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Clustered multi-imidazolium side chains functionalized alkaline anion exchange membranes for fuel cells

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Abstract

Clustered alkyl side chains bearing a string of three imidazolium cations with hexyl spacers are grafted to fluorene-based poly (arylene ether sulfone) successfully. Nanostructure is directly configured within the anion exchange membranes (AEMs) via the novel multi-cation side chains. As confirmed by atomic force microscopy (AFM) and small angle X-ray scattering (SAXS), percolating OH⁻ conducting channels with the size of ionic clusters nearly 20 nm endow the trimPES-0.4 membrane with an excellent ion conductivity in excess of 120 mS cm⁻¹ at 80 °C. Because of the self-assembly of ionic groups, water molecules are compartmentalized into the hydrophilic side chain regions instead of backbones, resulting in

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