CHARACTERISTICS OF LYOPHILIC AND LYOPHOBIC SOLS

Some features of lyophilic and lyophobic sols are listed below.

(1) Ease of preparation

Lyophilic sols can be obtained straightaway by mixing the material (starch, protein) with a suitable solvent. The giant molecules of the material are of colloidal size and these at once pass into the colloidal form on account of interaction with the solvent.

Lyophobic sols are not obtained by simply mixing the solid material with the solvent.

(2) Charge on particles

Particles of a hydrophilic sol may have little or no charge at all.

Particles of a hydrophobic sol carry positive or negative charge which gives them stability.

(3) Solvation

Hydrophilic sol particles are generally solvated. That is, they are surrounded by an adsorbed layer of the dispersion medium which does not permit them to come together and coagulate. Hydration of gelatin is an example.

There is no solvation of the hydrophobic sol particles for want of interaction with the medium.

(4) Viscosity

Lyophilic sols are viscous as the particle size increases due to solvation, and the proportion of free medium decreases. Warm solutions of the dispersed phase on cooling set to a gel *e.g.*, preparation of *table jelly*.

Viscosity of hydrophobic sol is almost the same as of the dispersion medium itself.

(5) Precipitation

Lyophilic sols are precipitated (or coagulated) only by high concentration of the electrolytes when the sol particles are dissolved.

Lyophobic sols are precipitated even by low concentration of electrolytes, the protective layer being absent.

(6) Reversibility

The dispersed phase of lyophilic sols when separated by coagulation or by evaporation of the medium, can be reconverted into the colloidal form just on mixing with the dispersion medium. Therefore this type of sols are designated as **Reversible sols.**

On the other hand, the lyophobic sols once precipitated cannot be reformed merely by mixing with dispersion medium. These are, therefore, called **Irreversible sols.**

(7) Tyndall effect

On account of relatively small particle size, lyophilic sols do not scatter light and show no Tyndall effect. Lyophobic sol particles are large enough to exhibit tyndall effect.

(8) Migration in electronic field

Lyophilic sol particles (proteins) migrate to anode or cathode, or not at all, when placed in electric field.

Lyophobic sol particles move either to anode or cathode, according as they carry negative or positive charge.

COMPARISON OF LYOPHILIC AND LYOPHOBIC SOLS

Lyophilic Sols	Lyophobic Sols
1. Prepared by direct mixing with dispersion medium.	1. Not prepared by direct mixing with the medium.
2. Little or no charge on particles.	2. Particles carry positive or negative charge.
3. Particles generally solvated.	3. No solvation of particles.
4. Viscosity higher than dispersion medium; set to a gel.	4. Viscosity almost the same as of medium; do not set to a gel.
5. Precipitated by high concentration of electrolytes.	5. Precipitated by low concentration of electrolytes.
6. Reversible.	6. Irrerversible.
7. Do not exhibit Tyndall effect.	7. Exhibit Tyndall effect.
8. Particles migrate to anode or cathode, or not at all.	8. Particles migrate to either anode or cathode.