

Research Interests: surface science, scanning probe microscopy, single molecule spectroscopy, epitaxial graphene, molecular electronics, heterogeneous catalysis



Our research encompasses a broad range of activities, listed below, with a common objective: to better understand fundamental principles and mechanisms involved in the chemistry and physics at surfaces. Our interest stems from a wish to explore the fundamental properties of the materials, as well as from a need for understanding their properties in sufficient detail to be able to improve device performances in technological applications. We believe many of such issues can be addressed with scanning probe microscopies (STM, AFM) by providing high-resolution, real-space, and time-resolved images of surface phenomena. Strategies are devised to properly interrogate relevant systems at the atomic scale. For instance, surface nano-engineering is investigated with the aim of delivering concepts that can be used for the development of new devices, in a variety of fields such as heterogeneous catalysis, photo-catalysis, optoelectronics, molecular electronics and architectures. The various research activities we are presently working on are related to (1) epitaxial graphene, (2) molecular switches and electronics, and (3) the Fischer-Tropsch synthesis.

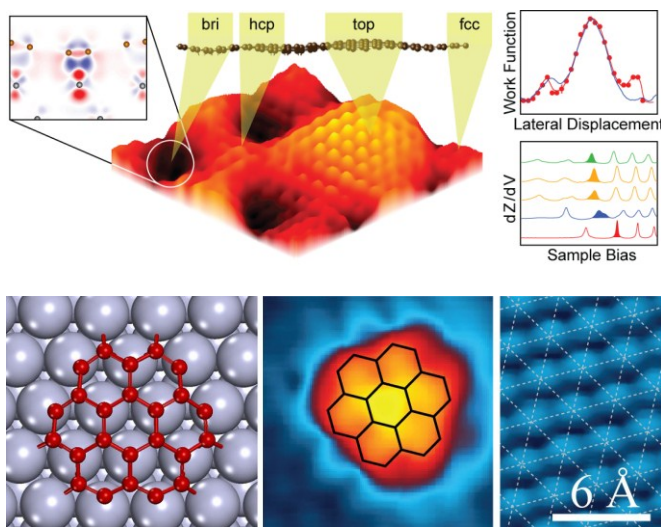


Figure: (top) An illustration of the electronic structure of epitaxial graphene grown on Rh(111), and (bottom) experimental identification of size-selective graphene precursors  $C_{24}$  on the Rh(111) surface.

## SELECTED RECENT PUBLICATIONS

1. Oxygen-Mediated Diffusion of Oxygen Vacancies on the  $TiO_2(110)$  Surface, R. Schaub, E. Wahlström, A. Rønna, E. Lægsgaard, I. Stensgaard, F. Besenbacher, *Science* **299**, 377 (2003).
2. Enhanced Bonding of Gold Nanoparticles on Oxidized  $TiO_2(110)$ , D. Matthey, J.G. Wang, S. Wendt, J. Matthiesen, R. Schaub, E. Lægsgaard, B. Hammer, F. Besenbacher, *Science* **315**, 1692 (2007).
3. Coupling Epitaxy, Chemical Bonding and Work Function at the Local Scale in Transition-Metal Supported Graphene, B. Wang, M. Caffio, C. Bromley, H. Früchtl, R. Schaub, *ACS Nano* **4**, 5773 (2010).
4. Strong Electron Correlations in the Normal State of the Iron-Based  $FeSe_{0.42}Te_{0.58}$  Superconductor Observed by Angle-Resolved Photoemission Spectroscopy, A. Tamai, A. Y. Ganin, E. Rozbicki, J. Bacsá, W. Meevasana, P. D. C. King, M. Caffio, R. Schaub, S. Margadonna, K. Prassides, M. J. Rosseinsky, F. Baumberger, *Physical Review Letters* **104**, 097002 (2010).
5. Size-Selective Carbon Nano-Clusters as Precursors to the Growth of Epitaxial Graphene, B. Wang, X. Ma, M. Caffio, R. Schaub, W.-X. Li, *Nano Letters* **11**, 424 (2011).