



Increasing selectivity of a heterogeneous ion-exchange membrane

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ABSTRACT

Selectivity, permselectivity, and conductivity are the main ion-exchange membrane parameters. While permselectivity determines how well the membrane separates cations from anions, the selectivity determines how well the membrane transports uni- and multi-valent ions. On the other hand, conductivity determines how fast the ions are transported through the membrane. All these parameters depend on many other factors, especially on the membrane structure. It is difficult to develop highly selective (permselective) and highly conductive heterogeneous ion-exchange membranes. Reason for this is porosity: while the conductivity increases with increasing porosity, the selectivity and permselectivity decreases. This work was focused on increasing the selectivity and, at the same time, the conductivity of heterogeneous ion-exchange membranes. It was found that most of the techniques of modification of homogeneous membranes cannot be used with modification heterogeneous ion-exchange membranes. It appears that the choice of a polymer matrix is a key factor in the preparation of heterogeneous ion-exchange membranes with high selectivity to monovalent ions and also high permselectivity while maintaining the same, even a higher conductivity.

Keywords: Ion-exchange membrane; Selectivity; Permselectivity; Conductivity

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