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Publications:

Heterogeneous anion conducting membranes based on linear and crosslinked KOH doped polybenzimidazole for alkaline water electrolysis

Polybenzimidazole is a highly hygroscopic polymer that can be doped with aqueous KOH to give a material with high ion conductivity in the 10^{-2} – 1 Scm $^{-1}$ range, which in combination with its low gas permeability makes it an interesting electrolyte material for alkaline water electrolysis. In this study membranes based on linear and crosslinked polybenzimidazole were evaluated for this purpose. Extensive characterization with respect to spectroscopic and physicochemical properties during aging in 6molL $^{-1}$ KOH at 85°C for up to 176 days indicated structural stability of the high molecular weight specialty polymer, however, with limitations with respect to hydrolytic stability. The gradual decay of the average molecular weight resulted in a severe deterioration of the mechanical properties over time. Membranes based on crosslinked polybenzimidazole showed better stability than the membranes based on their linear counterpart. The technical feasibility of the membranes was evaluated by the preliminary water electrolysis tests showing performance comparable to that of commercially available cell separators with great potential of further improvement.

General information

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Authors: Aili, D. (Intern), Hansen, M. K. (Ekstern), Renzaho, R. F. (Intern), Li, Q. (Intern), Christensen, E. (Intern), Jensen, J. O. (Intern), Bjerrum, N. J. (Intern)

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BFI (2012): BFI-level 2

Scopus rating (2012): 2.223 1.975

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BFI (2011): BFI-level 2

Scopus rating (2011): 1.837 1.727

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Scopus rating (2010): 1.819 1.82

BFI (2009): BFI-level 2

Scopus rating (2009): 1.646 1.691

BFI (2008): BFI-level 2

Scopus rating (2008): 1.457 1.811

Scopus rating (2007): 1.463 1.579

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