

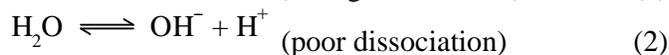
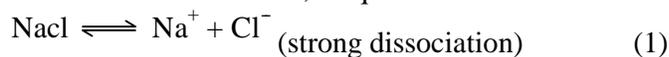
ACID BASE CONCEPTS: TITRATIONS

Q. 1. Write a note on salt hydrolysis

Ans. When salt are dissolved in water, the solution may not always be neutral. It may be acidic or basic, due to salt hydrolysis which means interaction between ion of a salt and ion of water. Salts are divided into 4 categories.

1. Salt of strong acids and strong bases. Eg NaCl , K₂SO₄ etc.

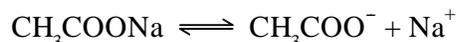
If NaCl is dissolved in water, 2 equilibrate exists



sodium ion do not have tendency to combine with OH⁻ to form NaOH & Cl⁻ do not combine with H⁺ to form HCl. This is because NaOH and HCl are strong electrolyte which are completely dissociated in solution. Therefore, ions of salt NaCl i.e. Na⁺ and Cl⁻ do not interfere with the equilibrium (2) and solution remain neutral with pH equal to 7; same that of H₂O . It is therefore concluded that salt of strong acids and strong bases are not hydrolyzed.

2. Salt of weak acids and strong bases: eg: CH₃COONa; salt of weak acid CH₃COOH and strong base NaOH.

Salt is completely dissociated. Therefore CH₃COONa will be completely dissociated in aqueous solution.



water being weak electrolyte will be poorly dissociated

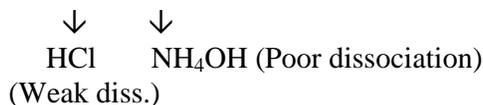
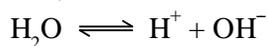
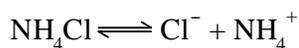


CH₃COO⁻ combine with H⁺ to form poorly dissociated CH₃COOH , hence water will further dissociate to give more H⁺ and OH⁻ . Since CH₃COOH, is a weak acid it will be slightly dissociated to give small concentration of H⁺.

On the other side, Na⁺ do not combine with OH⁻ as NaOH being strong base is completely dissociated and OH⁻ concentration will be much larger than H⁺ . The solution is therefore basic. Therefore, due to interaction between ions of CH₃COONa and H₂O weak acid and strong base is formed and therefore resulting solution is alkaline and salts is said to be hydrolyzed.

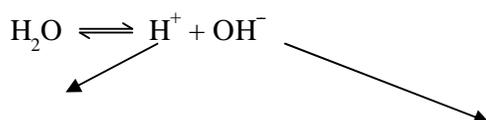
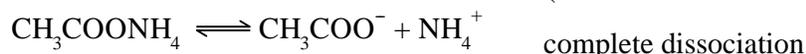
3. Salt of strong acid and weak base:

Eg: NH₄Cl salt of HCl and NH₄Cl



Therefore, it is shown that salt of strong acid and weak base when interacts with water will produce weak base so that its solution is acidic.

4. Salt of weak acid and weak based: CH₃COONH₄ (salt of CH₃COOH + NH₄OH)



weak acid poor dissociation

weak base poor dissociation

Whether salt solution is neutral, basic or acidic, it will depend upon the relative strengths of weak acid and weak base formed after hydrolysis.

If K_a and K_b are dissociation constants of weak acid and weak base then

if $K_a = K_b$ Neutral
 $K_a > K_b$ acidic, $K_b > K_a$ – Basic.