



Columbia University

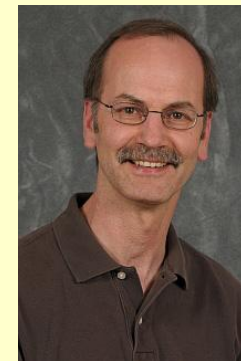


IGERT and Quantum Electronics Seminar

“Dynamics and Mechanism of Photoreactions on TiO₂(110) Surfaces”

M. G. White

*Department of Chemistry, Stony Brook University
Chemistry Department, Brookhaven National Laboratory*



Date/Time: Thursday, October 30, 10.30AM – 11.30AM

Location: Sindband East 414, CEPSR

Abstract: The sustained scientific interest in photoreactions on titania is largely driven by its application in environmental photocatalysis and solar energy conversion. As a photocatalyst, titania surfaces are especially effective in “mineralizing” organic materials through UV-induced photooxidation reactions. The basic process involves interaction of photoexcited charge carriers (e/h) at the adsorbate-titania interface following excitation at energies above the band gap (~3.1 eV). Mechanistic information is often derived from product analysis or detection of intermediates, however, for experiments at ambient pressure or in solution these are often the result of secondary reactions and do not represent the primary photoproducts. In our work, we use well-defined single crystal TiO₂(110) surfaces and laser-pump-probe techniques to investigate the initial steps of photooxidation that provide information on molecular binding sites, gas-phase and surface-bound products, and fragmentation dynamics. Results will be presented for the UV photooxidation of simple ketones and alcohols on TiO₂(110) that provide new insight into the interfacial charge transfer processes leading to molecular fragmentation and clarify the role of molecular oxygen.

Bio: B.S., 1974, University of Pittsburgh; Ph.D., 1979, University of California; Research Associate, University of British Columbia, Vancouver, Canada, 1979-80; Senior Chemist, Brookhaven National Laboratory, 1995-present; Chair, Chemistry Department, Brookhaven National Laboratory, 2000-2001; Professor, SUNY Stony Brook, 2001-present.