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Specific Templating of Inorganic Materials on Self-Assembled Clathrin Proteins[1] SARAH HEILSHORN, Stanford University — Nature has evolved numerous methods for the reproducible self-assembly of nanoscale architectures that are ideal templates for patterning inorganic nanostructures. For example, the protein clathrin assembles into a variety of 2D and 3D structures depending on environmental conditions during assembly. The ability of this single protein to form multiple architectures makes clathrin an ideal model system for investigating the kinetic and thermodynamic principles of self-assembly, which will lead to the ability to predictably control template architecture. We design bi-functional peptide linkers to serve as molecular bridges between distinct sites on the clathrin monomers and specific inorganic materials including gold, titania, and cobalt oxide. By generating a family of bi-functional peptides, we develop a flexible, modular system that enables the rapid development of multiple inorganic nanostructures from a single protein template without requiring re-design of the template. We present examples of gold and anatase titania catalysts fabricated through this method.

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