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Novel negatively-charged ultrafiltration membranes made by a combination of immersion precipitation and photopolymerization

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Ultrafiltration (UF) membranes are currently used in industry for the concentration of proteins and other macromolecules. Performance of UF membranes is generally limited by a trade-off between permeability and selectivity [1]. However, electrically-charged ultrafiltration membranes can provide a dramatic improvement in ultrafiltration performance [2]. Novel UF membranes were made by combining traditional immersion precipitation process for making membranes with photopolymerization of the casting solution comprising polyethersulfone, glycidyl methacrylate and other reactive monomers. Negative charges were introduced either by initially using 2-acrylamido-2-methylpropane sulfonic acid as a reactive monomer, or were later created by epoxide ring opening of crosslinked glycidyl methacrylate. As shown in Fig. 1, selectivity of these membranes significantly improved as the concentration of negatively-charged groups in the membrane increased. The effects of membrane composition on the properties and separation performance of these novel UF membranes will be presented.

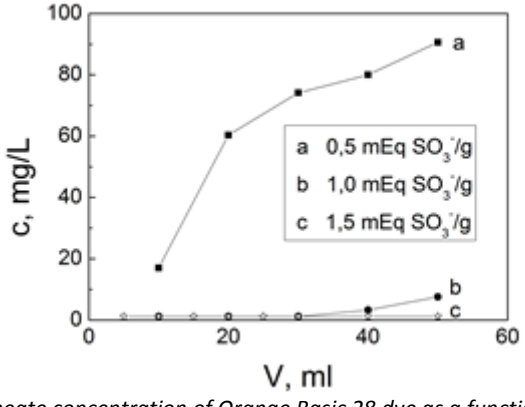

Fig. 1. Permeate concentration of Orange Basic 28 dye as a function of the volume filtered through negatively-charged UF membranes.

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References:

[1] A. Mehta, A.L. Zydney, *J. Membrane Sci*. **249** (2005) 245.
[2] R. van Reis, J.M. Brake, J. Charkoudian, D.B. Burns, A.L. Zydney, *J. Membrane Sci*. **159** (1999) 133.