An experimental and modeling study of nanofiltration processes for mixed electrolyte solutions

S.A. Avlonitis*, D.A. Avlonitis, S. Skourtis, D. Vlachos

Laboratory of Quality Control, Operations Management and Process Engineering, Department of Mechanical Engineering, Technological Educational Institution (T.E.I.) of Chalkida, 34400 Psaxna, Evia, Greece
Tel. +30 (22280) 99650; Fax +30 (22280) 99649; email savlon@teihal.gr

ABSTRACT

An experimental and modeling procedure is presented for the investigation of the performance of nanofiltration membranes. The proposed procedure may be applied to nanofiltration membrane system operating with mixed salts solutions to estimate the flux and quality of the permeate water. The model had been proven successful in the past for the study of RO systems and is based on the analytical equations of the two dimensional flow. It contains a set of five constants that are case-specific and have to be determined. Two of these constants were determined by forcing agreement of the model to appropriate experimental data while the rest were calculated from established generalized correlations. A number of pilot plant experiments were conducted using TRISEP (4040-XN45-TSF) nanofiltration membrane with mixed salts solutions differing in composition and in temperature. A set of the data obtained by these experiments has been used for fixing the parameters of the model while the remaining sets were used for evaluation of the performance of the model. The method is consistent and robust and as it is demonstrated, the predictions of the model are in excellent agreement to the experimental data. It is believed, therefore, that the proposed procedure is useful in cases where predictions of nanofiltration membrane performance are required.

Keywords: Nanofiltration; Modelling; Experimental data; NF performance

---

* Corresponding author.