

Synthesis of Novel branched fluorinated poly(aryl ether oxadiazole)s for anion exchange membranes

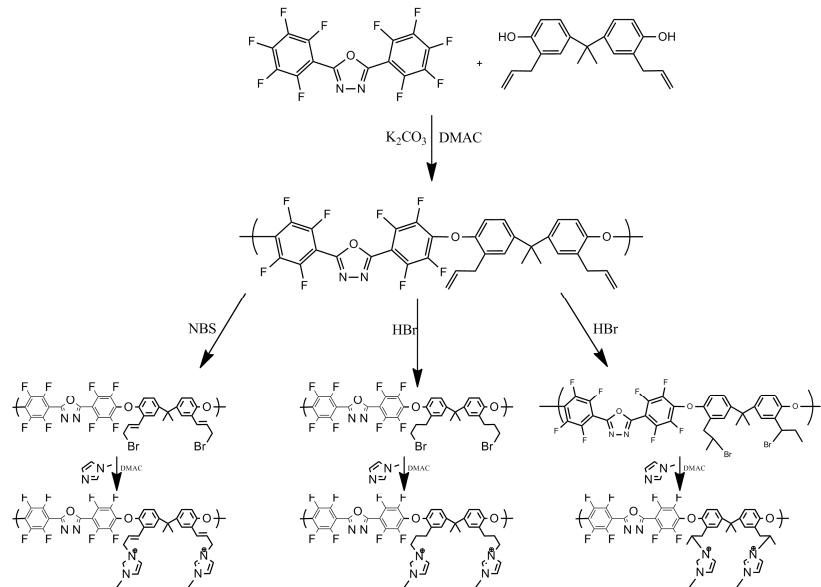
Cunpu LI, Xiaofeng XIE *, Changsheng DENG

Institute of Nuclear and New Energy Technology, Tsinghua University

Beijing 100084, China

ABSTRACT:

We have synthesized a system of novel branched fluorinated poly(aryl ether oxadiazole)s membranes. The monomers used were 5-bis(2,3,4,5,6-pentafluorophenyl)-1,3,4-oxadiazole (FPOx) and diallyl bisphenol A (DABPA). There's a double bond in the DABPA, after the polymer synthesized, the double bond was opened to get different brominated group. The N-methylimidazole (NMI) was reacted with the bromine to get different anion exchange group. The anion exchange membranes were obtained by solution casting method, followed by hydroxide exchanging in sodium hydroxide solution. The chemical structures and properties of the membranes were studied. The highest ionic conductivity of the membrane was achieved at 1.96×10^{-2} S/cm at 20 $^{\circ}\text{C}$. Its swelling ratio and TGA properties revealed their good mechanical and thermal stability. Compared with other methods, double bond in the DABPA plays an active role in the effective synthesis of high purity branched polymer.



Scheme 1 The synthesis of the membranes

Keywords: anion exchange membranes (AEMs); alkaline electrolyte membrane fuel cells (AEMFCs); fluorinated poly (aryl ether oxadiazole); double bond