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Composite anion conductive membranes based on para-polybenzimidazole and montmorillonite

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Abstract

One of the best materials for preparation of ion conductive membranes is poly[2,2'-(p-phenylene)-5,5'-bisbenzimidazole] denoted p-PBI. Here we report the preparation of potassium hydroxide doped p-PBI membranes, loaded with high concentrations of montmorillonite and discuss some of their properties. The doped PBI membranes, containing filler, show considerable increase of the anion conductivity as well as improvement of mechanical properties, compared to pristine p-PBI doped with potassium hydroxide. For the membrane, containing 100 wt. % montmorillonite, anion conductivity of $1465 \text{ mS}\cdot\text{cm}^{-1}$ was measured. This value is approaching the anion conductivity of the dopant - 50% water solution of potassium hydroxide. The improvement of the anion conductivity has to be attributed to the electrolyte, trapped in the montmorillonite channels.

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