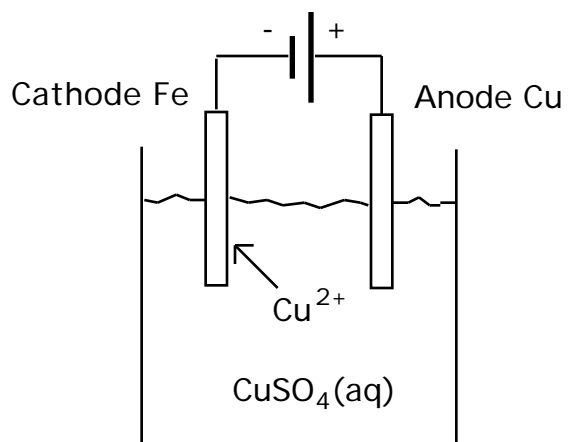
4)a) Draw a picture of a cell that can be used to plate copper onto iron.

b) Give the anode and cathode reactions and a suitable electrolyte.

c) Find the minimum voltage necessary to run the cell.

d) Find the mass of copper that can be plated in 1.00 hour if the current is 0.500 Amps. (1.00 Amperes =  $1.04 \times 10^{-5}$  mol/s)

Answers : 1) anode :  $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$ , cathode :  $\text{Zn}^{2+} + 2\text{e}^- \rightarrow \text{Zn}$ , minimum voltage = 2.12 V., 2)a) anode :  $2\text{I}^- \rightarrow \text{I}_2 + 2\text{e}^-$ , cathode :  $2\text{H}_2\text{O} + 2\text{e}^- \rightarrow \text{H}_2 + 2\text{OH}^-$ , b) anode :  $2\text{Br}^- \rightarrow \text{Br}_2 + 2\text{e}^-$ , cathode :  $\text{Ni}^{2+} + 2\text{e}^- \rightarrow \text{Ni}$ , c) anode :  $2\text{H}_2\text{O} \rightarrow \text{O}_2 + 4\text{H}^+ + 4\text{e}^-$ , cathode :  $\text{Ni}^{2+} + 2\text{e}^- \rightarrow \text{Ni}$ , 3)  $\text{KF}$ ,  $\text{Na}_2\text{SO}_4$ , and others..., 4)a)



b) Anode :  $\text{Cu} \rightarrow \text{Cu}^{2+} + 2\text{e}^-$ , Cathode :  $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$ , electrolyte ;  $\text{CuSO}_4$ , and others..., c) Greater than 0.0 V. (small), d) 0.595 g.