

The Department of Physics and Astronomy &
The Department of Chemistry
Presents Research Seminar Speaker

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Friday March 12, 2010

Meet & Greet: 3:00-3:30 p.m.

Seminar: 3:30-4:30 p.m.

Location: MB 0.302

Observation of Chemical Reactions on Surfaces using STM- Watching Individual Molecules do their Molecular Dances

The scanning tunneling microscope provides spatial resolution able to observe the molecular shape and site location of single molecules adsorbed on surfaces. I will show how this measurement technique can be used to observe the molecular details of adsorption and of decomposition of individual molecules on surfaces, with decomposition being caused by electron injection into the molecule from the STM tip. Also we have been able to observe a free-radical type of chain reaction occurring on the surface between self-assembled molecules, where as many as 10 molecules are involved in the chain propagation process. Chain reactions have been recognized since the early days (1920's) of gas phase chemical kinetics research. This work is the first to witness the individual molecular steps of the chain reaction for adsorbed species.

Reference: P. Maksymovych, D. C. Sorescu, K. D. Jordan and J. T. Yates, Jr.,
Science 322, 1664 (2008), December 12, 2008