



Investigation on overall charged behavior of polyamide nanofiltration membranes by electrokinetic method

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ABSTRACT

In this paper, the overall charged behavior of polyamide nanofiltration membranes, including their skin-layer and support-layer, was explored by electrokinetic method. Based on trans-membrane streaming potentials of two polyamide nanofiltration membranes (NF90 and NF) measured in a given series of electrolyte solutions (NaCl, KCl, CaCl₂, Na₂SO₄ and MgSO₄), respectively, the corresponding zeta potential and charge density were estimated by means of the Helmholtz–Smoluchowski equation and the Gouy–Chapmann double-electric layer theory. The experimental results show that the factors, such as concentration of electrolyte solution, type and valence of ions, have an important influence on the charged behavior of polyamide nanofiltration membranes. Furthermore, it was also found that the relationship between the charge densities and the feed solution concentration agreed well with Freundlich adsorption isotherms under certain testing conditions. Furthermore, it was confirmed that charge formation of polyamide nanofiltration should be attributed to the specific adsorption of ions.

Keywords: Polyamide nanofiltration membrane; Electrokinetic method; Specific adsorption; Charge densities

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