

**Fall 2009 Seminar Program**

*Friday, October 23<sup>rd</sup>*  
**WBSH, Room 6030 - 3:15 p.m.**



**Jennifer Aitken, Ph.D.**

**Associate Professor  
Dept. of Chemistry & Biochemistry**

**Duquesne University**



**“Synthesis and Characterization of Diamond-Like Semiconductors”**

**ABSTRACT**

CuInSe<sub>2</sub>-based materials are a viable alternative to silicon for use in photovoltaic devices. CuInSe<sub>2</sub> adopts the chalcopyrite structure, which can be derived from the cubic, sphalerite structure by doubling the unit cell in one direction such that the crystal system becomes tetragonal. In the structure there are two crystallographically unique cation sites, namely 4a and 4b. In this study, two series of compounds, CuIn<sub>1-x</sub>Mn<sub>x</sub>Se<sub>2</sub> and Cu<sub>1-y</sub>In<sub>1-y</sub>Mn<sub>2y</sub>Se<sub>2</sub>, were prepared via high-temperature, solid-state synthesis. Single-phase materials could be found up to x=0.10 and 2y=20%, respectively. The bandgap of the materials, estimated from optical diffuse reflectance spectroscopy, remains at approximately 0.9 eV independent of doping concentration. Rietveld refinement of neutron powder diffraction data revealed that the Mn ions have a site preference, independent of the nominal composition. Thermopower and electrical conductivity data will also be presented.

**BIO**

**PROFESSIONAL PREPARATION**

**Rider University Chemistry B.S. 1996**

**Michigan State University Inorganic Chemistry Ph.D. 2001**

**Wayne State University Solid-State Chemistry Post Doc. 2001-2003**

**APPOINTMENTS**

**Associate Professor: Duquesne University, Department of Chemistry and Biochemistry**

**600 Forbes Avenue, Pittsburgh, PA 15282 (08/09 to present)**

**Assistant Professor: Duquesne University, Department of Chemistry and Biochemistry**

**600 Forbes Avenue, Pittsburgh, PA 15282 (08/03 to 08/09)**