

MAR12-2011-000535

Abstract for an Invited Paper  
for the MAR12 Meeting of  
the American Physical Society

### **Cluster Structure and Reactions: Gaining Insights into Catalytic Processes**

A. WELFORD CASTLEMAN, Penn State University

To many researchers outside the field of cluster science it comes as a surprise that much can be learned of its relevance to catalysis, even restricting the discussion to ionized systems. The objective of this talk is to present how fundamental insights into reaction mechanisms can be gained through employing alternative approaches that complement rather than supersede more conventional methods in the field of catalysis. In view of the well acknowledged role of defect centers in effecting reactivity, and the preponderance of recent papers presenting evidence of the importance of charged sites, the desire to conduct repetitive experiments is clear. Presented herein are approaches using clusters to accomplish this in order to unravel fundamental catalytic reaction mechanisms, and to use identified superatoms and the concepts of element mimics to tailor catalysts with desired functionality.