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Control dispersion of water in thin films of semi-fluorinated polymer/POSS nanocomposites DILRU RATNAWEERA, DVORA PERAHIA, Clemson University, MANISH DUBEY, JAROSLAW MAJEWSKI, Los Alamos National Laboratory — The permeation and distribution of solvents in polymer nanocomposites is governed by the way the nanoparticles (NP) associate within the matrix polymer. We have previously shown that in thin films interfacial effects affect the distribution of the NP. The current work focuses on the response of a semi-fluorinated random copolymer, Biphenyl Perfluorocyclobutane, and Polyhedral Oligomeric Silsesquioxane (POSS) NP modified with fluorinated or protonated side chains, to presence of D_2O. POSS was introduced either as a free NP or tethered to a polymer chain. We found that the presence of POSS reduces the overall uptake of D_2O. It also changes the distribution of water in the film as well. In the pristine polymer film the water mainly accumulated at the substrate/polymer interface. In the nanocomposite, the water distribution is correlated with the NP distribution, where NP at the air interface minimize water penetration.

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