

Functional analysis of cellulose acetate flat membranes prepared via casting technique

S.A. Ahmed*, M.H. Sorour, H.A. Talaat, S.S. Ali

*Chemical Engineering and Pilot Plant Department, National Research Centre, Cairo, Egypt
Tel. +20 2 20106728939; email: safaaabdelraouf@yahoo.com*

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ABSTRACT

Cellulosic membranes reflect better utilization of renewable resources with minimum impacts on the environment. Significant market for medium pressure application is encountered in water filtration and reclamation. Thus, endeavors are needed to balance advancement of cellulose membrane and manufacturing technology modification. Cellulose membranes have been prepared via phase inversion process from different blends of polymers/solvents/additives. The casting solutions comprising polymer concentration range from 15 to 25 wt%, and acetone, tetrachloroethane and N,N dimethyl formamide as solvents. Different samples of membranes have been prepared and tested using polymer with different acetyl contents. The prepared membranes have been characterized using scanning electron microscope (SEM). Further, performance indicators comprising: flux, operating time, permeability and selectivity has been investigated according to casting solution constituents and membrane matrix morphology. Operating pressures up to 50 bar has been applied. The results indicate that the appropriate polymeric content has been found to be between 20% and 22%. Enhanced performance is also observed in the presence of both polymethylhydrosiloxan (PMHS) and dibutyl phthalate (DBP) denoting better salt rejection. Almost all prepared membranes, could tolerate operating pressures up to 50 bar.

Keywords: Cellulose acetate; Flat membranes; Membrane preparation

* Corresponding author.