

Size-Selective Synthesis of Gold and Platinum Nanoparticles Using Novel Thiol-Functionalized Ionic Liquids

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One-phase synthesis of gold and platinum nanoparticles using new thiol-functionalized ionic liquids (TFILs) is described for the first time. TFILs as stabilizing agents for gold and platinum nanoparticles were designed to have thiol groups on either the cation or anion and symmetrical or unsymmetrical positions only in the cation. Transmission electron microscopy, electron diffraction, and NMR were used for the characterization of nanoparticles. The metal nanoparticles formed using TFILs are crystalline structures with face-centered cubic packing arrangements and have small sizes (the average diameters are 3.5, 3.1, and 2.0 nm for Au and 3.2, 2.2, and 2.0 nm for Pt, respectively) and uniform distributions (the standard deviations are 0.7, 0.5, and 0.1 nm for Au and 1.1, 0.2, and 0.1 for Pt, respectively). It is believed that the nanoparticle size and distribution depend on the number and position of thiol groups in the IL.