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Neutron Reflectivity Study of Interdiffusion of Ionomers into Van der Waals Polymer Thin Films THUSITHA ETAMPAWALA, DILRU RATNAWEERA, SIDATH WIJESINGHE, DVORA PERAHIA, Department of Chemistry, Clemson University, Clemson, SC, JAROSLAW MAJEWSKI, Lujan Neutron Scattering Center, Los Alamos National Laboratory, Los Alamos, NM — The slow dynamic processes in amorphous ionic polymers are affected by physical cross-links resulting from clustering of the ionic groups. Therefore in addition to entanglement barriers, the motion of the polymers is coupled to the dynamics of the ionic clusters where the resulting dynamics is an interplay between the effects of the two types of barriers. Using neutron reflectometry we have probed a model system where interfacial diffusion of a Van der Waals polymer, polystyrene, into its sulfonated analogs. Results controlling the molecular weights that determine the overall number of entanglements as well as the degree of sulfonation which affects the strength and number of the ionic clusters will be presented. Comparison to the diffusion of polystyrene into polystyrene will resolve the effects of the ionic clusters from those of entanglements. The presence of the physical cross-links slows down the dynamics significantly with respect to that of polystyrene and an asymmetric process where the non-ionic blocks migrate into the ionic one is observed. Further rearrangements take place at a later stage.

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