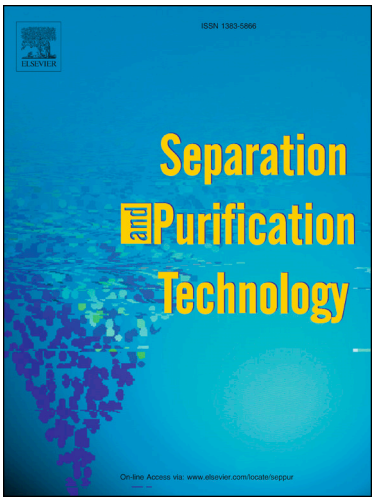

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ABSTRACT

The manuscript demonstrates the synthesis of novel poly (2, 6-dimethyl-1, 4-phenylene oxide) based hybrid anion conducting membrane for efficient electro-membrane applications. The ACMs were synthesized by in situ reaction of 1-vinylimidazole on denser supported membrane matrix with the aid of (3-aminopropyltriethoxysilane). Synthesized hybrid membranes were designated as BPVI, BPVI, BPVI-AP-10, BPVI-AP-20, BPVI-AP-50 and BPVI-AP-80 accordingly with the quantity of (3-aminopropyltriethoxysilane). Membranes show excellent physicochemical properties like water uptake, ion exchange capacity and water kinetics inside the membrane. Ionic conductivity of the hybrid membrane also improved and reaches to almost four times of its initial value for BPVI-AP-80 membrane. Interpolation of the silica and surface morphology are investigated by TEM, shows the uniform distribution of silica throughout matrix. Membranes are also evaluated by methanol crossover resistance and salt removal efficiency. Methanol permeability and selectivity for BPVI-AP-80 membrane was calculated to the 1.93×10^{-7} cm^2S^{-1} and 3.662×10^5. On the other hand, it shows 89.7% current efficiency and 0.985 kWh kg^{-1} power consumption during salt removal by electrodialysis for same membrane. Furthermore, the applicability of the membrane towards fuel cells and electrodialysis is potentially high.

Key words: PPO; Anion Conducting Membranes; Ionic conductivity; Water desalination.