

Distinct Platinum Growth Mode on Shaped Gold Nanocrystals

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A mono-atomic layer amount of platinum can be deposited on gold surface using copper underpotential deposition and galvanic exchange. In this study, we found that the structure of deposited platinum can vary depending on the surface structure of gold. When platinum was deposited on shape-controlled gold nanocrystals (GNC), the platinum tended to deposit as layers on the octahedral GNC with a Au(111) surface, while it aggregated and formed small particles on the cubic GNC with a Au(100) surface. By using density functional theory calculation, we have confirmed that platinum on Au (111) surface was more stable as layer structure while platinum on Au(100) surface was more stable as particle structure. Electrochemical CO stripping result also supported our observation.