



POLYACRYLONITRILE ULTRAFILTRATION MEMBRANES FOR RECYCLING OF REFINERY AND PETROCHEMICAL EFFLUENTS

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Abstract

Hollow fiber polyacrylonitrile membranes with three different MWCOs (i.e. 6, 13, 50 kDa) have been tested for dead-end ultrafiltration of a combined refinery and petrochemical secondary effluent. The effluent treatment envisaged further recycling as cooling water make-up following an ultrafiltration/reverse osmosis advanced treatment scheme. Criteria for ultrafiltration evaluation included flux restoration by backwashing, turbidity removal efficiency and water recovery. The membranes could be operated at stable permeate fluxes of 43 to 55 $\text{lh}^{-1}\text{m}^{-2}$, with a good flux recovery of 60 - 70% by backwashing with demineralised water at 1.4 bar for 30 s. High removal efficiency for turbidity, i.e. 99% and partial removal of organics (expressed as COD) could be achieved. In addition, the preliminary results suggested that a lower molecular weight cut-off membrane, e.g. 6 kDa and 13 kDa vs 50 kDa may result in a lower rate of flux decline and better water recovery when operated at comparable permeate fluxes and using the same backwashing procedure.

Keywords: flux recovery, recycling, refinery and petrochemical effluents, ultrafiltration, wastewaters

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