

Abstract Submitted
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Polymer Blends for Proton Exchange Membranes¹ TINA LOVATO, National Technical Institute for the Deaf, RIT, KELLY MCNABB, RIT, Mechanical Eng, JASON MEYERS, National Technical Institute for the Deaf, RIT, GABER RUPNIK, Gallaudet, Chemistry, QIAN MA, Tufts, Physics, MENG ZHAO, JINGJING PAN, JOEL WALKER, THOMAS SMITH, RIT, Chemistry, PEGGY CEBE, Tufts, Physics — In the present research, the crystal structure of PVDF in semicrystalline composite films composed of poly(vinylidene fluoride) (PVDF) and poly[4(5)-vinylimidazole/vinylimidazolium trifluoro-methyl-sulfonylimide] (PVI_m/VI_m⁺ TFSI⁻) were studied. In these composites, conditions such as choice of solvent, drying conditions, and thermal treatment can affect the crystal phase, crystallite size and degree of crystallinity of PVDF as well as the distribution of the minor component, poly[4(5)-VI_m/VI_m⁺ TFSI⁻]. Such composites may have potential in fuel cells as high-temperature proton-exchange membranes. PVDF imparts mechanical strength to the blend, and because of its high crystal melting point ($T_m > 160^\circ\text{C}$), should improve the high temperature stability of resulting fuel cell membranes. The long range goal is to make a thin, high strength membrane that will exhibit substantial proton conductivity at high temperature and low relative humidity. Thin PVDF/PVI_m-PVI_m⁺ composite films have been fabricated and the nature of the PVDF crystalline polymorph and % crystallinity have been evaluated as a function of the HTFSI content.

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