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Methanol Diffusion into Thin Ionomer Films: An *in situ* Study Using Neutron Reflectometry . LILIN HE, Clemson University — THUSITHA, N. ETAMPAWALA DVORA, PERAHIA Department of Chemistry, Clemson University, Clemson, SC 29634 JAROSLAW MAJEWSKI, Lujan Neutron Scattering Center, Los Alamos National Laboratory, Los Alamos, NM 87545 CHRISTOPHER J. CORNELIUSSandia National Laboratories, MS 0886, Albuquerque, New Mexico 87185-0886 The penetration of solvent into a polymer that consists of incompatable groups is determined by the specific interactions with the guest molecule, where interfacial structure and dynamics of the polymer affect the onset of the process. The current work presents a neutron reflectometry study of the penetration of methanol into sulfonated polyphenlylene thin films. The ionomer films were exposed to saturated deuterated methanol vapor and reflectometry patterns were recorded until equilibrium was reached. The process incorporates two stages where the vapors first wet the surface and then penetrate into the film. Significant swelling takes place as soon as the film is exposed to the vapors. Similar to previous studied in water, the onset diffusion is Fickian followed by an anomalous diffusion process. The entire process however is faster than that observed for water.

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