Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Ultrasmall metal clusters and their interaction with a molecular matrix – the fullerene-Au model system PETRA REINKE, HUI LIU, University of Virginia, HELGE KROEGER, Universitaet Goettingen — Metal clusters with less than 50 atoms, are of great interest in the development of true nanoscale electronics. The electronic structure is strongly size dependent and future applications rely on a narrow size distribution. Our goal was to investigate the possibility to use fullerene surfaces as templates in the formation of cluster arrays, to analyze the cluster-fullerene interface and the electronic structure of the components. This study was performed by using photoelectron spectroscopy, and scanning tunneling microscopy and spectroscopy (UHV-conditions). The Au-cluster size is controlled by the coverage and the fullerene lattice limits the cluster surface mobility, making them accessible to STM analysis. The fullerene matrix enhances the cluster stability and ripening occurs above 500 K. A comprehensive description of the Au-cluster-fullerene system has been achieved and includes the interface characteristics, local and global electronic structure, and the spatial distribution of Au-clusters with respect to the fullerene matrix. Our understanding is currently most advanced for the Au-C_{60} and Si- C_{60}system, where in the latter, a preferential nucleation at the interstitial lattice sites of the C_{60} was confirmed.

Petra Reinke
University of Virginia

Date submitted: 05 Dec 2005 Electronic form version 1.4