

Interfacial synthesis of dendritic platinum nanoshells templated on oil nanodroplets stabilized in water by a photocatalytic lipoporphyrin

Haorong Wang¹, Yujiang Song², Craig J Medforth³, and John A. Shelnutt³. (1) Center for Micro Engineering Materials, University of New Mexico, Advanced Materials Lab, 1001 University Blvd. SE, Albuquerque, NM 87106, haorangw@unm.edu, (2) Departments of Chemistry and Chemical and Nuclear Engineering, University of New Mexico, (3) Advanced Materials Laboratory, Sandia National Laboratories

Nanoscale metal shells have many potential uses and in some applications offer significant advantages over nanoparticles, such as reduced costs, lower densities, and, in some cases, special optical properties. Platinum nanostructures have been well known for various catalytic applications. Platinum nanoshells were synthesized in O/W nanoemulsion system using nanodroplet as templates. The emulsion is stabilized by a novel functional surfactant of tin(IV)-lipoporphyrin complex. No co-surfactant is needed to stabilize nanoemulsion because of the lipoporphyrin's intrinsic structural properties. In addition, the lipoporphyrin also acts as a photocatalyst at the oil-water interface that reduces platinum complex onto the nanodroplets to form the dendritic metal nanoshells. Platinum shells containing magnetic interior are made simply by dispersing Fe₃O₄ nanoparticles in the organic nanodroplets during the emulsion preparation.

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