

Salts.

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Salts are the class of compounds formed by partially or completely displacing the replaceable hydrogen ~~present~~ of an acid by metallic ions or by group of elements acting as metallic ions.

Types of salts.

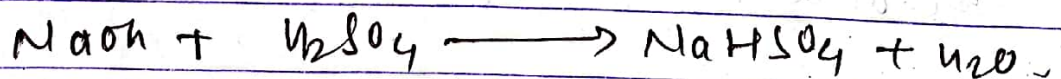
(i) ~~Acidic salts~~: Neutral (Normal) salts.

A salt produce by complete neutralization of an acid by base. is called neutral salt
eg. NaCl , KCl , Na_2SO_4 , K_2SO_4 , MgSO_4 , etc

(ii) Acidic salt:- ^{when reaction}

Salts formed by ~~acid~~ dibasic acid or tribasic acid ~~with react with and with with~~ react partially with base.

eg. NaHSO_4 , KHSO_4 , Na_2HPO_4 , etc

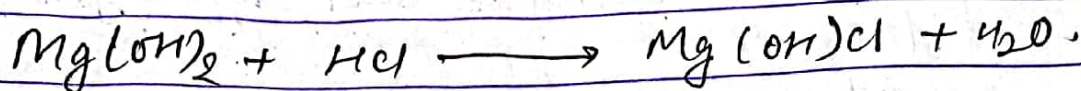


It turns blue litmus paper into red.

(iii) Basic salts:

Salts formed by the partial neutralization of a base by an acid.

eg. Mg_2CO_3 , K_3PO_4 , CH_3COONa ,
 $\text{Mg}(\text{OH})\text{Cl}$, $\text{Ca}(\text{OH})\text{Cl}$, $\text{Al}(\text{OH})_2\text{Cl}$

(iv) Mixed or double salt

The salt contain more than one cation, formed by combination of two normal salts. They lose their identity when dissolves in polar solvents like water. ~~(is solid)~~

eg. ⓧ Mohr's salt :- $\text{FeSO}_4 \cdot (\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$

ⓧ Potash alum $\rightarrow \text{K}_2\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 \cdot 24\text{H}_2\text{O}$.

ⓧ Carnalite $\rightarrow \text{KCl} \cdot \text{MgCl}_2 \cdot 6\text{H}_2\text{O}$.

(v) Complex salt:- (formed by complex cation or anion)

The salt formed by combination of central metal atom or ion with number of neutral molecules or anions and their properties remain same either in solid or in solution state.

eg.

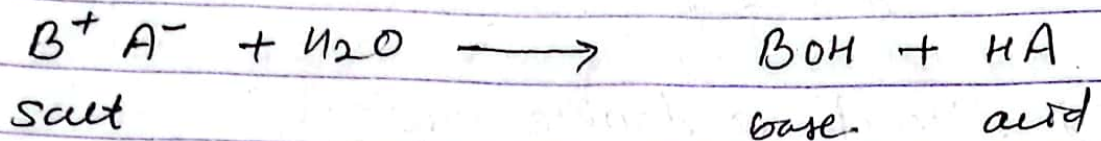
Tetra amine copper sulphate $[\text{Cu}(\text{NH}_3)_4\text{SO}_4]$

Potassium ferro cyanide $[\text{K}_4[\text{Fe}(\text{CN})_6]]$

Salt Hydrolysis

or Hydrolysis of salt.

The phenomenon in which a salt react with water to give either acidic or basic solution is called ~~as~~ salt hydrolysis.



If BOH is stronger base then the resulting solution is basic and if HA is stronger acid then the ~~net~~ resulting solution is acidic.

The nature of acid and alkali so formed during hydrolysis determines the nature of salt solution.

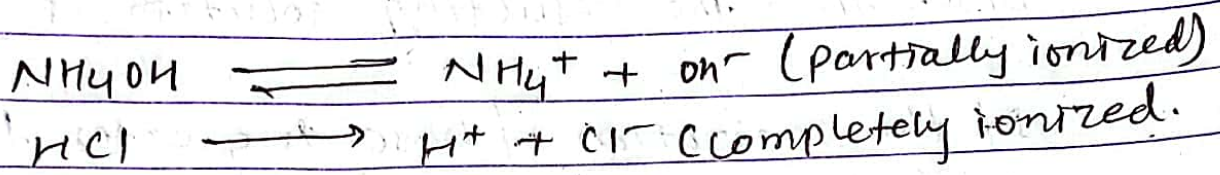
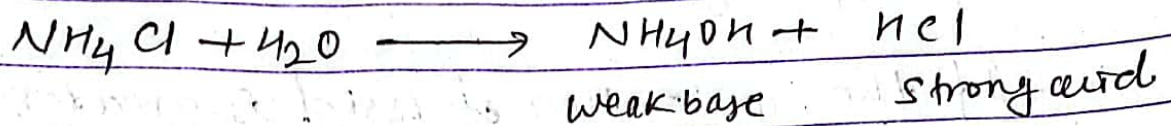
The hydrolysis of salt is classified as:
(four types).

17. Hydrolysis of salt of strong acid and weak base.

These type of salt like NH_4Cl , $LiSO_4$, $FeCl_3$, $Li(NO_3)_2$, $MgCl_2$, $ZnSO_4$ etc on hydrolysis gives strong acid and weak base. Strong acid get completely ionised but

weak base gets partially ionized. In this way, the concentration of H^+ ion in the resulting solution becomes greater than OH^- . Hence the resulting solution is acidic.

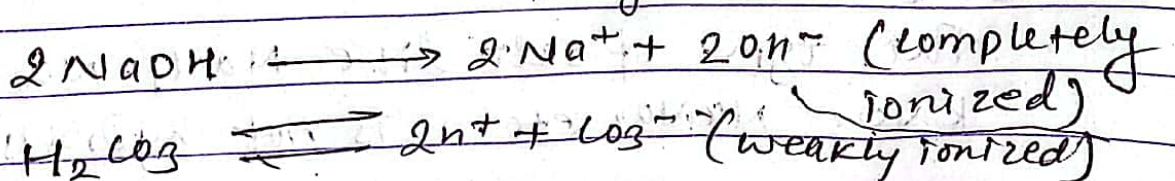
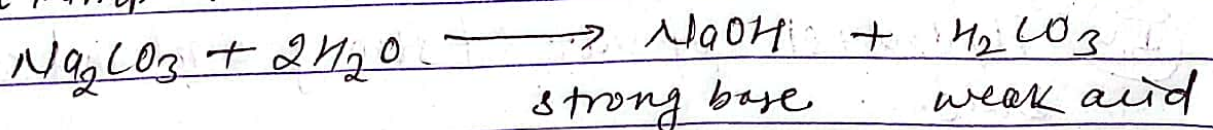
Example.



(ii) Hydrolysis of salt of weak acid and strong base.

This type of salt like Na_2CO_3 , $NaCN$, CH_3COONa , $HCOONa$, $NaHCO_3$, etc. on hydrolysis give weak acid and strong base. weak acid gets partially ionized but strong base gets completely ionized. In this way the concentration of OH^- ion in the resulting solution becomes greater than H^+ ion. Hence the resulting solution is basic.

Example:-



(iii) Hydrolysis of salt of weak acid and weak base:-

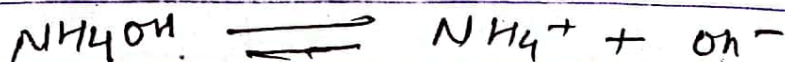
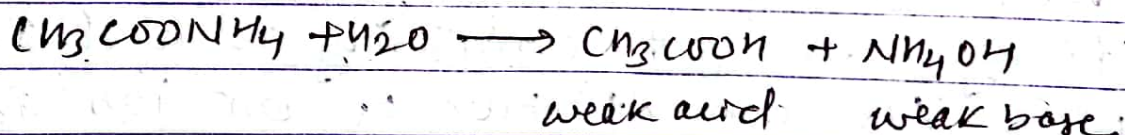
⇒ These type of salt like $(\text{NH}_4)_2\text{CO}_3$, $\text{CH}_3\text{COONH}_4$, $(\text{HCOO})_2\text{Ca}$, NH_4CN etc on hydrolysis give weak acid and weak base.

If the ionization of acid is greater than base, then the resulting solution is acidic.

If the ionization of base is greater than acid then the resulting solution is basic.

If the ionization of acid and base are same then the resulting solution is neutral.

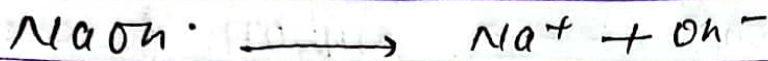
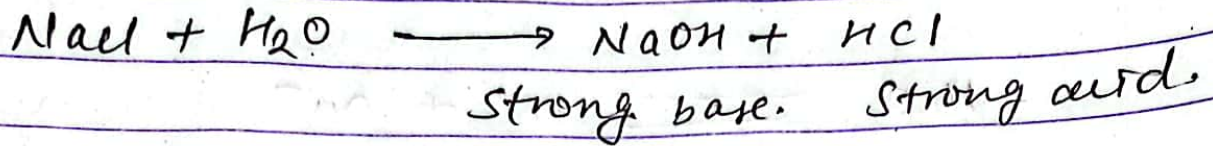
Example:-



(iv) Hydrolysis of salt of strong acid and strong base.

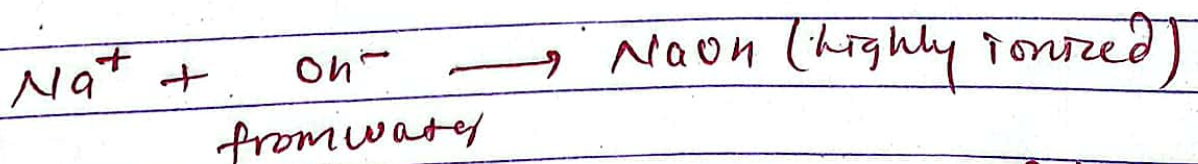
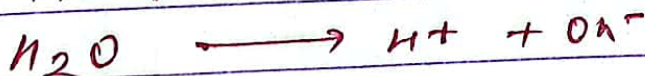
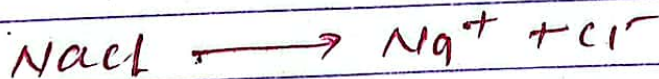
This type of salt like NaCl , Na_2SO_4 , KNO_3 , NaNO_3 etc. is not hydrolysed

because the resulting solution is neutral.
Example.



Salt hydrolysis is the reverse of neutralization reaction. During neutralization rxn, H^+ ion from acid combines with OH^- ion from base results in the formation of water molecule. But during salt hydrolysis, water molecule dissociates into H^+ and OH^- ion.

E.g.



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