Desalination and Water Treatment
www.deswater.com
doi: 10.5004/dwt.2018.22630

128 (2018) 155–169
October

Reverse osmosis of ammonium and sodium salt solutions and its model description

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Received 31 March 2018; Accepted 12 June 2018

ABSTRACT

The tested models of membrane transport were based on the steric, dielectric (Born and image force effects), and Donnan exclusions. Generally, the models with the concentration-dependent electrolyte permeability described the retention data satisfactorily, irrespectively of the origin of that dependence (dielectric or Donnan effect). Regarding the steric-dielectric exclusion, the same goodness of fit was obtained for many pairs of pore radius and dielectric constant. However, it was not possible to explain the differences in the electrolyte permeabilities, because of the inconsistency of the dielectric constant of a pore solution and/or an effective membrane thickness. Much too high values of that thickness obtained for the pure Donnan exclusion indicated that this type of exclusion was of marginal importance.

Keywords: Reverse osmosis; Ammonium salts; Dielectric exclusion; Nernst–Planck equation

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Presented at the XII Scientific Conference "Membranes and Membrane Processes in Environmental Protection" – MEMPEP 2018 13–16 June 2018, Zakopane, Poland.