

## TUNING THE MAGNETIC PROPERTIES OF GOLD NANOPARTICLES

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Metallic nanoparticles exhibit properties different from those of bulk material. The differences are mainly due to the large ratio of surface to volume atoms, which increases as the dimensions of the particle diminishes. Furthermore, the atoms at the surface can be modified by and appropriate capping: The bond between the capping species and the atoms at the surface will modify the electron density at those places and consequently the physical properties related to this value.

In this paper we report the modification in the magnetic and optical properties of 2.4 nm diameter gold nanoparticles by capping with different molecules. The most outstanding result is the change in the magnetic behaviour of the nanoparticles, that varies from diamagnetic to ferromagnetic-like behaviour (with  $H_c=250$  Oe at RT) depending on the capping system. The enhancement of magnetic properties of the system is accomplished by an increase in the holes density at the 5d band of gold atoms and a decrease in the surface plasmon resonance absorption. The result points toward the localization of electron holes at the surface Au-S bonds as responsible for the changes in the magnetic behaviour of the nanoparticles.