Structure and Stability of Intermetallic Compounds

Overview

The Intermetallic compounds are solid phases containing two or more metallic elements, with optionally one or more non-metallic elements, whose crystal structures differ from their constituent elements. They include the semiconducting, highly polar, electron precise Zintl phases to metallic alloys. Intermetallic compounds have high potential of practical applications in industry as coating materials, energy materials etc. They are also of great technological importance as they can be functionalized to produce intriguing electronic, magnetic, optical, catalytic and mechanical properties.

Complex intemetallics (CIMs) are formed with crystal structures, based on large unit cells comprising some tens to thousands of atoms. The periodicity of the crystal unit cell is no longer a relevant property, since it becomes much larger than the average first-neighbor distance, and more specifically exceeds the distance that characterizes basic interactions in the crystal. As a consequence, most physical properties, and especially transport of electrons and phonons, depart significantly from the ones found in conventional metals and alloys that are characterized by small unit cells, containing just a few atoms.

Although the topics are introduced in various courses, teaching structure and stability of intermetallics as a subject has been steadily reduced as more topics are included in materials science undergraduate curricula. Therefore, experts often find that they have to pick up the topics by themselves if they need an understanding of structures, stabilization mechanism and crystallographic description of intermetallics.

The primary objectives of the course are as follows: familiarising the participants with the intermetallic compounds, providing an overview of the governing factors behind the structure and stability of intermetallics, presenting an insight on the description of intermetallic structures.

Course participants will learn these topics through lectures and case studies. Assignments will be shared to stimulate research motivation of participants.

Modules	**A: Structure and Stability of Intermetallic Compounds : Dec 3, 2018 - Dec 7, 2018** **Number of participants for the course will be limited to fifty.**
You Should Attend If…	You are a student (BTech/MSc/MTech/PhD) or faculty from reputed academic institutions and technical institutions willing to have/improve their knowledge of intermetallics. You are a metallurgical and/or materials engineer or a research scientist (Chemistry, Physics, and Materials science) interested in understanding the structure and stability of intermetallics.
Fees	The participation fees for taking the course is as follows: **Participants from abroad : US $300** **Industry/ Research Organizations: Rs. 10,000/-** **Teachers/Faculty Members: Rs. 5,000/-** **Students: Rs.1,000/-** The above fee includes all instructional materials, materials for tutorials and assignments, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.

The Faculty

Dr. Walter Steurer is a Professor emeritus of Crystallography at the Laboratory of Crystallography ETH Zurich as well as at the University of Zurich, Switzerland. His research topics include structural studies of aperiodic crystals and their phase transformations as a function of pressure/temperature, modeling of order/disorder phenomena, measurement of thermoelasting tensors of single crystals, physical properties of materials as a function of size, X-ray holography, phononic crystals and higher-dimensional crystallography.

Dr. Partha Pratim Jana is an Assistant Professor at Indian Institute of Technology Kharagpur. His research interest revolves around synthesis, crystal structures, physical properties, and theoretical investigation of intermetallic phases.

Course Co-ordinator

Prof. Partha Pratim Jana
Department of Chemistry
IIT Kharagpur, India-721302
email: ppj@chem.iitkgp.ac.in
Office:03222-283330
E-mail: ppj@chem.iitkgp.ac.in
http://www.gian.iitkgp.ac.in/GREGN