T_CSUH Bi-Weekly Seminar

Texas Center for Superconductivity at the University of Houston

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"Some New Insights on the Chemistry of Intermetallics and Metal-Rich Phases"

Friday, April 13, 2007

Room 102, University of Houston Science Center
12:00 noon – 1:00 p.m.

Abstract

Polar intermetallic phases formed between transition and post-transition metals with one or more of the electropositive alkali, alkaline-earth, and rare-earth metals exhibit a rich variety of complex structures. More importantly, the smooth transition of electronic properties from semiconducting intermetallics to classical metallic compounds along the Zintl border provides a fertile area to search for materials with novel electronic properties. This also offers unique opportunities in investigating structure-bonding-property relationships among materials at the border between metals and nonmetals. We have used the Zintl concept in rationalizing the synthesis, stoichiometry, and chemical bonding of novel ternary and quaternary "electron-poor" Zintl phases that exhibit unusual π-bonding. Recently, our exploratory work near the Zintl border has also resulted in a number of novel polar intermetallic structures. These compounds and other newly discovered polar intermetallics add new insight to the structural and chemical bonding peculiarities of Zintl phases and the less polar intermetallics. In addition, results of exploratory forays into the yet unexplored chemical reactivity of Zintl phases will be presented. The mild reduction and oxidation of the "salt-like" intermetallics provides a novel route to new materials with interesting properties and structures.

Bio

Prof. Arnold Guloy received a BS in Chemistry (1985) from the University of the Philippines, Quezon City, and a Ph.D. in Inorganic Solid State Chemistry from Iowa State University (1991; advisor, Prof. John D. Corbett). He was a Postdoctoral Fellow at IBM TJ Watson Research Center at Yorktown Heights (1991–93, supervisor: Dr. Bruce A. Scott) and an Assistant Professor, Department of Chemistry, University of Houston (1994 - 2000). He is currently Associate Professor, Department of Chemistry, University of Houston (2000–present), and a Visiting Professor/Guest Scientist, Max-Planck-Institut for Chemical Physics of Solids, Dresden, Germany (2004–present).

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