Synthesis of Shape-Controlled Au@Pt Nanoparticles and their Application as Electrocatalyst

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Platinum was overgrown on shaped gold nanocrystals. Three different shapes of gold nanocrystals(octahedron, cube, sphere) were synthesized and platinum was overgrown selectively on (100) facets. The overgrowth selectively occurred on the planes of gold cubes and on the vertexes of gold octahedra. On gold spheres, platinum fully covered on gold surface with random atomic orientation. Platinum shell was polycrystalline and its atomic state was analyzed by EXAFS and XPS. TEM images showed unique shapes of as-synthesized Au@Pt core-shell nanoparticles. The electrocatalytic activities of Au@Pt core-shell nanoparticles were investigated by performing methanol electro-oxidation, CO electrooxidation and oxygen reduction reaction and the effect of gold core shape was evaluated.