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Spectral diffusion in the tunneling spectra of ligand-stabilized undecagold clusters THOMAS P. PEARL, North Carolina State University, RACHEL K. SMITH, SANJINI U. NANAYAKKARA, PAUL S. WEISS, The Pennsylvania State University, GERD H. WOEHRLE[1], JAMES E. HUTCHISON, University of Oregon — Electronic properties of isolated, solution-derived, and ligand-stabilized undecagold clusters ($Au_{11}L_{10}$) in both cryogenic (4 K, UHV) and ambient conditions were measured using scanning tunneling microscopy and spectroscopy. Clusters were immobilized on alkanethiolate self-assembled monolayer matrices with inserted dithiol tethers. At low temperature, $Au_{11}L_{10}$ clusters demonstrated Coulomb blockade, with zero-conductance gaps resulting from quantum size effects, and spectral hopping. While these clusters were immobilized for probing, we hypothesize that these assemblies may be dynamic and influence their charge transport significantly. Diffusion in the conductance resonances of the tunneling spectra of $Au_{11}L_{10}$ clusters is observed for a *single* cluster, as well as across multiple clusters. The observed spectral diffusion is independent of tunneling conditions and varies significantly for spectra recorded with identical setpoint/tunneling junction conditions.

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