

Abstract Submitted
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Composition, functionality and topology effect on the self-assemble behaviors of PS-POSS conjugates. STEPHEN CHENG, WEI ZHANG, The University of Akron, CHENG RESEARCH GROUP TEAM — We have designed a synthetic strategy to allow us to attach the “nanoatoms” on to a polystyrene (PS) chain with controlled heterogeneity. The “nanoatoms” used here are polyhedral oligomeric silsesquioxanes (POSS). The heterogeneity of the primary chemical structures is reflected in the self-assembled supramolecular structures. In the bulk state, the full phase diagram is identified as BCC \rightarrow HEX \rightarrow LAM \rightarrow DG \rightarrow inversed HEX at sub-10 nm length scale when the volume fraction of POSS increase in linear PSm-(POSS)_n. The phase structures can also be affected by tuning the topology and functionality at the same volume fraction. In the solution state, as the number of POSS or connection branches increase, the small packing parameters with structures evolve from vesicles \rightarrow long cylinders \rightarrow short cylinders \rightarrow spheres.

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