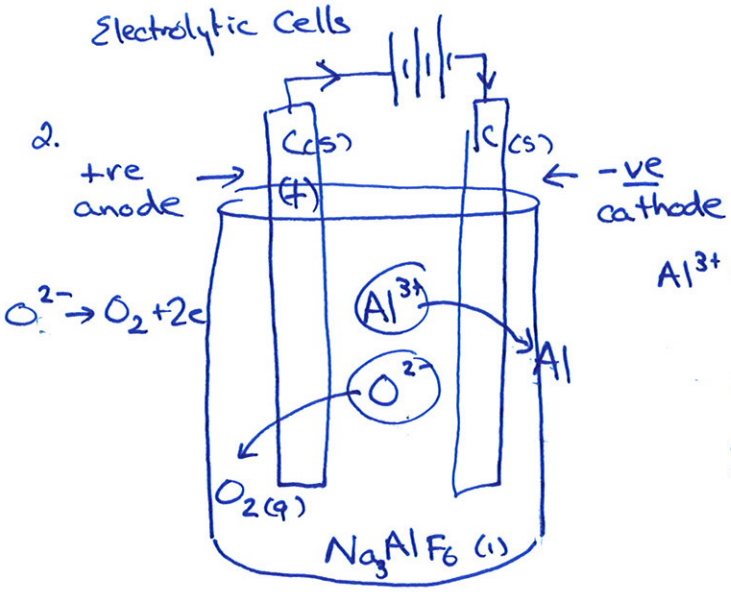
Electrolytic Cells

2.

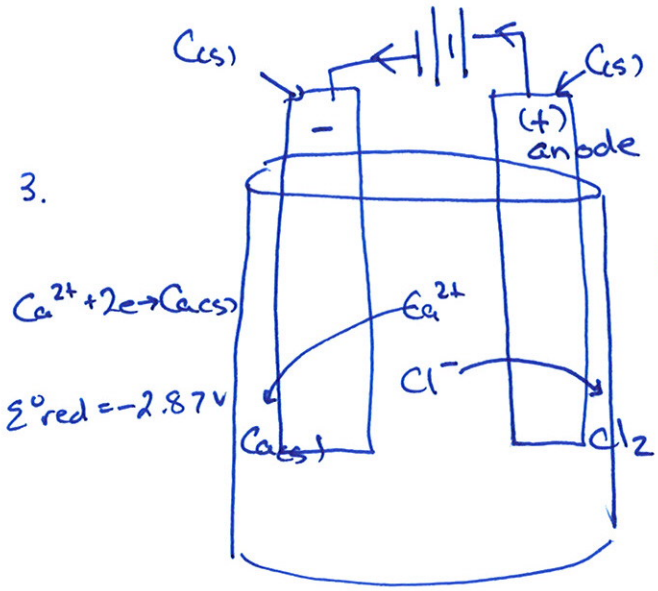


$Al^{3+} + 3e \rightarrow Al_{(s)}$ $\quad \Sigma^\circ_{red} = -1.66\ V$

Net rxn

$2Al^{3+} + 3O^{2-} \rightarrow 2Al_{(s)} + 3O_{2\ (g)}$

3.



$2Cl^- \rightarrow Cl_2 + 2e$

$\Sigma^\circ_{oxid} = -1.36\ V$

net rxn

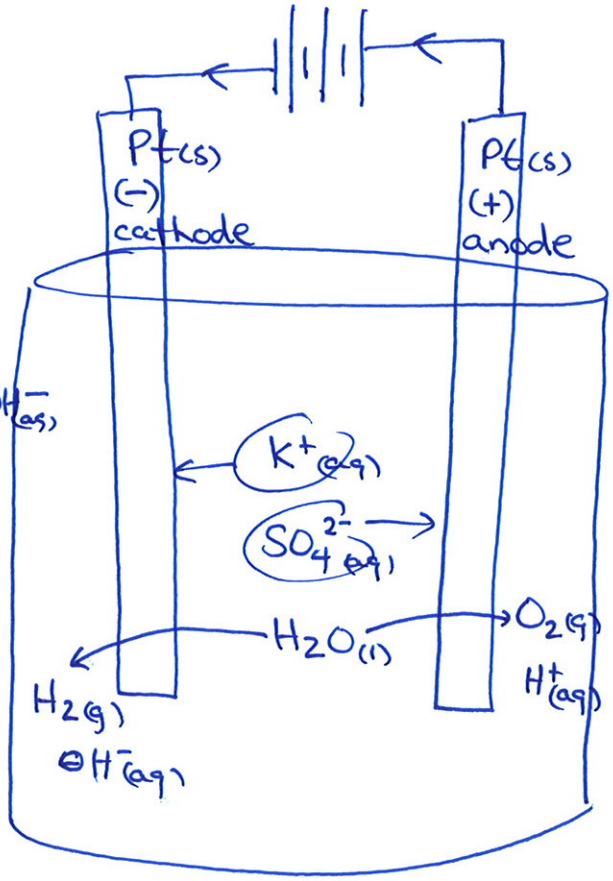
$Ca^{2+} + 2Cl^- \rightarrow Ca_{(s)} + Cl_{2\ (g)}$

$\Sigma^\circ_{cell} = \Sigma^\circ_{red} + \Sigma^\circ_{oxid}$

$= -2.87\ V + -1.36\ V$

$= -4.23\ V$

4.



reduction

$2H_2O_{(l)} + 2e \rightarrow H_{2(aq)} + 2OH^-_{(aq)}$

$\mathcal{E}^\circ_{red} = -0.83V$

oxidation

$2H_2O_{(l)} \rightarrow O_{2(g)} + 4H^+ + 4$

$\mathcal{E}^\circ_{oxid} = -1.23V$

net rxn

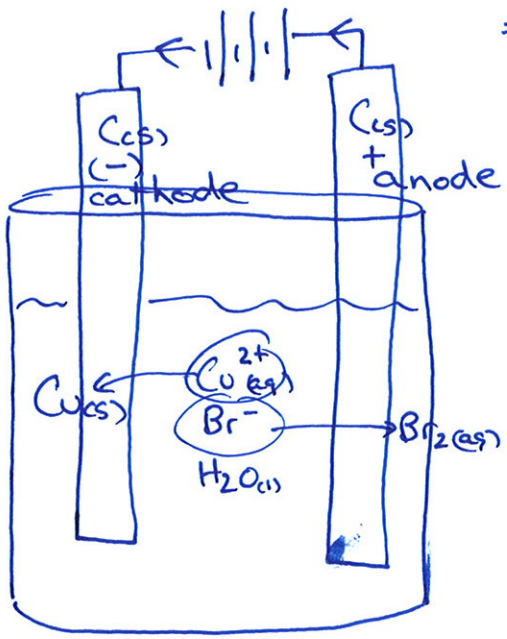
$2H_2O_{(l)} \longrightarrow O_{2(g)} + 2H_{2(g)}$

$\mathcal{E}^\circ_{cell} = \mathcal{E}^\circ_{red} + \mathcal{E}^\circ_{oxid}$

$= -0.83V + -1.23V$

$= -2.06V$

5.



reduction

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

$\mathcal{E}^\circ_{red} = 0.34V$

oxidation

$2Br^-_{(aq)} \rightarrow Br_{2(aq)} + 2e$

$\mathcal{E}^\circ_{oxid} = -1.07V$

$Cu^{2+}_{(aq)} + 2Br^-_{(aq)} \longrightarrow Cu_{(s)} + Br_{2(aq)}$

$\mathcal{E}^\circ_{cell} = \mathcal{E}^\circ_{red} + \mathcal{E}^\circ_{oxid}$

$= 0.34V + -1.07V$

$= -0.73V$