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Atomic Structure and Mass-Production of Supported Size-Selected Nanoclusters

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Deposition of size-selected nanoclusters assembled from atoms in the gas phase is a novel route to the fabrication of <10nm surface features. I will focus on the creation and atomic structure of monodispersed metal cluster arrays which enable new model catalysts and protein biochips. The atomic structure of the clusters – previously the province of theory - is revealed experimentally [1] by aberration-corrected scanning transmission electron microscopy (STEM) in the HAADF imaging regime; we can "count" atoms and obtain 3D information not just 2D projections. Results include mass spectrometry of thiolated Au clusters, adatom dynamics on Au923 magic-number nanoclusters [2], first atomic imaging results for Au55 and Au20 and a method to explore the potential energy landscape of (Au923) clusters via cluster transformations [3], presenting a reference system for theory. A new kind of cluster beam source, to allow super-abundant generation of size-selected nanoclusters, will also be demonstrated.

[1] *Z.Y. Li, N.P. Young, M. Di Vece, R.E. Palmer, et al, Nature 451 46 (2008).,* ***[2]*** *Z.W. Wang and R.E. Palmer, Nano Lett. 12 91 (2012).,* ***[3]*** *Z.W. Wang and R.E. Palmer, Phys. Rev. Lett. 108 245502 (2012).*

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