

CHEMISTRY STUDY MATERIALS FOR CLASS 10

(NCERT Based notes of Chapter -02)

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ACIDS, BASES AND SALTS

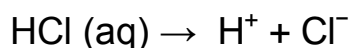
COMMON IN ACID AND BASE

Acids give hydrogen gas when they react with metal. This shows that all acids contain hydrogen. For example: Hydrochloric acid (HCl), sulphuric acid (H₂SO₄), nitric acid (HNO₃), etc.

When an acid is dissolved in water, it dissociates hydrogen. The dissociation of hydrogen ion in aqueous solution is the common property in all acids. Because of dissociation of hydrogen ion in aqueous solution, an acid shows acidic behavior.

Example:

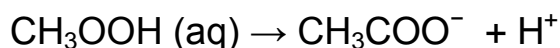
- Hydrochloric acid (HCl) gives hydrogen ion (H⁺) and chloride ion (Cl⁻) when it is dissolved in water.



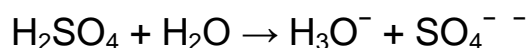
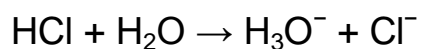
- Sulphuric acid (H₂SO₄) gives hydrogen ion (H⁺) and sulphate ion (SO₄²⁻) in water. H₂SO₄ (aq) → H⁺ + SO₄²⁻

- Nitric acid (HNO₃) gives hydrogen ion (H⁺) and nitrate ion (NO₃⁻) in water. HNO₃ (aq) → H⁺ + NO₃⁻

- Acetic acid (CH₃COOH) gives acetate ion (CH₃COO⁻) and hydrogen ion (H⁺).



- Hydrogen ion which is produced by acid (when acid is combined with water molecule), exists in the form of hydronium ion (H_3O^+) in aqueous solution. That's why hydrogen ion is always written with suffix (aq), such as H^+ (aq).



Thus, because of dissociation of hydrogen ions; acid shows its acidic behavior.

Acids conduct electricity in their aqueous solution because of dissociation of hydrogen ion. Hydrogen ion in aqueous solution conducts electricity.

A dry acid, such as dry hydrochloric acid does not change the colour of blue litmus paper to red because a dry acid does not dissociate hydrogen ion.

This is the cause that a moist litmus paper is used to check the acidic or basic character of a gas.

Acidic behavior of carbon dioxide gas:

Carbon dioxide gas produces carbonic acid when dissolved in water. This carbonic acid dissociates hydrogen ion and carbonate ion in the aqueous solution.



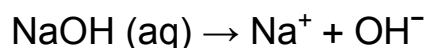
Are all compounds which contain hydrogen, necessarily acids?

No, all compounds which contain hydrogen are not acid. For example; glucose ($\text{C}_6\text{H}_{12}\text{O}_6$), methyl alcohol (CH_3OH), etc. are not acid in spite of the fact that they contain hydrogen. This is because these compounds do not dissociate hydrogen ion in their aqueous solution.

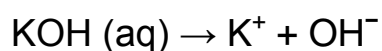
Common in all Bases:

A base dissociates hydroxide ion in water, which is responsible for the basic behavior of a compound. Example:

When sodium hydroxide is dissolved in water, it dissociates hydroxide ion and sodium ion.



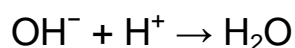
Similarly, when potassium hydroxide is dissolved in water, it dissociates hydroxide ion and potassium ion.



Thus, base shows its basic character because of dissociation of hydroxide ion.

NEUTRALISATION REACTION:

When an acid reacts with a base, the hydrogen ion of acid combines with the hydroxide ion of base and forms water. As these ions combine together and form water; instead of remaining free, thus both neutralize each other.



Example:

➤ When sodium hydroxide (a base) reacts with hydrochloric acid, sodium hydroxide breaks into sodium ion and hydroxide ion and hydrochloric acid breaks into hydrogen ion and chloride ion. Hydrogen ion and hydroxide ion combine together and form water, while sodium ion and chloride ion combine together and form sodium chloride.

