What is Salt Hydrolysis?

Worksheet

Salt hydrolysis is the reaction of salt ions with water molecules, producing H or OH. Salts of weak acids or bases hydrolyze, making solutions acidic or basic.

salt hydrolysis: cation + HO H + anion or anion + HO OH + cation

Questions

1. Which salt solution is acidic?

A) NaCl
B) NHCl
C) NaCO
D) NaOH

2. Hydrolysis constant Kh = Kw/Ka. Why divide?

A) Hydrolysis opposes dissociation
B) Sum of forward and reverse
C) Empirical rule
D) Water is a weak acid

3. Does NaCl hydrolyze?

A) Yes, Na attracts OH
B) Yes, Cl attracts H
C) No, both ions are too stable
D) Only at high temperature

4. Rank by pH (highest to lowest): NaA, NaCl, NHCl.

A) NaCl > NaA > NHCl
B) NaA > NaCl > NHCl
C) NHCl > NaA > NaCl
D) All equal

5. A 0.1 M solution of NaA (weak acid A). Ka = 110. Will it be acidic or basic?

6. In a solution of NHCl, which ion hydrolyzes? Is the solution acidic or basic?

7. NaCl dissolved in water. Explain pH.

8. Define: What is salt hydrolysis?

9. Define: Do salts of strong acids hydrolyze?

10. Define: Why does NaA solution turn basic?

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Answer Key

1. B) NHCl - NH hydrolyzes: NH + HO NH + HO produces H.

2. A) Hydrolysis opposes dissociation - Hydrolysis is the reverse of acid dissociation; Kh is inverse of Ka times Kw.

3. C) No, both ions are too stable - Cl is conjugate of strong HCl; Na is conjugate of strong NaOH-no hydrolysis.

4. B) NaA > NaCl > NHCl - NaA basic (anion hydrolyzes), NaCl neutral, NHCl acidic (cation hydrolyzes).

5. Kh = Kw/Ka = (110)/(110) = 110 A is a weak base, hydrolyzes: A + HO HA + OH The anion forms OH solution is basic (pH > 7).

6. NH is conjugate acid of weak base NH. NH + HO NH + HO Produces H solution is acidic (pH < 7).

7. Na does not hydrolyze (conjugate acid of strong base). Cl does not hydrolyze (conjugate base of strong acid). No hydrolysis occurs pH 7 (neutral).

8. The reaction of salt ions with water, producing H or OH ions.

9. No. Cl, NO, SO are too weak to attract protons.

10. The anion A (from weak acid HA) hydrolyzes: A + HO HA + OH.

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