

**185b** Generalized and Large-Scale Synthesis of Uniform-Sized Nanocrystals and Nanorods [Invited]

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We developed a new generalized synthetic procedure to produce monodisperse nanocrystals of many transition metals, metal oxides, and metal sulfides without a size selection process. Highly-crystalline and monodisperse nanocrystals were synthesized from the thermal decomposition of metal-surfactant complexes. So far, we have synthesized monodisperse spherical nanocrystals of Fe, Co, magnetite, cobalt ferrite, manganese ferrite, Ni, MnO, Pd, CdS, ZnS, PbS, MnS, and core/shell structured materials of Ni/Pd and Cu/CuO. Very recently, we were able to synthesize 40 gram of monodisperse magnetite nanoparticles without going through a size selection process. By controlling the nucleation and growth processes, we were able to synthesize monodisperse magnetite nanoparticles with particle sizes of 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16 nm. We developed new non-hydrolytic sol-gel reactions to synthesize uniform-sized nanocrystals of various metal oxides including zirconia, ceria, ZnO and Titania. We developed a new generalized synthetic procedure to produce various nanorods. Diameter-controlled synthesis of various nanorods was achieved. So far we have synthesized nanorods of iron, iron oxide, iron phosphide, cobalt phosphide, manganese phosphide, ZnO, TiO<sub>2</sub> and ZnS. The synthesis, characterization, and applications of these nanocrystals will be presented.