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A Polyketone-based Anion Exchange Membrane for Electrochemical Applications: Synthesis and Characterization

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Abstract

An anion exchange membrane (AEM) was made with a modified polyketone (PK). AEMs of polyamines were prepared in a three-step procedure: (I) PK synthesis using ethylene and carbon monoxide, supported by a Pd catalyst, followed by the introduction of 1,2-diaminopropane to yield the polymeric amines; (II) solvent casting of the modified PK with a low degree of amination; (III) iodomethylation to form the AEM (PK-PDAPm(I)), followed by ion exchange with KOH (PK-PDAPm(OH)).

The structure of the modified polyketone was characterized using FTIR, and UV-Vis spectroscopy, demonstrating the successful introduction of amine in the PK. The conductivity of the AEM was studied using broadband electric spectroscopy (BES) in the temperature range from -100 to 120°C: the highest value of $9 \times 10^{-4} \text{ S} \cdot \text{cm}^{-1}$ was reached at 120°C for the ionic conductivity of PK-PDAPm(I), followed by PK-PDAPm(OH) with

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