

SEMINAR

BIOMOLECULES AS BUILDING BLOCKS FOR
DIRECTING THE STRUCTURE AND
FUNCTION OF NEW MATERIALS.**Nathaniel L. Rosi**

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This lecture will focus on the roles that biomolecules can play as building blocks for constructing new functional materials. The lecture will be divided into two parts: one focusing on the use of coordination chemistry to assemble simple biomolecules and a second focusing on the use of peptides to direct the assembly of nanoparticles.

Part I: Adenine has proven to be a useful building block for constructing porous crystalline materials. By controlling the coordination chemistry of adenine within these materials, we can control the pore size and pore functionality of the material. These aspects can be carefully tuned to afford materials with applications ranging from drug release to CO₂ capture to molecular sensing. This presentation will describe strategies for constructing 1-D, 2-D, and 3-D periodic micro and mesoporous metal-adeninate porous materials and will highlight their application as sorbents for selectively capturing CO₂ from gas mixtures.

Part II: Nanoparticle assemblies exhibit interesting physical properties that will be useful for a variety of potential applications. The properties of these assemblies depend on the size, shape, and composition of the component nanoparticle building blocks and also on the spatial arrangement of these building blocks within the assembled structure. Therefore, it is critically important to have methods for controlling the precise placement and organization of nanoparticles within nanoparticle assemblies. In this presentation, I will detail a new peptide-based method for simultaneously controlling both the synthesis and growth of nanoparticles. This method merges concepts from peptide-mediated 'biomineralization' and peptide-based self-assembly. I will discuss how this strategy can be used to carefully design and prepare complex nanoparticle superstructures, including nanoparticle double helices, hollow nanoparticle-based capsules, and 1-D nanoparticle chains. I will also demonstrate how this method can be used to carefully control the composition and metrics of the target nanoparticle superstructures.

REMEMBER

NATHANIEL L. ROSI

SPECIFIC SEMINAR: Biomolecules as Building Blocks for Directing the Structure and Function of New Materials.

DATE: June 18, 2010.

TIME: 10:00 am.

PLACE: IFAE.