

ECE Department Guest Seminar

Speaker: Xiaoshan Xu, Ph.D.
Bryn Mawr College

Exploring low dimensional complex oxides and interfaces to the organic semiconductors

December 6th, 2012 at 2:00 pm
Room 3507

Abstract

In this talk, I will present the research I have initiated in the Oak Ridge National Lab. The research covers two related areas, namely exploring novel low dimensional oxide materials and the interfaces with organic semiconductors. Complex oxides exhibit variety of structural and electronic properties which have long been scientifically interesting and proven commercially useful. The endeavor at developing new advanced materials and tuning known materials to realize novel and multiple functionalities (e.g. information storage and processing, energy conversion and storage), has been a focus for studying complex oxides. Taking advantage of many emerging phenomena at nanoscale has become a fruitful way of tailoring the properties of complex oxides. In addition, the effort on the integration of complex oxides into heterostructures and the interfaces with other functional materials is becoming more and more a focus. Here we are particularly interested in the interface between low dimensional complex oxides and organic semiconductors. Organic semiconductors hold great potential in energy related applications such as organic light emitting diode and organic photovoltaics. These organic electronics are highly attractive because of their light weight, flexibility, and environmental friendliness. The interfacial properties between organic semiconductors and the inorganic materials are among the intrinsic factors governing the device performance (e.g. energy conversion efficiency), stability (life time) and predictability. In particular, the possible tunability of the organic semiconductor devices offered by the interface between organic semiconductors and tunable complex oxides is extremely intriguing. I will discuss the discovery of new multiferroics hexagonal ferrites as an example of tailoring functional materials at low dimension. Our effort on tuning the electronic properties of oxide/organic semiconductor interface will also be presented.

Bio

Dr. Xiaoshan Xu is a Research Associate in Bryn Mawr College. He obtained his Ph.D. degree from Georgia Institute of Technology in Physics with minors in Computer Science while his B.A. and M.S. degrees from Nanjing University in Physics. He has worked as a postdoctoral research associate in the University of Tennessee and a staff member in the Oak Ridge National Lab. Dr. Xu has published 36 papers with more than 600 total citations. He is a recipient of the ORNL Eugene Wigner Fellowship in 2010, the most prestigious early career award within ORNL. Dr. Xu has given invited talks at international conference and served as referees for many international journals like European Physical Journal - Applied Physics, Journal of Physics D: Applied Physics, Journal of Physics: Condensed Matter, Physical Review B, Physical Review Letters, Solid State Communications.