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Thermoresponsive Self-Assembling Nanocomposites KARI THORKELSSON, YUE ZHAO, THOMAS SCHILLING, University of California, Berkeley, ALEXANDER MASTROIANNI, JOSEPH M. LUTHER, University of California, Berkeley, Lawrence Berkeley National Laboratory, YUE WU, University of California, Berkeley, A. PAUL ALIVISATOS, TING XU, University of California, Berkeley, Lawrence Berkeley National Laboratory — Nanoparticles have significant potential for use in fields including photovoltaics and memory storage, but to realize this potential, their distribution must be finely controlled. We present here a verstile method to achieve such control, using a diblock copolymer supramolecule composed of polystyrene-block-poly(4-vinylpyridene) (PS-b-P4VP) and 3-pentadecylphenol (PDP). The PDP hydrogen bonds to the P4VP block, forming a comb block. This change in morphology causes the PS-b-P4VP(PDP) supramolecule to force the nanoparticles into well-organized rows one nanoparticles thick at the center of the P4VP(PDP) domains. Furthermore, the morphology of the supramolecule-nanoparticle composite changes with temperature as hydrogen bonding is broken and the PDP becomes soluble in the PS block. This provides a useful path for the production of polymer-based thermoresponsive nanocomposites.

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