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2-D Hierarchical Structure of a Block Copolymer and Bio-nanoparticle Composites DONGSEOK SHIN, Dept. of Polymer Science and Engineering, Univ. of Massachusetts Amherst, YAO LIN, Biosciences Division, Argonne National Laboratory, QIAN WANG, Dept. of Chemistry and Biochemistry, Univ. of South Carolina, THOMAS RUSSELL, Dept. of Polymer Science and Engineering, Univ. of Massachusetts Amherst — 2-dimensional hierarchical structures were generated by combining two different self assembling systems; block copolymer and bio-nanoparticle. For this study, a block copolymer having a positively charged component, i.e. poly (styrene-b-N-methyl-4-vinylpyridinium iodide), was used. Thin film composites of this block copolymer and bio-nanoparticles were fabricated by adsorbing bio-particles on the polymer film and subsequently annealing the sample under the presence of solvent vapor. 2-dimensional hierarchical structures, where block copolymer chains microphase separated inside of discrete grains surrounded by bio-nanoparticles, were obtained with rod- like bio-particles (tobacco mosaic virus and M13 phage) as well as with spherical one (ferritin). The pH effect on the assembly of rod-like bio-particles and the morphology of composites was investigated. When the pH of the solution used for the adsorption of bio-particles was low, the bio-molecules aggregated and formed large bundles, while they were dispersed well at high pH. This difference was reflected in the morphology of the resultant complexes.

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