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Review

A Review on Electrochemical Parameters of Ion Exchange Composite Membrane and their Permeable Characteristic

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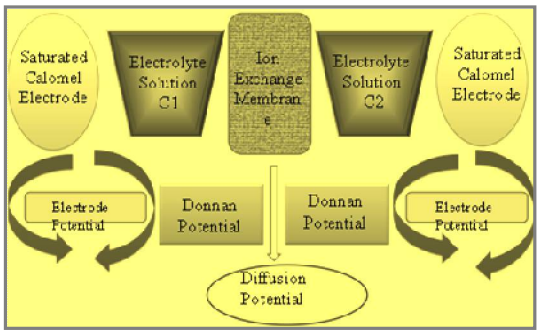
ABSTRACT

The electrochemical properties of composite membranes, particularly ion exchange membranes which are characterized by the presence of some functional groups that differ in both chemical structure as well as properties. So the membrane with modified surface and ion-exchange characteristic consist from cationic or anionic layers of different nature as well as bipolar modification. The major distinction of such membrane is the anisotropy of their structure and physicochemical properties due their charge characteristics. The diffusion flow of salt through them and forming diffusion potential differ from one another depending on the orientation of layers relative to the diffusion flow direction. When the membrane simultaneously is under effect of the both gradients of concentration and electric fields, the value of electric current passing through a membrane also depends on a disposition of membrane layers. These phenomena, which are typical for these membranes, make asymmetric transport properties. Due to the unequal concentration of electrolyte solutions separated by an ion exchange membrane with the fixed charge groups arises potential difference at the constant temperature and pressure. At the interface between membrane and electrolyte solutions, the Donnan potential occurs due to the transfer of ions. Donnan potential appears as a result of Donnan equilibrium, which refers to the distribution of ionic species between two ionic solutions separated by the permeable membrane. There are various methods, but particularly Teorell, Meyer and Sievers (TMS) method has been mostly used to determine the electrochemical parameters like transport number, mobility ratio, surface charge density etc of the membrane.

Graphical Abstract



Electrochemical setup used for ionic potential measurement.

Keywords: Polymeric-Inorganic composite, Electrochemical Parameters, Permeable Characteristic, Donnan potential, Teorell-Meyer and Sievers (TMS) method.