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Preparation and Structural Studies on Hybrid Core-Shell Nanoparticles Consisting of Silica Core and Conjugated Block Copolymer Shell Prepared by Surface-Initiated Polymerization SOURAV CHATTERJEE, Tulane University, TONY KARAM, California Institute of Technology, CORNELIA ROSU, Georgia Institute of Technology, XIN LI, Louisiana State University, CHANGWOO DO, Oak Ridge National Laboratory, SANG GIL YOUM, LOUIS HABER, Louisiana State University, PAUL RUSSO, Georgia Institute of Technology, EVGUENI NESTEROV, Louisiana State University — Controlled Kumada catalyst-transfer polymerization occurring by chain-growth mechanism was developed for the synthesis of conjugated polymers and block copolymers from the surface of inorganic substrates such as silica nanoparticles. Although synthesis of conjugated polymers via Kumada polymerization became an established method for solution polymerization, carrying out the same reaction in heterogeneous conditions to form monodisperse polymer chains still remains a challenge. We developed and described a simple and efficient approach to the preparation of surface-immobilized layer of catalytic Ni(II) initiator, and demonstrated using it to prepare polymers and block copolymers on silica nanoparticle. The structure of the resulting hybrid nanostructures was thoroughly studied using small-angle neutron and X-ray scattering, thermal analysis, and optical spectroscopy. The photoexcitation energy transfer processes in the conjugated polymer shell were studied via steady-state and time resolved transient absorption spectroscopy. This study uncovered important details of the energy transfer, which will be discussed in this presentation.

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