

MIXTURES

OVERVIEW OF MIXTURES

SOLUTION

COLLOID

SUSPENSION

COLLOIDS

A colloid is a homogeneous mixture in which particles of one substance are dispersed (spread out evenly) throughout another substance.

I. COMPONENTS OF COLLOIDAL DISPERSION

A. COLLOIDAL PARTICLES:

1. Colloidal particles are the particles that are dispersed throughout another substance or mixture.
2. Colloidal particles are referred to collectively as the dispersed phase.
3. Characteristics of colloid particles
 - a. Each particle is a small cluster of atoms or ions or a single large molecule (macromolecule).
 - b. Particle size : 1 - 100 nm in diameter
 - c. Particles are insoluble in dispersing medium.

B. DISPERSING MEDIUM

1. The dispersing medium is a substance or a solution in which the colloidal particles are dispersed.
2. The dispersing medium is also referred to as the continuous phase.

C. Colloids have special names which depend on the states of matter of the dispersed and continuous phases.

DISPERSED PHASE	CONTINUOUS PHASE		
	SOLID	LIQUID	GAS
SOLID	solid sol	sol, gel	solid aerosol
LIQUID	solid emulsion, gel	emulsion	liquid aerosol
GAS	solid foam	foam	

II. PROPERTIES OF COLLOIDS

- | | |
|---------------------------------|---------------------|
| A. TYNDALL EFFECT | D. DIALYSIS |
| B. BROWNIAN MOVEMENT | E. RATE OF SETTLING |
| C. FILTRATION & GEL PENETRATION | F. ADSORPTION |

III. FORMATION OF COLLOIDAL SYSTEMS

A. DISPERSION METHOD

Dispersion: Large pieces of a substance are broken down into particles of colloidal size.

B. CONDENSATION METHOD

Condensation: atoms, ions or small molecules are made to cluster together to form particles of colloidal size.

IV. LIQUID COLLOIDAL SYSTEMS (colloids in which dispersing medium is a liquid)

A. LYOPHILIC COLLOID

1. Lyophilic colloid is one in which the colloidal particles are more attracted to the particles of the dispersing medium than they are to each other.
2. Hydrophilic colloid is a lyophilic colloid in which the dispersing medium is water.

B. LYOPHOBIC COLLOID

1. Lyophobic colloid is one in which the colloidal particles are more attracted to each other than to the particles of the dispersing medium.
2. Hydrophobic colloid is a lyophobic colloid in which the dispersing medium is water.

V. HYDROPHILIC COLLOIDAL DISPERSIONS

A. COLLOIDAL DISPERSION OF MACROMOLECULES

1. In this type of colloid, each colloidal particle is a single large macromolecule.
2. Examples of dispersions of macromolecules:

B. ASSOCIATION COLLOIDS (MICELLES)

1. In this type of colloid, each colloidal particle is made of several molecules (all are alike). These molecules are amphipathic - that is - one end of the molecule is hydrophilic (attracted to water) and the other end is hydrophobic (repelled by water).
2. Examples of Association Colloids

VI. HYDROPHOBIC COLLOIDAL DISPERSIONS

Hydrophobic colloidal dispersions are inherently unstable; the colloidal particles will not remain of colloidal size without being stabilized.

A. STABILIZATION OF HYDROPHOBIC COLLOIDS

1. Stabilization by Adsorption of Ions
2. Stabilization by Protective Colloid
3. Stabilization by Powder

B. METHODS OF COAGULATION OF HYDROPHOBIC COLLOIDS

1. Heating
2. Adding an electrolyte
3. Mixing two colloidal dispersions whose particles are oppositely charged
4. Applying an electrical current