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Electronic behavior of Coumarin labelled quantum sized Au clusters.[1] ANGELA MEOLA, Towson University, VIRAJ THANTHIRIGE, Western Michigan University, KEITH REBER, MARY SAJINI DEVADAS, Towson University — Magic number gold clusters are at the forefront of research owing to their characteristic size dependent optical and electrochemical properties. Of recent interest is their use as biological imaging agents due to their near-IR luminescence (whose wavelength of emission is ligand dependent). Magic number $Au_{25}L_{18}$, and $Au_{144}L_{60}$ clusters were synthesized using a one phase method with L = hexanethiol or dodecanthiol as a stabilizing ligand. The electronic transition states of each particle was observed through UV-Vis, steady state fluorescence, and electrochemical analysis. The clusters were characterized through observation of documented HOMO/LUMO gap using both optical and electrochemical techniques. Au_{144}-clusters indicated quantized double layer charge upon electrochemical analysis. Steady state fluorescence measurements indicates quenching. Transmission electron microscopy was employed to determine particle size and dispersity. The MPCs (Mono Protected Clusters) with the hexanethiol stabilizing ligand were then labeled with a coumarin dye via directed ligand exchange. The products of the exchange reaction were then compared with the MPC made from the coumarin ligand. The details of the synthesis, characterization and two-photon cross-sections of these clusters will be presented.

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