Zaporizhzhya State Medical University

Analytical Chemistry Department

COLLOIDAL SOLUTIONS

COARSELY DISPERSED SYSTEMS

Lecturer: Monaykina Yulia Vitalievna

2016

Disperse system is a system consisting of two or more phases.

One of them which mass prevails is named a disperse medium.

The other phase (or few phases) being in it in dispersed state in a form of fine particles is named a disperse phase.

Classification of disperse systems

1. According to a disperse phase dispersion degree :

1) coarsely dispersed (particle diameter is more than 10^{-7} m),
2) fine-grained (particle diameter is 10^{-7} - 10^{-9} m)
3) molecular dispersed (particle diameter is less than 10^{-9} m).

Classification of disperse systems

2. <u>According to the aggregate state of the disperse phase and the disperse medium</u> the disperse systems are classified into 8 types.

S/L/, L/L, G/L, S/S, L/S, G/S, S/G, L/G

<u>3. According to the interphase interaction</u>:

1)lyophobic

2)lyophilic

Methods of colloidal solutions preparation

1. **Dispergation methods** (breaking up larger particles to the colloid dispersion degree)

2. **Condensation methods** (association of atoms, molecules or ions to form colloidal particles).

Colloidal solutions purification methods

- Dialysis
- Electrodialysis
- Ultrafiltration

Structure of colloidal particles

Each sol consists of micelles and intermicellar liquid.

Micelle *is an electrically neutral particle of a disperse phase with the double electrical layer surrounding it.*

The main parts of a micelle structure :

nucleus

adsorbed layer

diffuse layer

The process of settling of disperse phase particles under the action of forces of different nature (gravitational, centrifugal, electrical) is called *sedimentation*.

The process of colloidal particles combining into larger aggregates due to loss of aggregation stability is called coagulation

Coarsely dispersed systems

Aerosols are disperse systems with a gas disperse medium and a liquid or solid disperse phase (mists, smokes or dusts, smogs).

Powders are coarsely dispersed systems with a solid disperse phase and a gaseous disperse medium. The disperse phase particles diameter is 10^{-8}-10^{-4} m.

Suspensions are coarsely dispersed systems with a solid disperse phase and a liquid dispersion medium.

Coarsely dispersed systems

Pastes are coarsely dispersed systems with high concentration of a solid disperse phase in a liquid disperse medium. Mass fraction of the disperse phase is 25-75%.

Emulsions are micro-heterogeneous systems consisting of two liquids which do not mix with each other because of different polarity.

Coalescence is a phenomena of adhesion of a disperse phase drops.

The formation of aggregates of a few drops which do not merge but exist individually is called **flocculation.**