

QB365 Question Bank Software Study Materials

Surface Chemistry Important 2 Marks Questions With Answers (Book Back and Creative)

12th Standard

Chemistry

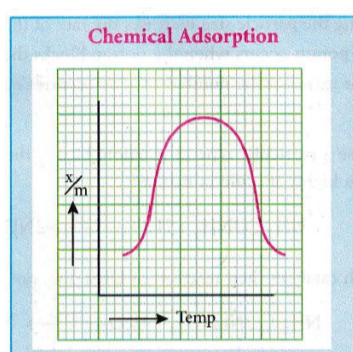
Total Marks : 40

2 Marks

20 x 2 = 40

- 1) In case of chemisorption, why adsorption first increases and then decreases with temperature?

Answer : In chemical adsorption, $\frac{x}{m}$ increases with rise in temperature and then decreases. The increase illustrates the requirement of activation of the surface for adsorption is due to fact that formation of activated complex requires certain energy. The decrease at high temperature is due to desorption, as the kinetic energy of the adsorbate increases.

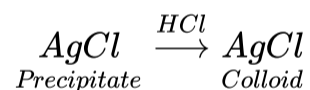


- 2) Heat of adsorption is greater for chemisorptions than physisorption. Why?

Answer : In Chemisorptions the molecules are held on the surface by attractive forces by formation of chemical bonds. As strong bond is formed nearly 400 kJ / mol is given out as heat of adsorption chemical bonds are much stronger, whereas the Vander Waal's forces in physisorption is weaker.

- 3) Peptising agent is added to convert precipitate into colloidal solution. Explain with an example.

Answer : By addition of suitable electrolytes precipitated particles can be brought into colloidal state. The process is termed as peptisation and the electrolyte added is called peptising or dispersing agent.



- 4) Why is desorption important for a substance to act as good catalyst?

Answer : (a) The product or the unreacted reactant has to be removed from the surface of the catalyst. Desorption helps this.
(b) It makes the catalyst free for the next reaction (ie) adsorption of new reactants.

- 5) Comment on the statement: Colloid is not a substance but it is a state of substance.

Answer : (i) A Colloid depends on the size of the particle. A Colloid is formed when the size of the particle lies between 1 nm and 100 nm. For example soap dissolves in water to form colloidal soap solution whereas it dissolves in alcohol to form a true solution. Thus change of state takes place. A colloidal state maybe an intermediate between a true solution and a suspension.

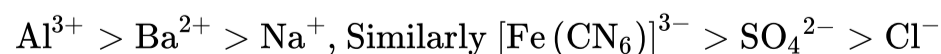
(ii) Also some crystalloids under certain conditions can be colloids. NaCl is a crystalloid in aqueous medium; but when mixed with benzene it acts as a colloid.

- 6) Explain any one method for coagulation.

Answer : Addition of electrolytes:

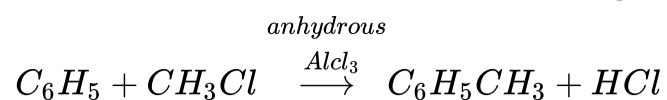
A negative ion causes the precipitation of positively charged sol and vice versa. When the valency of ion is high, the precipitation power is increased.

For example, the precipitation power of some cations and anions varies in the following order

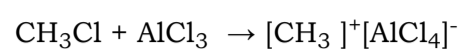


The precipitation power of electrolyte is determined by finding the minimum concentration (millimoles/lit) required to cause precipitation of a sol in 2 hours. This value is called flocculation value. The smaller the flocculation value greater will be precipitation.

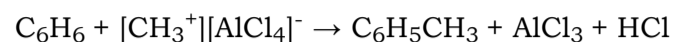
- 7) The mechanism of Friedel crafts reaction is given below



Answer : The action of catalyst is explained as follows



It is an intermediate.



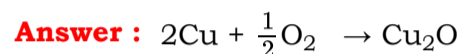
- 8) Thermal decomposition of $KClO_3$ in presence of MnO_2 proceeds as follows.
Steps in the reaction $2KClO_3 \rightarrow 2KCl + 3O_2$ can be given as



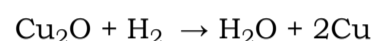
It is an intermediate



- 9) Formation of water due to the reaction of H_2 and O_2 in the presence of Cu proceeds as follows. Steps in the reaction $H_2 + 1/2O_2 \rightarrow H_2O$ can be given as

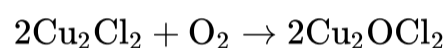


It is an intermediate.

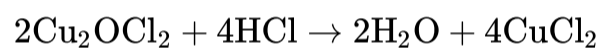


- 10) Oxidation of HCl by air in presence of $CuCl_2$ proceeds as follows

Answer : Steps in the reaction $4HCl + O_2 \rightarrow 2H_2O + 2Cl_2$ can be given as



It is an intermediate.



This theory describes

(i) the specificity of a catalyst and

(ii) the increase in the rate of the reaction with increase in the concentration of a catalyst.

- 11) What is collodion?

Answer : Collodion is a solution of nitrocellulose in a mixture of alcohol and water.

- 12) What causes Brownian movement in a colloid?

Answer : The colloidal sol particles are continuously bombarded with the molecules of the dispersion medium and hence they follow a zigzag, random, continuous movement.

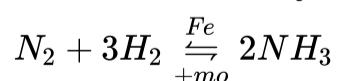
- 13) A solid catalyst is more effective in its finely divided form - Justify.

Answer : Finely divided form of a catalyst has greater surface area when compared to their crystalline form. Greater the surface area, greater the adsorption and higher the catalytic activity.

- 14) What are promoters? Give an example.

Answer : (i) A substance which, though itself not a catalyst, promotes the activity of a catalyst is called a promoter.

(ii) Eg: In the Haber's process for the synthesis of ammonia, traces of molybdenum increase the activity of finely divided iron which acts as a catalyst.



- 15) What are lyophilic colloids? Give examples.

Answer : (i) Colloidal solutions in which the dispersed phase has considerable affinity for the dispersion medium are called lyophilic (solvent loving) colloids.

(ii) Gelatin, protein and starch are examples of this type.

- 16) What are active centres?

Answer : The surface of a catalyst is not smooth. It bears steps, cracks and corners. Hence the atoms on such locations of the surface are co-ordinatively unsaturated. So, they have much residual force of attraction. Such sites are called active centres.

17) What is flocculation value?

Answer : The precipitation power of electrolyte is determined by finding the minimum concentration (millimoles/ lit) required to cause precipitation of a sol in 2 - hours. This value is called flocculation value. The smaller the flocculation value greater will be precipitation.

18) What do you meant by a) Sorption b) Occlusion?

Answer : a) Sorption: Simultaneous adsorption and absorption is called sorption
b) Occlusion: The sorption of gases on metal surfaces is called occlusion.

19) Account for Brownian movement.

Answer : The colloidal sol particles are continuously bombarded with the molecules of the dispersion medium and hence they follow a zigzag, random, continuous movement.

20) How is coagulation or precipitation can be brought about?

Answer : 1. Addition of electrolytes
2. Electrophoresis
3. Mixing oppositely charged sols
4. Boiling