

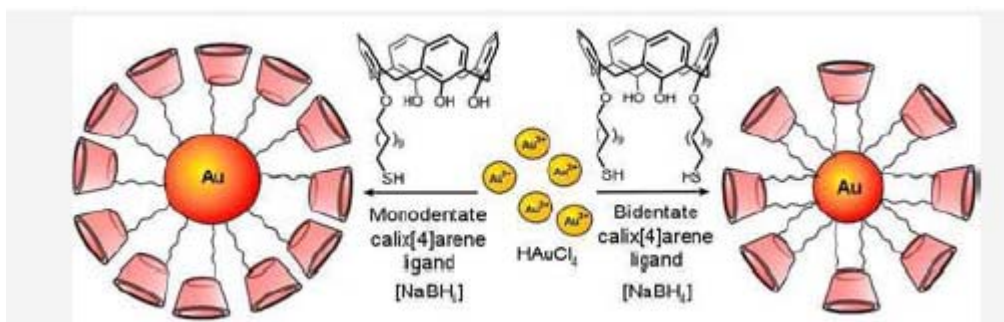
Nanometer-sized Au nanoparticles from mono-, bi- and tri-dentate thiolate ligands

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Ligand-stabilized nanoparticles represent an emerging class of organic–inorganic hybrid materials, constituted by a discrete aggregate of metal atoms stabilized by a shell of organic molecules that maintain their stability in solution and prevent aggregation phenomena.[1,2] A series of gold nanoparticles (AuNPs) stabilized by monodentate, bidentate, and tridentate thiolate calix[n]arene ligands was prepared by using the Brust–Schiffirin synthesis.[3] They have been characterized by NMR spectroscopy, elemental analysis, transmission electron microscopy (TEM), and X-ray Photoelectron Spectroscopy (XPS). The experimental data reveal the electronic states of different subsets of Au atoms, and show that the particular multidentate structure of calix[n]arene derivatives introduces a control element in the preparation of the nanoparticles, which allows to obtain very small (<1 nm) nanoparticles. These experimental findings are the first which identify a role of ligand denticity in the determination of the nuclearity of nanoparticles, and open the path to a ligand-assisted synthesis in the nanometer range.



[1] J.C. Love, L.A. Estroff, J. K. Kriebel, R.G. Nuzzo, G.M. Whitesides, *Chem. Rev.* 2005, 105, 1103.

[2] *Hybrid Materials. Synthesis Characterization, and Applications*, G. Kickelbick Ed., Wiley-VCH, Weinheim, 2007.

[3] L. Pescatori, A. Boccia, F. Ciesa, F. Rossi, V. Grillo, A. Arduini, A. Pochini, R. Zanoni and A. Secchi, *Chem. Eur. J.* 16, 11089 (2010).