

## Surface chemistry notes

1. The colloidal solutions are intermediate between true solutions and suspensions. The diameter of colloidal particles varies from 1 to 1000 nm.
2. A colloidal system is a heterogeneous system which consists of disperse phase and dispersion medium.
3. The **disperse phase** – component that exists in small amount and behave like solute in a solution. Dispersed phase constitutes the colloidal particles. The **dispersion medium** is the component usually present in excess and functions like solvent in a solution. It constitutes the medium in which the colloidal particles are dispersed.
4. There are eight types of colloidal systems based on the disperse phase and the dispersion medium.
5. Sols are the colloidal system in which the solid is disperse phase and the liquid is dispersion medium.
6. **Hydrosols**-Colloids in water.
7. **Lyophilic colloids** (solvent loving) are those substances that directly pass into the colloidal state when brought in contact with the solvent, e.g., proteins, starch, rubber, etc. These sols are quite stable because of the strong attractive forces between the particles and the dispersion medium.
8. **Lyophilic sols** are readily prepared by warming the substance with a dispersion medium, e.g., starch, gelatin, gum Arabic, etc., are easily brought into the colloidal state by warming with water.
9. **Lyophobic colloids** (solvent hating) are those substances that do not form the colloidal sol readily when mixed with the dispersion medium. These sols are less stable than the lyophilic sols.
10. The process of separating a soluble crystalloid from a colloid is called dialysis.
11. The colloids are also classified as multimolecular, macro-molecular and associated colloids.
12. **Lyophobic sols can be prepared by the following methods:**
  - (a) Chemical methods:**
    - (i) Oxidation,
    - (ii) Reduction,
    - (iii) Hydrolysis ,
    - (iv) Double decomposition,
  - (b) Physical methods:**
    - (i) Exchange of solvent
    - (ii) Excessive cooling: A colloidal sol of ice in an organic solvent ( $\text{CHCl}_3$  or ether) can be obtained by freezing a solution of water in the solvent.
  - (c) Dispersion methods:**
    - (i) Mechanical dispersion
    - (ii) Bredig's arc method
    - (iii) Peptization method

13. **Emulsions:** It is a colloidal system in which both the dispersed phase and the dispersion medium are liquids, e.g., milk consists of small drops of liquid fat dispersed in water. **Emulsification** is the process of making an emulsion

14. **Types of Emulsions**

- (a) Oil-in-water type in which small droplets of an oil are dispersed in water, e.g., milk, cod- liver oil, etc.
- (b) Water-in-oil type in which water droplets are dispersed in an oil medium, e.g., butter.