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Nanopatterning of Viruses and Proteins Using Microphase Separated Block Copolymers ARTHUR CRESCE, University of Maryland, Dept. of Materials Science and Engineering, ANGELA LEWANDOWSKI, WILLIAM BENTLEY, PETER KOFINAS, University of Maryland, Dept. of Chemical and Biomolecular Engineering — Diblock copolymers containing nickel ions have been prepared that are capable of selectively adsorbing histidine-tagged green fluorescent protein (hisGFP), and also binding tobacco mosaic virus (TMV). A block copolymer of norbornene and norbornene dicarboxylic acid was synthesized using ring-opening metathesis polymerization. A 400/50 block ratio achieved a spherical microphase-separated morphology with roughly 20 nm diameter dicarboxylic acid spheres. The spherical phase was exposed to nickel ions in solution, templating the formation of nickel nanoparticles. This process gave a nickel-loaded diblock copolymer film whose surface was used to chelate hisGFP. Fluorescence spectroscopy and TEM confirmed the presence of the protein on the polymer surface. A sulfonated triblock copolymer was loaded with nickel ions using a similar solution-doping procedure. The morphology of this copolymer was lamellar, and its sulfonated block was loaded with nickel ions. TEM studies revealed the presence of the virus on the surface of the copolymer and showed that the bond between the TMV and the polymer surface can withstand severe detergent washes.

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