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Interdiffusion of long alcohols into thin ionomer films; In situ Neutron Reflectivity study THUSITHA ETAMPAWALA, DILRU RATNAWEERA, UMESH SHRESTHA, DVORA PERAHIA, Clemson University, Clemson, SC, CHRISTOPHER CORNELIUS, Virginia Polytechnic Institute, Blacksburg, VA, JAROSLAW MAJEWSKI, Sandia National Laboratories, MS 0886, Albuquerque, NM — Transport of solvents and ions within ionic polymers controls their many current and potential applications from energy related to drug delivery systems. The transport is determined by the phase structure and the interaction of the diffusing species with the polymers, coupled with interfacial effects. The current work presents the kinetics of penetration of long chain alcohols diffusing into rigid ionomer thin films formed by a rigid polyphenylene sulfonated ionomer, using *in situ* neutron reflectivity. The penetration of deuterated n-octanol and n-hexanol into ~20nm thick films was followed as a function of time for different sulfonation levels of the polymer. As for shorter molecules, the diffusion process consists of two stages, a relatively fast one in which the film thickness increases linearly with time followed by a slow phase in which structural changes take place. With increasing sulfonation levels, the diffusion first increases and then decreases; a trend that is attributed to hydrophilic/hydrophobic balance.

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