



The OSU Department of Chemical Engineering Graduate Program

Cordially invites you to attend a seminar on

Structure-Function Relationship in Catalysis: Illustrations of Lessons Learned from Experiments and Theory

Thursday, April 25, 3:30 p.m.

Room 207 Koffolt Labs, 140 W. 19th Avenue

Reception before the Seminar in Room 336, at 3:00 pm

Professor Alexis T. Bell

University of California, Berkeley Chemical Engineering Department

Abstract

Catalysts are an essential component of virtually all processes used by the chemical and fuels industries, and for the abatement of environmental contaminants. The continual improvement of such processes, as well as the development of environmentally benign, or “green”, processes depends on the discovery and development of appropriate catalysts. Since the period from discovery of a new catalyst to its implementation can be from 3-10 years, there is continuing interest in finding ways to reduce this time. One of the significant contributors to this objective is knowledge of catalyst structure-function relationships. During the last several decades, considerable progress has been made in understanding catalysis at the molecular level. These advances have come through the use of multiple analytical techniques in combination with techniques for identifying reaction pathways and the relationships between catalyst composition and structure and catalyst activity and selectivity. Quantum chemical calculations have also proven to be increasingly useful in understanding the physical and chemical properties of active sites and in elucidating potential reaction pathways. This talk will illustrate how experimental and theoretical techniques can be used in combination to obtain a comprehensive picture of the structure and function of catalytically active sites, and how this knowledge can be used to suggest further improvements in catalyst performance. Specific examples will be presented for the oxidative dehydrogenation of alkanes to olefins, the synthesis of methanol, the oxidation of methanol to formaldehyde, and the decomposition of N₂O.



Professor Alexis T. Bell received his Sc.D. degree from M.I.T. in Chemical Engineering. He then joined the Department of Chemical Engineering at the University of California at Berkeley, where he currently holds the title of Full Professor. He has served as the Assistant Dean of the College of Chemistry and as the Chairman of the Department of Chemical Engineering, as well as Dean of the College of Chemistry. Professor Bell is also a Faculty Senior Scientist in the E. O. Lawrence Berkeley National Laboratory. He is Editor for *Catalysis Reviews*, and an Executive Editor for *Chemical Engineering Science*; he also serves on the editorial board of a large number of other journals. He has served on numerous committees of the American Chemical Society, the American Institute of Chemical Engineers, the Council for Chemical Research, and the National Research Council. The results of his research have been published in over 400 articles appearing in refereed journals. He has received many honors for his research contributions, including the Curtis W. McGraw Award for Research, given by the American Association of Engineering Education; the Professional Progress and R. H. Wilhelm Awards, given by the American Institute of Chemical Engineers; the Paul H. Emmett Award in Fundamental Catalysis, given by the Catalysis Society; and the ACS Award for Creative Research in Homogeneous or Heterogeneous Catalysis. Bell is a member of the National Academy of Engineering and a Fellow of the American Association for the Advancement of Science. He has presented ten named lectures at various universities and research institutes. Professor Bell is known for his research in the field of heterogeneous catalysis and is recognized as one of the leaders in applying *in situ* spectroscopic techniques in combination with isotopic tracer techniques to the study of catalyzed reactions.