

CHEMISTRY STUDY MATERIALS FOR CLASS 12

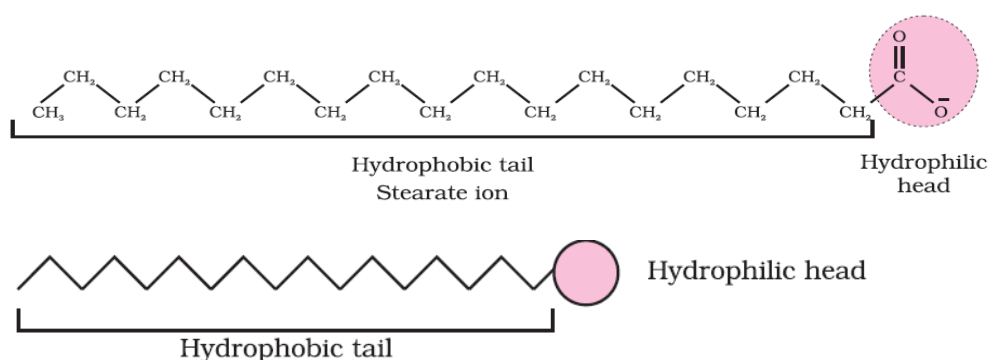
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DATE:- 26/05/2020

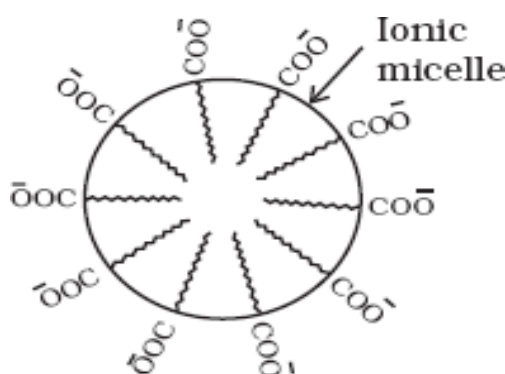
Surface Chemistry

Mechanism of micelle formation

An example for micelle is soap solution. Soap is sodium or potassium salt of a higher fatty acid and may be represented as $\text{RCOO}^- \text{Na}^+$. When dissolved in water, it dissociates into RCOO^- and Na^+ ions. The RCOO^- ions consist of two parts — a long hydrocarbon chain R (also called non-polar 'tail') which is hydrophobic (water repelling), and a polar group COO^- (also called polar-ionic 'head'), which is hydrophilic (water loving).



The RCOO^- ions are present on the surface with their COO^- groups in water and the hydrocarbon chains (R) at the surface. But at critical micelle concentration, the anions are pulled into the bulk of the solution and aggregate to form a spherical shape. Thus a micelle is formed.



Cleansing action of soaps

The cleansing action of soap is due to micelle formation. The soap molecules form micelle around the oil droplet in such a way that hydrophobic part is in the oil droplet and hydrophilic part projects out. Since the polar groups (hydrophilic end) can interact with water, the oil droplets are pulled in water and removed from the dirty surface. Thus soap helps in emulsification and washing away of oils and fats.

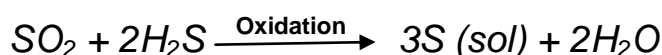
Preparation of colloids

Some of the methods used for the preparation of colloids are:

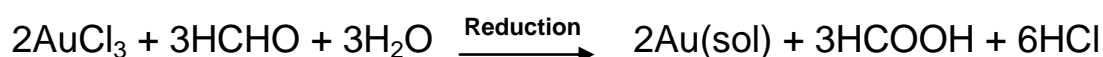
a) Chemical methods:

Colloidal solutions can be prepared by chemical reactions like oxidation, reduction, double decomposition, hydrolysis etc.

1. **Oxidation:** Sulphur sol can be prepared by passing H_2S gas through an aqueous solution of sulphur dioxide.



2. **Reduction:** Sols of metals like silver, gold and platinum are obtained by the reduction of their salts with reducing agents like formaldehyde, stannous chloride etc.



3. **Hydrolysis:** Ferric hydroxide sol is obtained when concentrated solution of ferric chloride is added drop-wise to hot water.



4. **Double decomposition:** A colloidal solution of arsenic sulphide is formed by passing H_2S through a dilute solution of arsenious oxide in water.



b) Electrical disintegration (Bredig's arc method):

This method is used for the preparation of metal sols like Ag, Au, Pt etc. The metal whose sol is to be prepared is taken in the form of two rods and it is kept in suitable dispersion medium containing small amount of electrolyte. The whole arrangement is kept in an ice bath. When high voltage is passed through the metal, the intense heat produced vaporizes the metal, which then condensed to form particles of colloidal dimension.

