

Purification of colloidal solution.

The colloidal solutions prepared by the above methods usually contain impurities especially electrolytes which can destabilize the sols. These impurities must be eliminated to make the colloidal solutions stable. The following methods are commonly used for the purification of colloidal solutions.

(1) Dialysis

(i) The process of separating the particles of colloid from those of crystalloid, by means of diffusion through a suitable membrane is called dialysis.

(ii) Its principle is based upon the fact that colloidal particles cannot pass through a parchment or cellophane membrane while the ions of the electrolyte can pass through it.

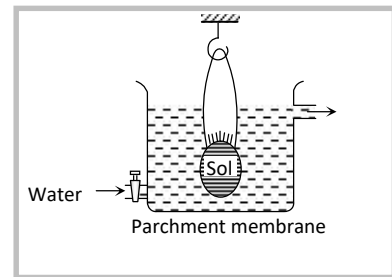
(iii) The colloidal solution is taken in a bag (parchment paper).

(iv) The bag is suspended in fresh water.

(v) The impurities slowly diffused out of the bag leaving behind pure colloidal solution

(vi) The distilled water is changed frequently to avoid accumulation of the crystalloids otherwise they may start diffusing back into the bag.

(vii) Dialysis can be used for removing HCl from the ferric hydroxide sol.



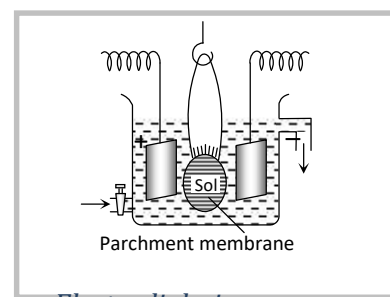
(2) Electrodialysis

(i) The ordinary process of dialysis is slow.

(ii) To increase the process of purification, the dialysis is carried out by applying electric field. This process is called **electrodialysis**.

(iii) Kidneys in the human body act as dialyzers to purify blood which is colloidal in nature.

(iv) The important application of dialysis process in the artificial kidney machine used for the purification of blood of the patients whose kidneys have failed to work. The artificial kidney machine works on the principle of **dialysis**.



Electrodialysis

(3) Ultra – filtration

(i) Sol particles directly pass through ordinary filter paper because their pores are larger (more than 1μ or $1000m\mu$) than the size of sol particles (less than $200m\mu$).

(ii) If the pores of the ordinary filter paper are made smaller by soaking the filter paper in a solution of gelatin or colloidion and subsequently hardened by soaking in formaldehyde, the treated filter paper may retain colloidal particles and allow the true solution particles to escape. Such filter paper is known as **ultra - filter** and the process of separating colloids by using ultra – filters is known as **ultra – filtration**.

(4) **Ultra – centrifugation**

(i) The sol particles are prevented from setting out under the action of gravity by kinetic impacts of the molecules of the medium.

(ii) The setting force can be enhanced by using high speed centrifugal machines having 15,000 or more revolutions per minute. Such machines are known as **ultra-centrifuges**.