Evaluation of separation characteristic of polysulfone membranes modified by polymer solvents etching

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ABSTRACT

In our work we have found a method of increasing the pore size of ready PSF membranes. We suppose that it is possible to effectively increase the membrane pore size without its degradation by acting on the membrane with a solvent of the polymer. We have found several solvents of the membranes and tested their effective action on ready membranes. Methyl acetate, ethyl acetate and methyl-ethyl ketone were checked as solvents. Ethanol was used as the non-solvent. For each membrane the etching conditions (solvent’s content in ethanol, time of etching) were selected. When permeating the solvent/non-solvent solutions through the membrane walls, slight dissolution of the membrane structure which caused an evident increase in porosity was observed. The retention value of etched membranes from human blood serum macromolecules like: albumin, immunoglobulin IgG and IgM, cholesterol HDL and LDL was evaluated. There is a possibility to obtain membranes of different retention values, allowing to completely retain or pass all blood serum compounds. The retention features depending on etching conditions. Therefore there is a possibility to separate some of the selected compounds with the blood serum. Scanning electron microscopy was performed in order to determine membranes structure changes before and after the modification with etching solvent.

Keywords: Polysulfone capillary membranes; Retention; Treatment; Markers; Ultrafiltration coefficient

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