

Abstract Submitted  
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**Measuring the Size Dependence of the Magnetic Properties of Alkanethiol-coated Gold Nanocrystals**<sup>1</sup> SARAH C. HERNANDEZ<sup>2</sup>, BRIAN A. KORGEL, ANDREW HEITSCH — Bulk gold is diamagnetic but 2 nanometer dodecanethiol capped gold nanoparticles have been reported to exhibit ferromagnetic properties.[1] Ferromagnetism is believed to result from spin-orbit coupling between the surface-bound thiol molecules and the gold surface atoms.[2] Therefore, as the gold nanoparticles size decreases and the surface area to volume ration increases, ferromagnetism is expected to increase. The size dependence of the magnetic properties of thiol-capped gold nanocrystals was studied. Thiol-capped gold nanocrystals were synthesized using Brust's method[3] with diameters that ranged from 2 to 6 nm. The magnetic susceptibility of the nanocrystals were measured using a superconducting quantum interference device at room temperature and 5 Kelvin.[1] Contrary to two published reports,[1,2] but consistent with another study,[4] the thiol-coated gold nanocrystals did not exhibit ferromagnetism, and were in fact diamagnetic, even down to diameters of 1.8 nm. [1] Crespo, P., *et al. Phys. Rev. Lett.* **93** (2004) 087204. [2] Hernando, A., *et al. Phys. Rev. Lett.* **96** (2006) 057206. [3] Brust, Mathias, *et al. J. Chem. Soc., Chem. Commun.*, (1994) 801. [4] Yamamoto, Y.; Hori, H., *Re. Adv. Mater. Sci.* **12** (2006) 23-32.

<sup>1</sup>NSF and NNIN

<sup>2</sup>NNIN REU at University of Texas at Austin

Sarah C. Hernandez  
Texas Christian University

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