

Characterization of non-uniformly charged ion exchange membranes prepared by plasma-induced polymerization

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Ion-exchange membranes (IEMs) with non-uniform fixed charge distribution were prepared and characterized. Polypropylene (PP)-g-sulfonated glycidyl methacrylate(GMA) composite membranes for cation-exchange membrane were prepared by grafting GMA on thin (25 μ m) microporous PP membranes via plasma-induced polymerization. Using the water solvent, surface region was rich in grafted GMA compared to the middle of the film, which led to nonuniform distribution of the grafted GMA across the membrane. The chemical and physical structures of the prepared membranes were investigated using FTIR, SEM and EPMA. The membranes were also characterized in terms of electrochemical properties, i.e. ion-exchange capacity, membrane electrical resistance, transport number, current-voltage and chronopotentiometric curves. The properties of the prepared membranes were comparable to those of commercial membranes. The characteristic of membranes with nonuniform fixed charge distribution was investigated by comparing commercial IEM with uniform fixed charge distribution.