Properties of colloidal solution

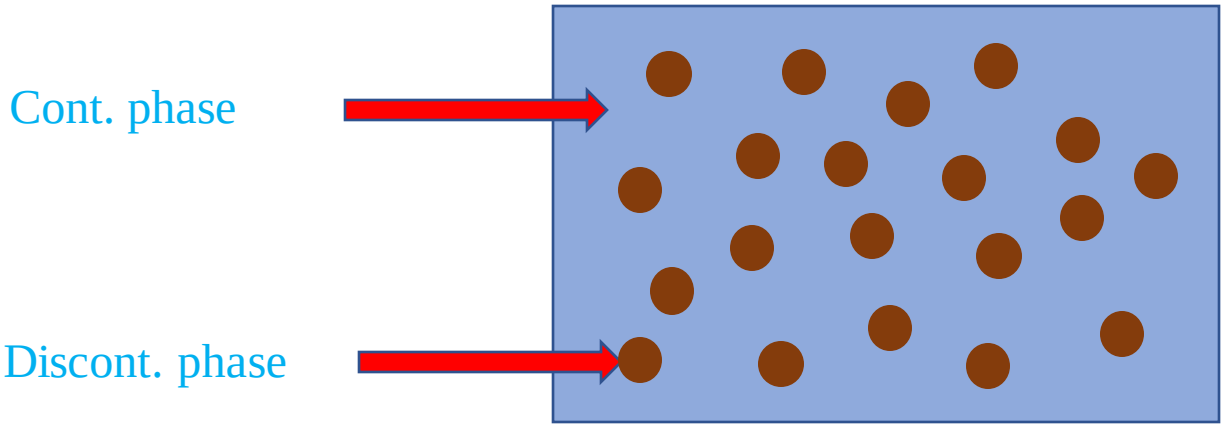
Lab-2

PHASES OF COLLOIDS SOLUTION

Colloidal solution has two phases:

1. Discontinuous phase (dispersed phase) : It is the substance present in small proportion and consists of particles of colloids size (1 to 100 nm).

2. Continuous phase (dispersion medium) : It is the medium in which the colloids particles are dispersed. For example, in a colloidal solution of sulphur in water, sulphur particles constitute the dispersed phase and water is the dispersion medium.



Properties of colloidal solution

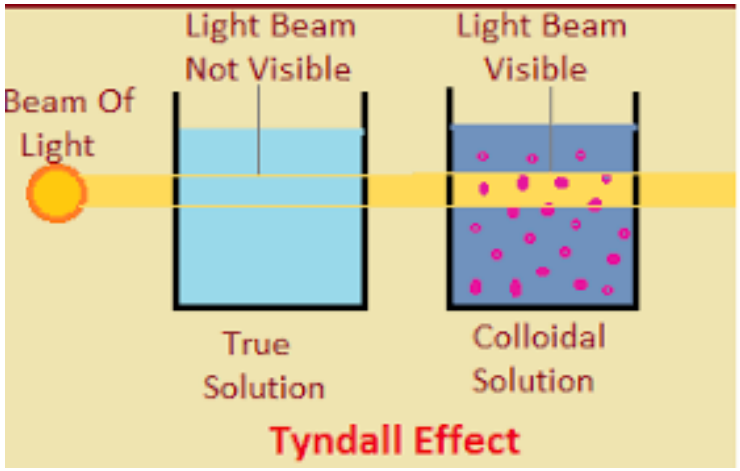
- Since particles are solid, they can scatter light
- Like light in the mist (fog) or in the dust

- This is called Tyndall Effect

Tyndall Effect : Tyndall in 1869, observed that if a strong beam of light is passed through a colloidal solution then the path of light is illuminated. This phenomenon is called Tyndall Effect. This phenomenon is due to scattering of light by colloidal particles. The same effect is noticed when a beam of light enters a dark room through a slit and becomes visible. This happens due to the scattering of light by particles of dust in the air.

Tyndall Effect

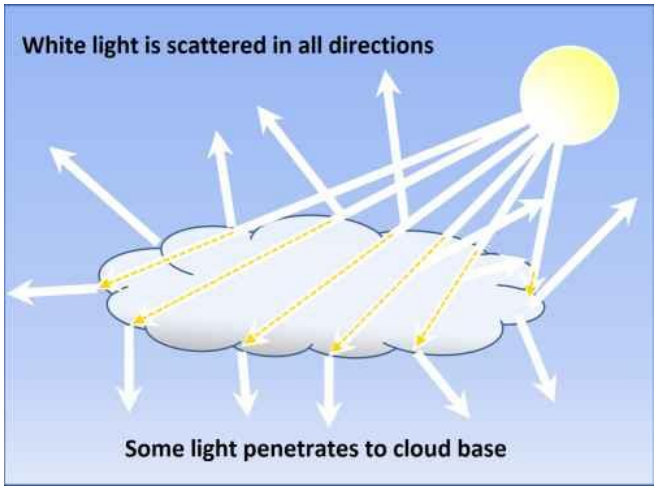
- Scattering of light by particles in a colloid or extremely fine solution.



- Particles must have one or more of its dimensions (length, width, or thickness) in the approximate range of 1-1000 nm, which is close the wave length of light.

Question?

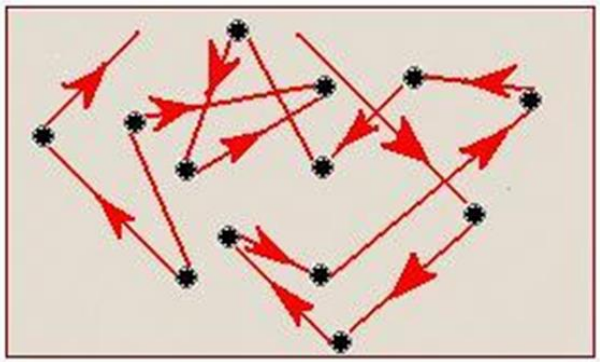
- What is this?



Brownian movement : It is also termed as **Brownian motion** and is named after its discoverer Robert Brown (a Botanist.)

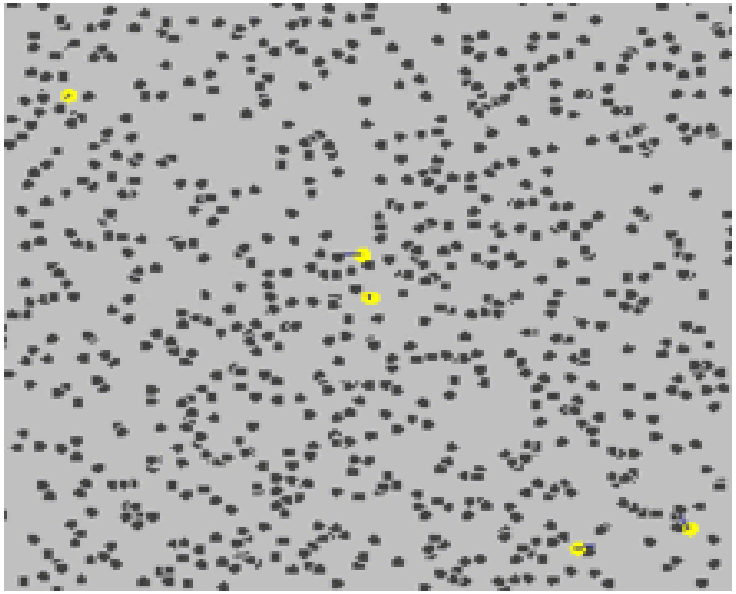
• Brownian Motion is the zig-zag movement of colloidal particles in continuous and random manner.

• Brownian motion arises because of the impact of the molecules of the dispersion medium on the particles of dispersed phase. The forces are unequal in different directions. Hence it causes the particles to move in a zig-zag way.



Brownian motion

- Factors affecting Brownian motion
  - Temperature
  - Viscosity
  - Number of particles
  - Size of the particles



Applications of Colloids

• **Foods**: Many of our foods are colloidal in nature, milk, salad dressing, jellies, ice cream and bread .

• **Medicines**: Colloidal medicines are more effective and are easily absorbed in our system.
Ex: cod-liver , many ointments , Antibiotics
such as penicillin and streptomycin are produced in colloidal form suitable for injections.

• **Electrical precipitation of smoke:** The smoke coming from industrial is a colloidal dispersion of solid particles in air. It is a pollutes the atmosphere. Therefore, before allowing the smoke to escape into air, it is treated by Precipitator.

• **Artificial Kidney machine**: Now-a-days, the patient's blood can be cleansed by shunting it into an artificial kidney machine. Here the impure blood is made to pass through a series of cellophane tubes surrounded by a washing solution in water. The toxic waste chemicals (urea, uric acid) diffuse across the tube walls into the washing solution. The purified blood is returned to the patient. The use of artificial kidney machine saves the life of thousands of persons each year.

• **Blue colour of the sky:** The upper atmosphere contains colloidal dust . As the sun rays enter the atmosphere these strike the colloidal particles. The particles absorb sunlight and scatter light of blue colour .

Experiment

- Exp : Tyndall phenomena

- Prepare starch or gelatin solution and put it in a glass beaker (colloidal solution) and put the beaker in dark field or case from carton.
- Illuminate one side of the case by strong light beam.
- Prepare salt solution and put it in a glass beaker (true solution), and put the beaker in dark field or case from carton.
- Make comparative between colloidal solution and true solution with explanation.