Optical and Catalytic Property of Unique Shapes of Au@Pt Composite Nanoparticles

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Platinum was selectively overgrown on (100) surfaces of the shape-controlled Au nanocrystals of cube, octahedra, and spheres. The unique shape of Au@Pt nanoparticles was further modified by partial etching. Cyanide ion etched the exposed Au surfaces and the depth of etched surface was varied by the concentration of cyanide ion. For Au(sph)@Pt nanoparticles, Au core underneath surrounding Pt shell was slowly leached and formed hollow Pt nanoparticle at high concentration of cyanide ion. Morphology of etched nanoparticle was observed by TEM and SEM. The change of optical property was observed by measuring red shifts of surface plasmon resonance (SPR) band by UV/Vis spectra. Dark field image and spectra supported SPR band splitting. The catalytic property of Au@Pt nanoparticles was also tested for formic acid oxidation.