

# Chemistry/T<sub>C</sub>SUH Joint Special Seminar

Texas Center for Superconductivity at the University of Houston

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(Germany)

## “Substitution Effects in Intermetallic Compounds”

**Friday, April 4, 2008**

Room 102, University of Houston Science Center

11:00 a.m. – 12:00 Noon

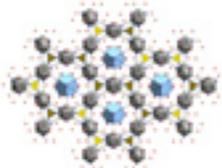
### Abstract

Intermetallic compounds are fascinating with respect to their atomic structures and their electronic band structures. On the one hand atomic structures can be as simple as close packed arrays of atoms, and they can also reach a complexity with up to thousand atoms per unit cell (complex metallic alloys). On the other hand the electronic band structure in many cases offers particularities such as pseudo-gaps or high density of states at the Fermi level, which permits their applications in various fields of material sciences. As a borderline case semi-conducting Zintl phases gain increasingly influence in technological relevant materials. Fine tuning of atomic and electronic structures can be achieved by partial substitution of specific components of an intermetallic compound. In this context the effect on structural and electronic properties of atom by atom substitution is demonstrated by means of the systems  $KPb_2$ - $KBi_2$ ,  $BaSn_3$ - $BaBi_3$ , mercury substitution in clathrate-I  $A_8Ge_{44}$  and  $A_8Sn_{44}$  ( $A$  = alkali metal), and zinc substitution in binary compound of the system  $Na-Sn$ . As a result the formation of complex structures containing atom clusters or long-range orders up to  $100\text{\AA}$  reveal as basic elements, as well as qualitative changes in the electronic properties.

□ A. Kaltzoglou, S. D. Hoffmann, T. F. Fässler, Eur. J. Inorg. Chem. 2007, 4162

□ S. Ponou, N. Müller, T. F. Fässler, U. Häussermann, Inorg. Chem. 2005, 44, 7423

□ T. F. Fässler, C. Kronseder, Angew. Chem. 1997, 109, 2800. Angew. Chem. Int. Ed. 1997, 36, 2683



### Bio

Thomas F. Faessler was born in Bad Waldsee/Reute (Germany). He studied chemistry and mathematics at the University of Konstanz. In 1988, he received his PhD with Prof. G. Huttner (Heidelberg). After a period of research at the University of Chicago with Prof. J. Burdett, he continued his work at the ETH Zurich with Prof. Reinhard Nesper where he completed his habilitation in 1997. In 2000, he became Professor at Darmstadt University of Technology, where he also directed the Institute of Inorganic Chemistry. In 2003 he moved to the Technical University of Munich where he is currently the Chair of Inorganic Chemistry with Focus on New Materials. Prof. Faessler's research encompasses a wide range of topics in solid state and inorganic chemistry - intermetallic compounds, molecular clusters, catalysis, as well as electronic structures and chemical bonding of solids.

*Persons with disabilities who require special accommodations in attending this lecture should call (713) 743-8210 as soon as possible.*



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