

Abstract Submitted  
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**Canopy Dynamics in a Nanoscale Ionic Material**<sup>1</sup> E. VON MEERWALL, The University of Akron, M.L. JESPERSEN, P.A. MIRAU, R.A. VAIA, Air Force Research Labs, N.J. FERNANDES, E.P. GIANNELIS, Cornell University — We have used nuclear magnetic resonance (NMR) relaxation and pulsed-gradient diffusion measurements to characterize molecular mobility in a set of nanoscale ionic materials (NIMS). 18 nm core silica nanoparticles were functionalized with a covalently attached alkyl silane monolayer corona followed by an ionically tethered bulky ethylene oxide/propylene oxide block copolymer canopy. NIMS are organic-inorganic hybrids exhibiting liquid-like character under ambient conditions in the absence of solvent and are of interest for a variety of applications. Our NMR studies show that the fast (ns) local dynamics of the block copolymer canopy are insensitive to the presence of the silica nanoparticles. Canopy diffusion in the NIMS is only modestly slowed relative to the neat copolymer. Not all canopy molecules are slowed equally due to crowding at the corona-coated nanoparticle surface, resulting in strongly bound fraction at the surface and weakly bound outer sphere capable of rapid exchange of canopy molecules between host particles. Electrostatic interactions with other ionic ( $\text{Na}^+$ ) species alter the dynamics by decreasing the strongly-bound population.

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Ernst von Meerwall  
Univ. Akron

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