

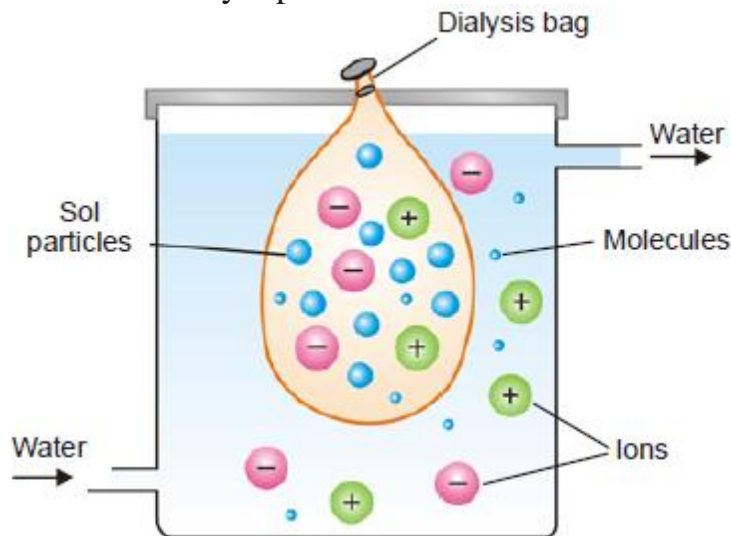
## PURIFICATION OF SOLS

In the methods of preparation stated above, the resulting sol frequently contains besides colloidal particles appreciable amounts of electrolytes. To obtain the pure sol, these electrolytes have to be removed. This purification of sols can be accomplished by three methods :

- (a) Dialysis
- (b) Electrodialysis
- (c) Ultrafiltration

### Dialysis

Animal membranes (bladder) or those made of parchment paper and cellophane sheet, have very fine pores. These pores permit ions (or small molecules) to pass through but not the large colloidal particles. When a sol containing dissolved ions (electrolyte) or molecules is placed in a bag of permeable membrane dipping in pure water, the ions diffuse through the membrane. By using a continuous flow of fresh water, the concentration of the electrolyte outside the membrane tends to be zero. Thus diffusion of the ions into pure water remains brisk all the time. In this way, practically all the electrolyte present in the sol can be removed easily.



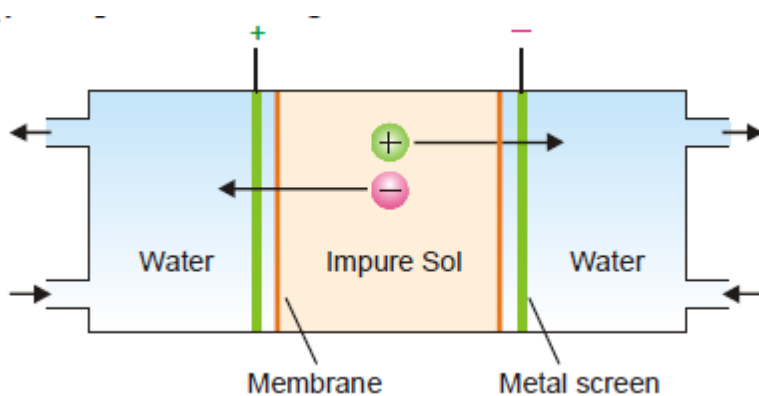
**Fig:Dialysis of a sol containing ions and molecules.**

**The process of removing ions (or molecules) from a sol by diffusion through a permeable membrane is called Dialysis. The apparatus used for dialysis is called a Dialyser.**

**Example.** A ferric hydroxide sol (red) made by the hydrolysis of ferric chloride will be mixed with some hydrochloric acid. If the impure sol is placed in the dialysis bag for some time, the outside water will give a white precipitate with silver nitrate. After a pretty long time, it will be found that almost the whole of hydrochloric acid has been removed and the pure red sol is left in the dialyser bag.

### **Electrodialysis:**

In this process, dialysis is carried under the influence of electric field (Fig. 22.8). Potential is applied between the metal screens supporting the membranes. This speeds up the migration of ions to the opposite electrode. Hence dialysis is greatly accelerated. Evidently **electrodialysis is not meant for nonelectrolyte impurities** like sugar and urea.



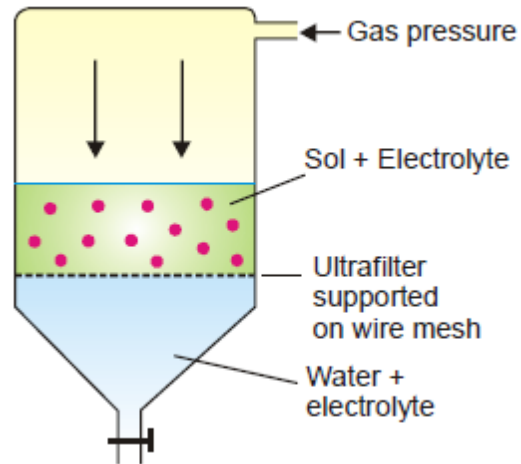
**Fig:Electrodialysis.**

### **Ultrafiltration**

Sols pass through an ordinary filter paper, Its pores are too large to retain the colloidal particles. However, if the filter paper is impregnated with collodion or a regenerated cellulose such as *cellophane* or *visking*, the pore size is much reduced. Such a modified filter paper is called an **ultrafilter**.

**The separation of the sol particles from the liquid medium and electrolytes by filtration through an ultrafilter is called ultrafiltration.**

Ultrafiltration is a slow process. Gas pressure (or suction) has to be applied to speed it up. The colloidal particles are left on the ultrafilter in the form of slime. The slime may be stirred into fresh medium to get back the pure sol. By using graded ultrafilters, the technique of ultrafiltration can be employed to separate sol particles of different sizes.



**Fig: Ultrafiltration**