

**Synthesis and characterization of branched and fluorinated poly (arylene ether sulfone) electrolyte membranes for fuel cell applications**

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This report describes the preparation and characterization of branched and sulfonated poly (arylene ether sulfone) copolymer (PAES) membranes containing perfluorocyclobutane moieties. Two different monomers, 4,4'-bis(trifluorovinyloxy)biphenyl, 4,4'-sulfonyl-bis (trifluorovinyloxy)biphenyl and a brancher 1,1,1-tris(4'-trifluorovinyloxyphenyl)ethane were synthesized through fluoroalkylation and Zn-mediated dehalogenation. They were then terpolymerized through thermal  $[2\pi+2\pi]$  cycloaddition. The branching degree of the terpolymers were controlled by the brancher content. Lastly they were post-sulfonated with chlorosulfonic acid. Their properties such as water uptake, ion exchange capacity and ion conductivity were observed in terms of sulfonation degree and branching degree.