

## Preface

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Materials have played crucial role in the advancement of civilization over thousands of years. Development of new materials has made significant impact on the quality of life in the 20th Century. The thrust of 21st Century research in materials is to develop and produce materials that are stronger, lighter, withstand extreme operating conditions and also have functional properties.

Graduate students are torch bearers of research across the globe and many important discoveries have been made by them. To promote high quality research, the Department of Metallurgical and Materials Engineering at the Indian Institute of Technology Madras, Chennai, India has started a biennial conference named International Symposium for Research Scholars (ISRS) in 2004 for the graduate students across the world researching in the area of metallurgical and materials engineering. This conference is unique in the sense that the papers are presented only by the graduate students, and facilitates a strong interaction among the peer group, which is expected to enhance sharing of knowledge and ideas.

The 5th edition of ISRS-2012 was held from December 13th to 15th 2012 at IIT Madras, and about 200 graduate

students from across the world participated in this conference. To encourage the young researchers who presented their papers, a special issue of the ISRS-2012 conference proceedings was proposed. The Transactions of the Indian Institute of Metals, which is being published by Springer has kindly agreed to publish this special issue. All the authors participated in the ISRS-2012 were encouraged to submit their research findings as a full paper and these papers were subjected to peer review process of the journal. Among 72 papers submitted for consideration for publication in the special issue, 27 papers have been found to be suitable for publication following the peer review process. The accepted papers cover number of different research areas in Metallurgical and Materials Engineering such as biomaterials, nanomaterials, ceramics (structural as well as functional), materials processing, characterisation and computational studies to understand the behaviour of materials. We hope the readers will appreciate the good quality of work being carried out by the graduate students, which we are bringing out through this special issue.