

A study of charge quantization on ligand-stabilized Au₅₅ cluster monolayers

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Low-temperature ultrahigh-vacuum scanning tunnelling microscopy and spectroscopy was employed to analyse the electronic transport through the ligand-stabilized metal cluster Au₅₅[P(C₆H₅)₃]₁₂Cl₆, prepared as a monolayer on Au(111) substrates. The current-voltage behaviour is governed by charge-quantization phenomena expected for a nanometre-sized metallic particle. The related electric capacitances of the involved tunnelling junctions have been determined from accompanying current-distance measurements. Resonant tunnelling through states of the ligands can be ruled out as a relevant process in electronic transport through the clusters.