BEHAVIOUR OF ION-EXCHANGE MEMBRANES IN AMPHOLYTE CONTAINING SOLUTIONS

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Biological processes integrated with membrane separation (bioreactors, dialysis, electrodialysis (ED), nanofiltration, etc.) is one of the most rapidly developing technologies in green chemistry. Carbonic, phosphoric and amino groups are very typically present in biomolecules and impart them ampholyte properties. These groups take part in protolysis (proton-transfer) reactions in aqueous solutions and thereby change the charge depending on the pH of solution.

The coupling of ampholyte transport inside charged membranes, at the membrane interface and in the adjoining diffusion layers are discussed. The unusual concentration dependences of membrane conductivity and electrolyte diffusion permeability are examined by applying the modified microheterogeneous model. It is shown that these dependencies may be interpreted as a result of the shift in ionic equilibriums caused by external concentration changes and the Donnan co-ion exclusion effect, which causes variation in the pH of the internal membrane solution. The long-term behavior of ion-exchange membranes used in electrodialysis of food industry solutions is discussed.

The results may be useful for the selection and improvement of ion-exchange membranes used in ED of bio-molecule containing solutions.

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