

## Synthesis and characterization of Zirconium Sulfophenyl Phosphate/Sulfonated Polyimide composite membrane for High temperature Fuel Cell membrane

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Organic-inorganic composite membranes from sulfonated polyimides and zirconium sulfophenyl phosphate were synthesized. The polyimides are synthesized from 1,4,5,8-naphthalenetetracarboxylic dianhydride, 4,4'-diaminobiphenyl 2,2'-disulfonic acid as the sulfonated diamine, and 2-bis[4-(4-aminophenoxy)phenyl]hexafluoropropane as the nonsulfonated diamine. The zirconium sulfophenyl phosphates are precipitated by the reaction of  $Zr^{4+}$  ion and m-sulfophenyl phosphonic acid with a molar ratio  $P/Zr = 2$ . These composite membranes were evaluated for proton conductivity, FT-IR spectroscopy, x-ray diffraction, ion exchange capacity and thermogravimetry analysis.