

Effect of pHs on the Structure Evolution of Platinum Nanoclusters and Their Surface Plasmon Resonance Properties

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Abstract

Multi-structured platinum nanoclusters have been prepared through a one-step aqueous synthetic process by controlling pHs. The included structures are closely packed 3-dimensional (3D) dendrites, loosely packed 3D dendrites, short-order dendritic chains, long-order dendritic chains, flatten nanoclusters and monodisperse nanoparticles. The high resolution transmission electron microscopy images (HRTEM) display that the nanoclusters with a variety of structures are filled with grains of average size ~ 2.0 nm. The images of the nanoclusters demonstrated that Pt nanoparticles were not fused to each other, but their aggregations were separated by cetyltrimethylammonium bromide (CTAB). The as-prepared Pt nanomaterials were studied by UV-visible absorption spectroscopy to identify their surface plasmon resonance (SPR) activities. The structure dependent SPR signals have been observed from 200 nm–800 nm.