

220c Synthesis of Size, Shape and Composition Controlled Nanocrystals of Metals, Metal Alloys and Metal Oxides

Xiaowei Teng, Yong Wang, Sean Maksimuk, and Hong Yang

Size, shape and composition of nanocrystals are important factors that determine the unique electronic, magnetic, photonic and catalytic properties of the materials. In this context, solution phase processing can have many advantages because the high degree of control in these parameters of nanoparticles is feasible. In this talk, I will present several strategies developed in our laboratory on the synthesis of metal (Pt, Ag, Au), metal alloys (FePt, CoPt, NiPt) and metal oxide (Fe_xO_y , SnO_2) based nanoparticles. Procedures for controlling the compositions in core-shell nanoparticles in organic solvents and in solid states will be presented. I will further discuss the shape control of nanoparticles including the formation of nanocrystals in ionic liquids, and the mode of formation of tetrapod and multipod nanomaterials. Their magnetic and electrocatalytic properties will also be discussed.