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Polymer nano-particle hybrid micelles: Encapsulation of POSS into semi-fluorinated polymer micelles DILRU RATNAWEERA, DVORA PERAHIA, Clemson University, SCOTT IACONO, Patrick Air Force Base, FL, JOSEPH MABRY, Edwards Air Force Base, CA, DENNIS SMITH, University of Texas, Dallas — Self-assembly of block copolymers in selective solvents was used to form a nanoparticle (NP)/polymer hybrid micelles. These micelles can be used as a cargo vehicle for other substances such as drug delivery, and as building blocks for polymer-nanocomposites with controlled NP distribution. Association of NPs into specific blocks of the copolymer depends on the compatibility between the NPs and the block as well as their preference to the solvent that micellization takes place. The current work introduces a small angle neutron scattering study of association of Polyhedral Oligomeric Silsesquioxane (POSS) NPs into micelles of a highly segregating random copolymer, Biphenyl Perfluorocyclobutane (BPh-PFCB), in toluene, which is a good solvent for BPh. Incompatibility between the blocks drives copolymer into micelles with PFCB in the core and BPh in swollen corona. Modification of NPs with polymer chains drives POSS cages into the micelle core and prevents the micelle dissociation at higher temperatures.

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