Simulation of rejection performance in nanofiltraion membrane using DSPM-DE model

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Nanofiltration (NF) has been getting interests due to high rejection of divalent and multivalent ions. Nowadays it has been used in some separation technologies such as desalination, wastewater treatment, and treatment of mining water. In order to broaden the application of NF further, it is important to propose the mathematical transport model. In this study, rejection performance of several solutes (NaCl, KCl, MgCl2) was simulated and compared with the experimental results. The theoretical result showed the overall agreement with experimental data. The Donnan Steric Pore Model with Dielectric Exclusion (DSPM-DE) was implemented as the mathematical model, which solves the extended nernst-planck equation and uses boundary conditions at membrane surface accounting for steric, electric, and dielectric exclusion.