353f Gas Transport in Poly(Arylene Ether Sulfone) Proton Exchange Membranes

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Poly(arylene ether sulfone) is a thermoplastic that displays excellent thermal and mechanical properties and is resistant to acid catalyzed hydrolysis as well as oxidation. Having demonstrated high proton conductivity at elevated temperatures, it is an excellent candidate as a proton-exchange membrane. In this paper we report on the primary gas transport mechanism of hydrogen and oxygen gases in poly(arylene ether sulfone) copolymers with varying degree of disulfonation and as a function of humidity. Experimentally, both permeation and gravimetric adsorption measurements were carried out and analyzed in conjunction with morphological and physical characterization studies. The results indicate that gas permeation increases with degree of sulfonation as well as hydration. Comparisons with gas transport properties in Nafion suggests that these copolymers have substantially higher gas permeabilities.