

Electrolysis  
 electrolyte      breakage

## Electrolysis

Cation (+)  
 move  
 towards

Anion (-)

ON  
 (The process of) Passage of electricity through the electrolyte  
 breaks this is known as electrolysis.

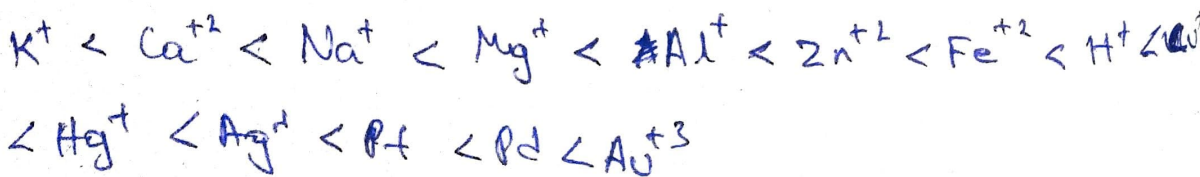
Cathode (-)  
 (negative electrode)



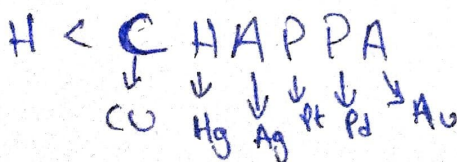
At cathode! - reduction

\*element with higher  
 standard reduction potential  
 (SRP) get deposited first  
 when more than one  
 cation were present

Order of deposition (of cation)

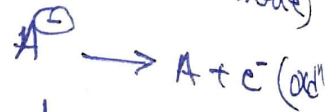


Short Trick



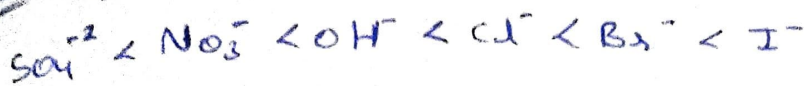
moves  
 towards

Anode (+)  
 (positive electrode)



\*element with  
 higher oxidation  
 potential (SOP)  
 will get deposited  
 first when more  
 than one cation  
 were present

order of deposition of anion SNO class Bring Ice



electrolysis depends on  
 i) nature of electrolyte  
 ii) nature of electrode

Electrodes → connects internal and external parts of cell.

Inert

\* not involved in

reaction

\* provides surface for redox rxn

eg: Pt, Pd

Reactive

\* will involve in

Reaction

iii) concentration of solution

iv) over potential of gases

Example:-

Electrolysis of NaCl

~~molten~~ NaCl

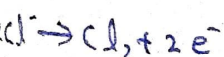
using Pt electrode

$\text{Na}^+ \rightarrow \text{cathode}$



$$E = \frac{Atwt}{1}$$

$\text{Cl}^- \rightarrow \text{Anode}$



$$E = \frac{Mwt}{2}$$

(or)

$$= \frac{22.4}{2}$$

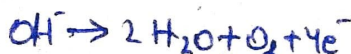
aq NaCl

using Pt electrode

~~$\text{Na}^+$~~



~~$\text{OH}^-$~~



$$E = \frac{32}{4}$$

$$= \frac{22.4}{4}$$

aq NaCl

using Hg electrode

very dilute

NaCl using

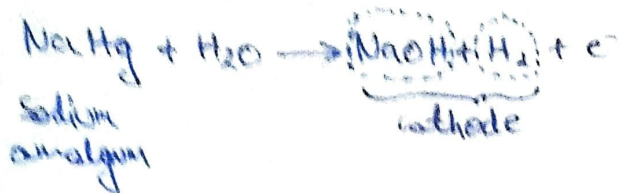
Pt electrode

Cl has less SOP but

it is obtained at A

because of over potential of gas

iii) dil NaCl using Hg electrode



$\text{Cl}^-$  since  $\blacksquare$  has over potential

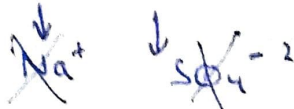
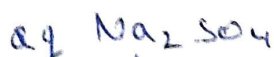
iv) Very dilute NaCl using Pt electrode



$\text{Cl}^-$  since conc is less

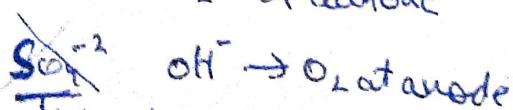
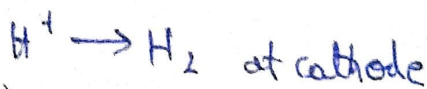


Electrolysis of aqueous soln of  $\text{Na}_2\text{SO}_4$  using Pt electrode



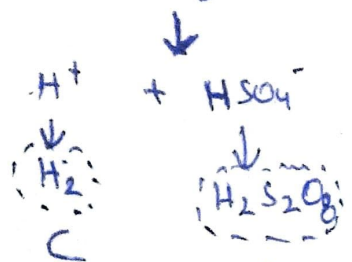
Electrolysis of  $\text{H}_2\text{SO}_4$

dil  $\text{H}_2\text{SO}_4$



$\text{H}_2\text{SO}_4$  is completely ionised  $\text{H}_2\text{SO}_4$  gives  $\text{SO}_4^{2-}$  at infinite dilution & for weak electrolytes is also 1.  $\text{HSO}_4^-$  is not present due to dilution

50%  $\text{H}_2\text{SO}_4$



A  
monobasic  
acid (or)  
Peroxydisulphate



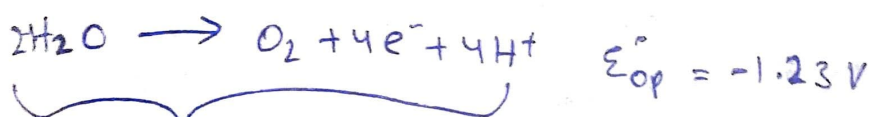
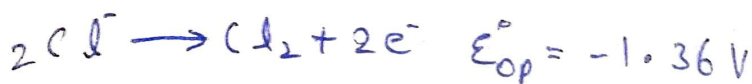
# Electrolysis of $H_2O$

Since water is not a good conductor of electricity, we prefer to take Acidulated water (Having traces of acid) (generally  $H_2SO_4$ )

## Acidulated water



Note:



Kinetically slow

Hence additional potential is required called over potential or bubble potential.

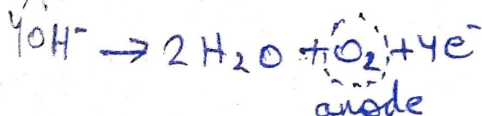
## aq $CuSO_4$

using Pt



~~$H^+$~~

~~$SO_4^{-2}$~~



NIMP

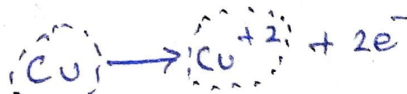
using

Cu electrode



$SO_4^{-2}$

$OH^-$



has higher SOP Anode

The concentration of  $Cu^{+2}$  is not changing bc cause they are reproduced again at Anode.