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Abstract

A series of anion exchange membranes (AEMs) having pendent bulky quaternary phosphonium groups (based on the tris(2,4,6-trimethoxyphenyl)phosphane) (TPP-x and LTPP-x) have been designed and prepared by Cu(I)-catalyzed click chemistry for H₂/O₂ alkaline fuel cell application. In spite of numerous attempts, the high degree of functionalization (DF) copolymer displayed very poor film forming ability. Thus, the tough and transparent membranes were obtained only at IEC level as low as ~1.0 meq./g. The as-obtained TPP and LTPP AEMs having bulky phosphonium groups showed lower water uptake than that of the clicked CQA and LCQA membranes based on quaternary ammonium groups in spite of their similar IEC values. Lower ion conductivities were observed for all of the AEMs due to the lower water uptake. However, the bulky phosphonium groups could protect efficiently the core atom in organic cations against hydroxide attack and thus induced excellent alkaline stability of

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