Chemistry Invited Faculty Seminar
Tomorrow (Friday) February 15 at 3:30 PM in HEC 125
Please note the room.

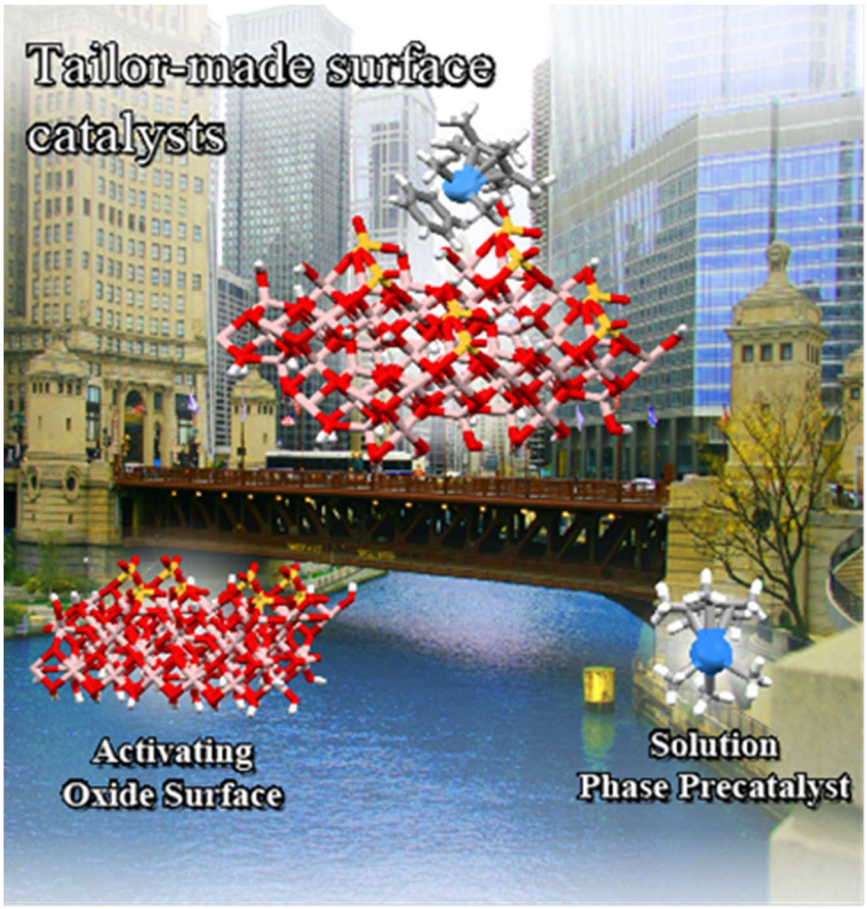
Dr. Tobin Marks

Distinguished Professor
Chemistry Department
Northwestern University, Evanston IL
Host: Titel Jurca

Surface Science Meets Homogeneous Catalysis: Surfaces as Activators and Ligands

Abstract

When chemisorbed upon certain surfaces, the reactivity of many types of organometallic molecules is dramatically enhanced in ways that historically have been poorly understood. High activities for a variety of catalytic reactions are illustrative consequences of this altered reactivity. This lecture focuses on the intricate non-covalent and covalent multi-center interactions that modulate these catalytic processes, focusing primarily on polymerization and hydrogenation/dehydrogenation processes. Specific interrelated topics include: 1) Catalytic chemistry of mononuclear and multinuclear d^0 catalysts anchored on/activated by surfaces versus those in homogeneous solution, 2) Catalytic chemistry and cooperativity effects in multinuclear groups 4 and 6 catalysts in homogeneous solution, 3) Definitive structural characterization of these catalysts on “super-acidic” oxide surfaces, and the broad scope of their catalytic properties, 4) Unusual catalytic chemistry of group 6 dioxo complexes adsorbed on activated carbon surfaces. It will be seen that the information obtained from these studies leads to design rules for next-generation homogeneous and supported catalysts, and for novel and useful polymerization and hydrogenation/-dehydrogenation processes, including the catalytic detoxification of gasoline, stereoselective aromatics hydrogenation, biofeedstock trans-esterification, and bio-alcohol dehydrogenation.


Tailor-made surface catalysts
Activating Oxide Surface
Solution Phase Precatalyst