Irreversible thermodynamics of transport across charged membranes. Part V. Isothermal transport through anion-exchange membranes and macroscopic resistance coefficients

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Abstract: Membrane properties: swelling, Donnan sorption, conductivity, transport numbers; and isothermal transports: diffusional, pressure driven, osmotic and electro-osmotic of the acid (HCl) and salt (NaCl) across two anion-exchange membranes Neosepta AM-1 and AFN-7 (Tokuyama Corp. Japan) are presented and discussed. Experiments have been performed aimed at the detailed analysis of transport phenomena applying irreversible thermodynamics. In this paper the ion-ion, ion-water and ion-polymer network interactions are discussed in terms of the molar straight, r(ii), and cross, r(ik), resistance coefficients, The effect of strong cation-anion and co-ion-membrane interactions have been discussed from the point of view of the composition and state of internal liquid phase. The results point out again that the permselectivity of operating membranes depends not only on the properties of the networks but not less on the mutual interactions of the species moving within. These interactions may oppose or accelerate permeations of individual ions.
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