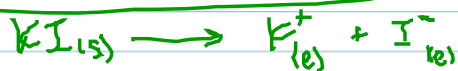


ELECTROLYSIS → using electrical energy to force a nonspontaneous reaction

"electrolytic cell"

① MOLTEN IONIC COMPOUNDS



cathode: K^+ will not oxidize further $\Rightarrow K^+ + e^- \rightarrow K$

anode: I^- will not reduce further $\Rightarrow 2I^- \rightarrow I_2 + 2e^-$

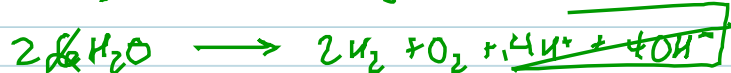
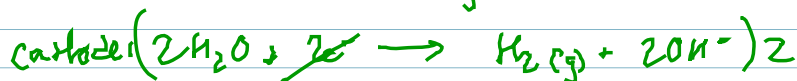
→ cation gets reduced (cathode)

anion gets oxidized (anode)

② AQUEOUS IONIC COMPOUNDS



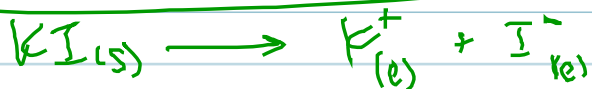
* H_2O can be oxidized and/or reduced



ELECTROLYSIS → using electrical energy to force a nonspontaneous reaction

"electrolytic cell"

① MOLTEN IONIC COMPOUNDS



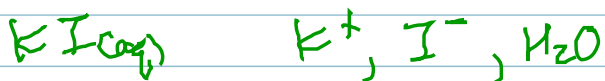
cathode: K^+ will not oxidize further $\Rightarrow K^+ + e^- \rightarrow K$

anode: I^- will not reduce further $\Rightarrow 2I^- \rightarrow I_2 + 2e^-$

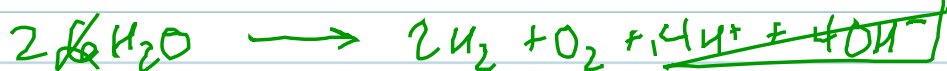
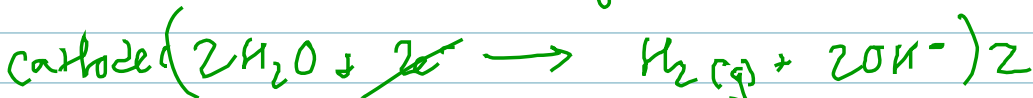
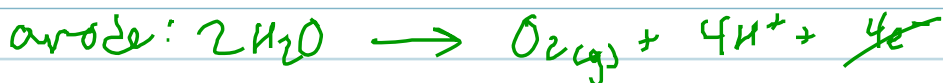
→ cation gets reduced
(cathode)

anion gets oxidized
(anode)

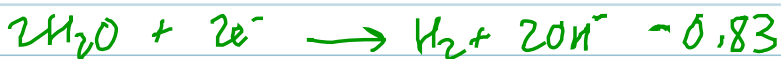
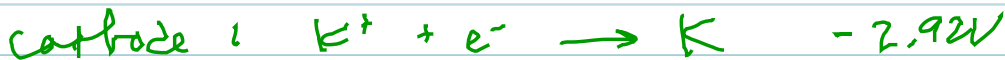
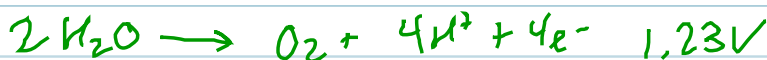
② AQUEOUS IONIC COMPOUNDS



* H_2O can be oxidized and/or reduced



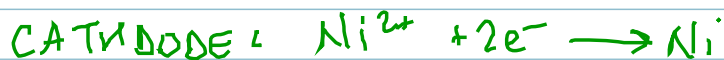
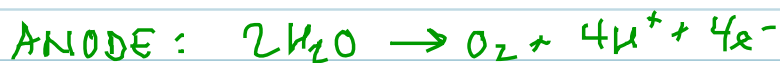
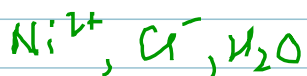
ANODE:



→ lower red pot'l gets oxidized

→ higher red pot'l gets reduced

electrode reactions: electrolyse $NiCl_2(aq)$



Metal plating

SO_4^{2-} non reactive
in electrolysis



Metal plating

electrical current = flow of e^- I
unit = amperes, amp A

unit of electric charge = coulombs (C) q symbol

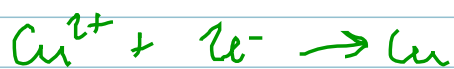
$$1 \text{ mole } e^- = 9.65 \times 10^4 \text{ C} \quad F$$

$$q = \frac{q}{t} \text{ A}$$

$$A = \frac{C}{s}$$

$$\frac{C}{A \cdot s}$$

If a 5.00 hr flow of electric current plates out 0.404 g of Cu from $\text{CuSO}_4(\text{aq})$, what was the current that was flowing?



$$A = \frac{C}{s}$$

$$5.00 \text{ hr} = 18000 \text{ s}$$

$$0.404 \text{ g Cu} \times \frac{1 \text{ mol}}{63.55 \text{ g}} \times \frac{2 \text{ mole } e^-}{1 \text{ mol Cu}} \times \frac{9.65 \times 10^4 \text{ C}}{1 \text{ mole } e^-} = 1230 \text{ C}$$

$$A = \frac{1230 \text{ C}}{18,000 \text{ s}} = 0.0683 \text{ A}$$