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Performance enhancement of polybenzimidazole based high temperature proton exchange membranes with multifunctional crosslinker and highly sulfonated polyaniline

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Abstract

Polybenzimidazole (PBI) based high temperature proton exchange membranes were prepared by covalent cross-linking with triglycidylisocyanurate (TGIC) and doping with highly sulfonated polyaniline (SPAN). Insoluble SPAN with high degree of sulfonation was synthesized as the proton conductor. SPAN was homogeneously dispersed in the PBI-TGIC matrix. The composite membranes presented good thermal, dimensional, mechanical and oxidative stability for fuel cell applications. Since TGIC was a tri-functional cross-linker, with a relatively low cross-linking degree (CLD), the mechanical strength, dimensional stability and oxidative resistance of the composite membranes were improved. The low CLD also allowed high doping level of SPAN

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