

CHAPTER - 5

SURFACE CHEMISTRY INTEXT SOLUTIONS

Question 5.1:

Write any two characteristics of Chemisorption.

Answer

1. Chemisorption is highly specific in nature. It occurs only if there is a possibility of chemical bonding between the adsorbent and the adsorbate.
2. Like physisorption, chemisorption also increases with an increase in the surface area of the adsorbent.

Question 5.2:

Why does physisorption decrease with the increase of temperature?

Answer

Physisorption is exothermic in nature. Therefore, in accordance with Le-Chatelieres's principle, it decreases with an increase in temperature. This means that physisorption occurs more readily at a lower temperature.

Question 5.3:

Why are powdered substances more effective adsorbents than their crystalline forms?

Answer

Powdered substances are more effective adsorbents than their crystalline forms because when a substance is powdered, its surface area increases and physisorption is directly proportional to the surface area of the adsorbent.

Question 5.4:

Why is it necessary to remove CO when ammonia is obtained by Haber's process?

Answer

It is important to remove CO in the synthesis of ammonia as CO adversely affects the activity of the iron catalyst, used in Haber's process.

Question 5.5:

Why is the ester hydrolysis slow in the beginning and becomes faster after sometime?

Answer

Ester hydrolysis can be represented as:



The acid produced in the reaction acts as a catalyst and makes the reaction faster. Substances that act as catalysts in the same reaction in which they are obtained as products are known as autocatalysts.

Question 5.6:

What is the role of desorption in the process of catalysis?

Answer

The role of desorption in the process of catalysis is to make the surface of the solid catalyst free for the fresh adsorption of the reactants on the surface.

Question 5.7:

What modification can you suggest in the Hardy-Schulze law?

Answer

Hardy-Schulze law states that 'the greater the valence of the flocculating ion added, the greater is its power to cause precipitation.'

This law takes into consideration only the charge carried by an ion, not its size. The smaller the size of an ion, the more will be its polarising power. Thus, Hardy-Schulze law can be modified in terms of the polarising power of the flocculating ion. Thus, the modified Hardy-Schulze law can be stated as 'the greater the polarising power of the flocculating ion added, the greater is its power to cause precipitation.'

Question 5.8:

Why is it essential to wash the precipitate with water before estimating it quantitatively?

Answer

When a substance gets precipitated, some ions that combine to form the precipitate get adsorbed on the surface of the precipitate. Therefore, it becomes important to wash the precipitate before estimating it quantitatively in order to remove these adsorbed ions or other such impurities.