Abstract Submitted
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Supramolecular Nanocomposites: Effects of the Aspect Ratio of Nanorods KARI THORKELSSON, Materials Science and Engineering, University of California, Berkeley, TING XU, Materials Science and Engineering, Chemistry, University of California, Berkeley; Materials Sciences Division, Lawrence Berkeley National Laboratory — Anisotropic particles display many unique electrical, mechanical, and optical properties useful in applications ranging from photovoltaic devices, plasmonic devices, and sensors to mechanically strengthened composites. These properties depend not only on size and shape, but also on spatial distribution and orientation. It is thus desirable to control both distribution and orientation with methods applicable to a wide range of size and shape. We have recently demonstrated control over spatial distribution and in some cases local orientation of nanorods by using a supramolecular approach to tailor the conformational entropy of block copolymer chains [1]. Alkyl-passivated nanoparticles can in this way be arranged into aligned arrays, sheets, continuous networks, and clusters. Here, we expand the application of this method to nanorods with a range of aspect ratios, showing that the spatial distribution of the nanorods can be controlled regardless of length, and orientation can also be finely controlled in the case of lengths comparable to the BCP periodicity. Findings will be accounted for by considering the interparticle interactions, the particle-supramolecule interactions and the phase behavior of supramolecules.

[1] Thorkelsson, K. et al. Nano letters 2012, 12, 498-504.

Kari Thorkelsson
Materials Science and Engineering, University of California, Berkeley

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