

Hydrocarbon-based anion exchange membrane materials with high performance and durability for energy conversion system

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The electrochemical energy conversion devices using anion exchange materials (AEMs), which could efficiently convert chemical energy to electrical energy or electrical energy to chemical energy, have been considered as attractive technology with the potential advantages of utilizing low-cost catalysts based on non-precious metals and less expensive metal hardware. Typically, among various components, which have an effect on the performance and durability of device, solid electrolyte used as AEMs and anion exchange binders (AEBs) are regarded as core components to play a major role. Although several kind of AEMs and AEBs, such as Fumasep®, Aemion™, Sustainion®, and Xion®, are released for commercial use, there are still no reliable ACMs to be utilized under harsh operating conditions. Herein, we show anion conducting polymer materials with outstanding chemical, electrochemical and morphological properties. Moreover, state-of-the-art performances of water electrolysis cell as well as excellent performances of fuel cell with the ionomer are released.