



Bestowing chirality to well-defined gold clusters

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Monolayer protected gold nanoparticles and clusters have promising potential applications as building blocks for nanotechnology, as catalysts or as sensors. Very recently, the chirality of these materials has attracted the attention of researchers [1] and application to chiral technologies is an interesting perspective.

This contribution deals with the preparation of chiral gold nanoparticles, with their chiroptical properties and with exchange reactions in their ligand shell. We applied Electronic and Vibrational Circular Dichroism (ECD/VCD) to study electronic transitions that are mainly located in the cluster core and to perform conformational analysis of the molecules in the ligand shell [2]. Ligand exchange reactions were performed and monitored by ECD and mass spectrometry [3].

The chiroptical studies indicate that chirality can be bestowed to gold clusters through the adsorption of chiral thiolates. However, even with achiral ligands chiral clusters can be obtained. In this case a racemic mixture is obtained during the synthesis. Using chromatography we were able to separate the enantiomers of Au₃₈ and Au₄₀ clusters and study their properties.

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