

# Metal-Based Nanomaterials. Preparation and Applications in Chemical Analysis and Catalysis

BY Prof. Ziling (Ben) Xue, Ph.D.

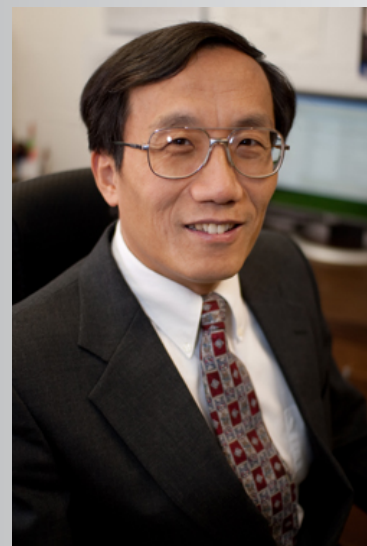
Department of Chemistry, University of Tennessee at Knoxville

## ABSTRACT

Nanomaterials such as Au nanoparticles have been used to enlarge electrode surface area or improve conductivity of functional coatings on the electrodes. The nanomaterials significantly enhance the electrochemical detection of metal ions such as chromate. Mixed metal oxide nanoparticles such as  $\text{Bi}_2\text{WO}_6$  and  $\text{Bi}_2\text{GeO}_5$  have been prepared through simple, rapid microwave-hydrothermal reactions. The oxide materials are found to be catalysts for the degradation of Rhodamine B (RhB) under visible light irradiation. This seminar will also cover recent studies of mechanistic pathways in the preparation of nanometer-thick, microelectronic gate oxides such as  $\text{HfO}_2$  or  $\text{Ta}_2\text{O}_5$  through the reactions of amides  $\text{M}(\text{NR}_2)_n$  ( $\text{M} = \text{Hf}, \text{Ta}$ ;  $\text{R} = \text{Me}, \text{Et}$ ) with  $\text{O}_2$  or  $\text{H}_2\text{O}$  in chemical vapor deposition (CVD) and atomic layer deposition (ALD) processes.

## BIOGRAPHY

Dr. Xue studied physical chemistry-catalysis at Nanjing University-Nanjing College of Pharmacy, and received his B.S. degree. As a Chemistry Graduate Program (CGP or William von E. Doering Program) fellow, he received his Ph.D. degree from UCLA. He then moved to Indiana University as a postdoctoral fellow. Dr. Xue has been at the University of Tennessee since 1992 and is now a Paul and Wilma Ziegler Professor of Chemistry. He served as a member of the Executive Committee, ACS Division of Inorganic Chemistry, and is now division Membership Chair. Dr. Xue is Associate Editor, Science China Chemistry. He has received several awards and honors including a National Science Foundation (NSF) Young Investigator Award, Camille Dreyfus Teacher-Scholar Award, Changjiang Lecture Professor, and an NSF Special Creativity Extension. Dr. Xue was elected a Fellow of the American Association for the Advancement of Science (AAAS) in 2010.



## EVENT DETAILS

**DATE:**

February 6, 2013

**TIME:**

11:00 AM

**LOCATION:**

Babbio 122  
Stevens Institute of Technology

**ATTENDANCE:**

Public

**Co-Sponsored by the  
CCBBME Department**