

Virus templated assembly of CdS Quantum dots for light driven hydrogen generation: An insight into the interaction between coat protein and nanoparticles.

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Abstract:

Recent studies show that biological molecules can be used as versatile templates for the assembly of nanoscale materials because of their unique structures and chemical diversities. Hierarchical organization of nanoparticles has drawn attention for its potential applications to photocatalytic systems, photonic devices and biosensors. Viruses are particularly attractive templates as they possess highly ordered coat proteins. The *Salmonella* bacteriophage P22 has an icosahedral structure measuring ~ 60 nm in diameter with 420 copies of coat protein. In this study we investigated the assembly of CdS semiconductor nanoparticles on genetically engineered and wild type P22 procapsids under different ionic conditions. Nanoparticles show different patterns of assembly with the change in the procapsid structure. The goal of this study is to develop a virus based template for the design and directed assembly of semiconductor nanoparticles for light driven hydrogen production. The primary results from Transmission Electron Microscopy and Atomic Force Microscopy are shown here.