

Synthesis and characterization of PVA-poly(styrenesulfonic acid-co-maleic acid) proton exchange membranes

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We describe the synthesis of new polymeric proton exchange membranes. The membranes are polymeric PVA/poly(styrenesulfonic acid-co-maleic acid) blends. We have prepared six different membranes with the poly(styrenesulfonic acid-co-maleic acid) mass composition ranging from 35 % to 60%. The electrical conductivity are measured in 0.2 mol/l HCl aqueous solutions from 30 to 60 °C. The tested membranes are highly conductive: the conductivity of the most conductive material, the PVA (40%)/poly(styrenesulfonic acid-co-maleic acid) (60 %) membrane, varies from $0.11 \Omega^{-1} \cdot \text{cm}^{-1}$ at 30 °C to $0.15 \Omega^{-1} \cdot \text{cm}^{-1}$ at 60 °C. The electrical conductivity, at a given temperature, grows sharply with the poly(styrenesulfonic acid-co-maleic acid) mass content in the blend. The outstanding temperature stability of the new PEM is the consequence of the presence of ester bonds between the two polymers