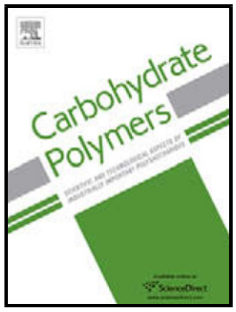

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Influence of pH and temperature of dip-coating solution on the properties of cellulose acetate-ceramic composite membrane for ultrafiltration

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Research Highlights

- Cellulose acetate-ceramic composite membranes were prepared by dip coating method.
- Temperature and pH of the polymer solution affected the membrane characteristics.
- Pore size, porosity and permeability of membranes decreased with increase in pH.
- Optimized membrane prepared at pH 7 showed very high oil rejection (99.6%).

ABSTRACT

Polymer-ceramic composite membranes were prepared by dip coating technique using 5 wt.% cellulose acetate (CA) solution at different temperatures (15°C, 25°C and 40°C). The effect of pH (2–12) of the polymeric solution on the properties of the membranes was studied using SEM, EDAX, FTIR, gas and liquid permeation. The thickness of the polymeric layer depended on the interaction of CA solution with the surface of ceramic support. Membrane permeability decreased with increase in pH because of decrease in pore size and porosity resulting from strong interaction of the polymer layer with the ceramic support. The porosity and mean pore size of the prepared membranes were found to be 28–60% and 30–47 nm (ultrafiltration range), respectively. The optimized membrane (pH 7) was used for ultrafiltration of oil in water