

A colloid is not a substance, but it depicts a particular state of a substance that depends upon the size of its particles. The size of a particle in a colloidal system is between 1-100 nm. A colloidal system is a two phase heterogeneous system in which one phase is called the dispersed phase and the other is called the dispersion medium.

Dispersed phase: It is the component present in a small proportion.

Dispersion medium: It is the component present in excess.

For example, in a colloidal solution of silver in water, silver is the dispersed phase and water is the dispersion medium.

How do we classify colloids?

Based on the physical state of the dispersed phase and dispersion medium, colloids can be classified into different types.

One important class of colloidal system is sols. In sols, the dispersed phase is solid and dispersion medium is liquid.

Depending upon the nature of the interaction between the dispersed phase and dispersion medium sols can be classified into two types.

1. Lyophilic sols
2. Lyophobic sols

What are Lyophilic Sols?

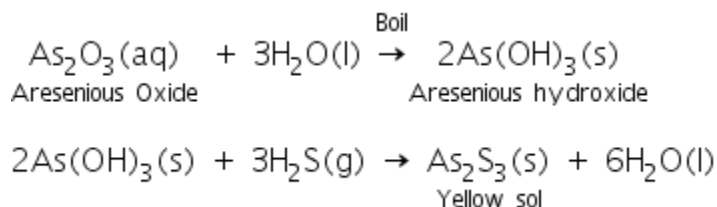
The word meaning of lyophilic means 'liquid-loving' or 'solvent-attracting'. This means that in this colloidal solution there is a strong attraction between the dispersed phase and dispersion medium, i.e., the dispersed phase has great affinity for the dispersion medium that results in the extensive solvation of the colloidal particles. In such solids, the dispersed phase does not easily precipitate and the sols are quite stable. These sols are reversible in nature. The dispersed phase obtained by the evaporation can be easily converted to the sol state by simply agitating it with the dispersion medium. Additional stabilisers are not required during their preparation. If water is used as the dispersion medium, lyophilic sols are called hydrophilic sols. Starch, gum, gelatin, egg albumin etc. are examples of lyophilic sols.

- **Starch Sol**

Starch forms lyophilic sol when water is used as the dispersion medium. The formation of sol is accelerated by heating. Starch sol can be prepared by heating it and water at 100 °C. It is quite stable and is not affected by the presence of any electrolytic impurity.

- **Gum Sol**

It is a lyophobic sol obtained by the hydrolysis of arsenious oxide with boiling distilled water, followed by passing H₂S gas through it.



Comparison between Lyophilic and Lyophobic sols

Lyophilic Sol	Lyophobic Sol
Relatively stable as strong force of interaction exists between dispersed phase and dispersion medium	Less stable as weak force of interaction exists between dispersed phase and dispersion medium.
Can be prepared directly by mixing dispersed phase with dispersion medium.	Cannot be prepared directly by mixing dispersed phase and dispersion medium.
No need of stabilisers during preparation.	Additional stabilisers are required during preparation.
They are reversible in nature.	They are irreversible in nature.
These are usually formed by organic substances like starch, gum, proteins etc.	These are usually formed by inorganic materials like metals and their oxides, sulphides etc.
They are highly viscous and have higher viscosity than that of the medium.	They have nearly the same viscosity as that of the medium.
They are highly hydrated.	They are not much hydrated.
Particles cannot be detected even under an ultramicroscope.	Particles can be detected under an ultramicroscope.
Charge on the lyophilic sol can be positive, negative or neutral.	Charge on the lyophobic sol can be positive or negative. As ₂ S ₃ sol is -ve and Fe(OH) ₃ sol is +ve in nature.
Depending on the charge, their particles migrate to either direction of an electric field.	Depending on the charge, their particles migrate only in one direction of an electric field.
Surface tension is usually lower than that of the dispersion medium.	Surface tension is nearly the same as that of the dispersion medium.