PENNSTATE

THE MATERICALS DEVICES AREA SEMINAR

(EE 500 GRADUATE COLLOQUIUM)

Fall 2009

You are cordially invited to

The Signals and Systems Area Seminar

Entitled

"Towards Efficient Conversion of Solar Energy to Electricity or Fuels Using Self-Assembled 1-D TiO2 Nanotube/wire Arrays"

By

Prof. Craig A. Grimes

Department of Electrical Engineering
Penn State University Park Campus

The talk will take place on

September 10, 2009
4:00 pm

At

225 EE West Building

Talk Abstract:

We consider the self-assembled synthesis and application to solar energy conversion of semiconducting n-type TiO2 nanotube as well as nanowire arrays. Details of the specific architecture, crystallinity, composition and illumination geometry of the nanotube or nanowire arrays are critical factors in their performance. We discuss the key aspects relating to each factor and the advances achieved in improving each. Solar fuel applications include include hydrogen generation via water photoelectrolysis, and the photocatalytic reduction of CO2 and water vapor to hydrocarbon fuels. We discuss several photovoltaic devices making use of the 1-D nanotube/wire morphology, including dye-sensitized, heterojunction, and resonance energy transfer FRET-based devices.

Speaker's Bio:

Craig A. Grimes received the Ph.D. degree in Electrical and Computer Engineering from the University of Texas at Austin in 1990. He is currently a Professor of Electrical Engineering at the Pennsylvania State University, University Park. His research interests include hybrid heterojunction solar cells, photocatalytic reduction of CO2 to hydrocarbon fuels, solar production of hydrogen by water photoelectrolysis, propagation and control of electromagnetic energy, and remote query environmental sensors. He is author/co-author of four books, many patents, and some 300 archival journal publications at least a few of which, to steal a quote from T. E. Mallouk, are worth reading.