

High Temperature Structural Materials

Overview

High temperature structural materials are frequently used in many fields, most notably in energy conversion applications. To date, the majority of energy provided to the community is based on fossil fuel based combustion engines such as in land-based turbines, aero engines, stationary gas and steam turbines. In order to increase the fuel efficiency of such engines it is of paramount importance to increase the combustion temperatures. This in turn requires the development of new materials which can withstand the multiple requirements for this application. This course will, thus, concentrate on presenting metallic based material systems that are (i) currently in industry service in (ii) and being developed in research for high temperature structural applications. Besides, the mechanisms and methodologies used for this development process will be highlighted. This includes descriptions of the grain boundary engineering principles, the mechanisms which control high temperature creep as well as oxidation and corrosion.

The participants will be given an overview of high temperature structural metallic materials currently used as well as those that are being developed. The complex loading profile these materials undergo in service and the toughness and workability at ambient temperatures, as well as creep and oxidation at high temperatures will be discussed. The concept of grain boundary engineering and its effect on high temperature properties (creep and corrosion behaviour) will be presented. The students should finally be able to apply the physical metallurgy based design principles that are covered in this course in their future R&D activities.

Dates for the Course	7th to 19th December, 2016
Host Institute	IIT Madras
No. of Credits	2
Maximum No. of Participants	50
You Should Attend If...	<ul style="list-style-type: none">▪ You are a metallurgical/ materials / mechanical / production engineer or research scientist in automotive / aerospace / energy industry interested in understanding the principles of high temperature structural materials▪ You are a student or faculty from an academic institution interested in understanding structure-properties correlations in high temperature structural materials and to know the state of the art in the research domain of high temperature structural materials development.
Course Registration Fees	<p>The participation fees for taking the course is as follows: Student Participants: Rs.2000 Faculty Participants: Rs.6000 Government Research Organization Participants: Rs.10000 Industry Participants: Rs.20000</p> <p>The above fee is towards participation in the course and the course material.</p> <p>Mode of payment: Demand draft in favour of "Registrar, IIT Madras" payable at Chennai The demand draft is to be sent to the Course Coordinator at the address given below.</p>
Accommodation	<p>The participants may be provided with hostel accommodation, depending on the availability, on payment basis. Request for hostel accommodation may be submitted through the link: http://hosteldine.iitm.ac.in/iitmhostel</p>

Course Faculty



Prof. Dr. Martin Heilmaier is the chair of Metallic Materials as Full Professor at the Institute for Applied Materials, Karlsruhe Institute of Technology, Germany. Prof. Heilmaier has 20 years of professional experience in R&D of metallic materials including superalloys, intermetallics, bulk metallic glasses and refractory metals. His research focuses on the characterisation of mechanical properties, especially at high temperatures, and microstructure as well as on the synthesis of new advanced metallic materials via various PM methods. He has published more than 100 papers in archival journals and holds seven patents. Prof. Heilmaier has been awarded the Best Teacher Award, in the Faculty of Mechanical Engineering of the Otto-von-Guericke University Magdeburg from the Student's Association, summer term 2005, winter term 2005/2006 and summer term 2006.



Dr. V. Subramanya Sarma is an Associate Professor in the Department of Metallurgical Engineering at the Indian Institute of Technology, Madras. His research interests are: Materials processing, development, characterisation and microstructure-texture-mechanical properties correlations in engineering metals and alloys.

Course Co-ordinator

Name: Dr. V. Subramanya Sarma
Department of Metallurgical and
Materials Engineering
Indian Institute of Technology
Madras
Chennai – 600036

Phone: 044 22574774

E-mail: vsarma@iitm.ac.in

.....
URL:

<http://mme.iitm.ac.in/vsarma>