055:191

Electrical & Computer Engineering Graduate Seminar (jointly with CBE)

"High Density Hydrogen Storage: Needs, Methods, and Applications"

Thursday September 24, 2009 3:30-4:20 PM Room 1505 SC

ABSTRACT: Hydrogen has the potential to become the highest energy density fuel outside of nuclear reactions. When used, the only products are energy and water, making it the cleanest fuel possible. It can be quite versatile, with energy storage applications at many scales. Hydrogen is currently used in energy applications ranging from cell phone batteries to hospital generators. However, in its natural form hydrogen is a dilute gas that is difficult to compress to the levels needed for most applications. Development of a medium to reversibly store hydrogen at extremely high densities is critical for opening up new clean energy technologies and could also prove useful for enhancing clean energy production from wind or solar power. We have developed a new route that could be used for reversibly storing hydrogen at very high volumetric densities. This method involves weakly bonding the hydrogen inside a layered material with a structure similar to graphite. In this seminar, a comparison will be made with this method to other storage materials including an overview of the requirements and feasibility for next-generation hydrogen powered devices.

Bio: Professor Kidd has been doing research in bonding properties, phase transitions and the overall electronic properties of low dimensional and nanoscale for over ten years. He has studied strongly correlated oxide superconductors, charge density wave systems, nanostructured semiconductors, and in recent years have led a research team involved with doping studies of layered materials like the dichalcogenides. In addition to this basic research, more recently my work has involved systems with potential applications in alternative energy fields such as hydrogen storage, photovoltaics, and thermo-electric materials. The work has led to the development of new growth techniques and the creation of materials in novel forms. In the near future, his group intends to expand on a newly



established program for crystal synthesis and characterization to explore novel materials for use in alternative energy applciations.

B.S. Engineering Physics 1995, University of Illinois Urbana-Champagin
Ph. D. Physics 2002, University of Illinois Urbana-Champagin
2002 - 2005: Post-Doc Brookhaven National Laboratory
2005 - Present: Assistant Professor of Physics, University of Northern Iowa

All ECE graduate students are required to attend.

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Individuals with disabilities are encouraged to attend all University of Iowa-sponsored events. If you have a disability that requires accommodation to participate in this program please contact the Electrical and Computer Engineering Department in advance at 335-5197