Electrocatalytic properties of Pt thin layer deposited on shape controlled Au nanocrystals

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We have investigated electrocatalytic properties of platinum thin layer deposited on three different gold nanocrystals of octahedra, cubes and spheres to establish the role of surface crystalline structure and electronic effect between platinum and gold in electrocatalytic reactions. Different shapes of gold nanocrystals(GNC) have different surface crystalline structure. Cube GNC has (100) facet, octahedral GNC has (111) facet and sphere GNC has poorly-defined surface. First we removed surface capping agent of GNC using oxygen plasma, then deposited Pt thin layer using underpotential deposition(UPD) method. Electrocatalytic properties of Pt thin layer on GNC were characterized through formic acid oxidation, methanol oxidation, oxygen reduction and CO oxidation. Collected data were compared with Pt thin layer deposited on single crystalline Au(100) and Au(111).