

Novel mixed alkyl/aryl anion-exchange membranes for electrochemical applications

Jochen Kerres¹, Anika Katzfuss¹, Viktor Gogel², Ulrich Storr², Ludwig Joerissen²

¹University of Stuttgart, Institute of Chemical process Engineering

Boeblinger Str. 78, D-70199 Stuttgart, Germany

²ZSW, GB3

Helmholtzstr. 8, D-89081 Ulm, Germany

In this contribution we report on R&D of the synthesis and characterization of novel mixed aryl/alkyl anion-exchange membranes for fuel cell and electrolysis applications.

The core structure of the new anion-exchange membranes was built up by reaction of dihalogenoalkanes with tertiary diamines under formation of quaternized anion-exchange macromolecules. The basic polymers differs from aromatic polymeric sulfinate and/or a polymer containing tertiary basic N groups such as poly(4-vinylpyridine) or self-synthesized polymers containing pyridine or tertiary amino functional groups and/or polymers comprising halomethyl groups such as bromomethylated PPO. Some of the polymers have also been embedded in an inert polymer structure such as PVDF.

Membranes with ionic and/or covalent crosslinks have been synthesized, showing good chemical and mechanical stability and good performance in direct methanol fuel cells (DMFC) with use of Pt-free electrodes, as will be presented in this contribution.