Special Issue on New Functions and Properties of Engineering Materials
Created by Designing and Processing II

PREFACE

The roles of materials science and engineering in our society are growing continuously on a global scale. Emerging technologies on every front necessitate the invention of new materials with novel functions and properties and new processing methods to fabricate them. Advanced materials garner continuous interest and have been important in every decade.

It was in this context that the first International Symposium on Designing, Processing and Properties of Advanced Engineering Materials (ISAEM) was held in Toyohashi, Japan in 1997. The 2nd, 3rd and 4th symposiums were held in Guilin, China (2000), Cheju, Korea (2003) and Nagoya, Japan (2008), respectively.

Following the success of the past events, the 5th symposium (ISAEM-2012) was organized by the 176th Committee on Process Created Materials Function of the Japan Society for the Promotion of Science (Chairperson: M. Niinomi, IMR, Tohoku University), and was held November 5–8, 2012, in Toyohashi, Japan. The primary objective of ISAEM-2012 was to provide an interactive forum for discussion of design, processing, 3D imaging, simulation and properties of advanced engineering materials, including metals, ceramics and polymers; the material functions were created using novel processing and techniques. More than 200 participants attended from USA, Germany, Australia, Italy, Korea, China, Japan and other countries. The scientific program included nine plenary talks, 12 keynote talks, 39 invited talks and 81 poster presentations.

This special issue includes selected papers from ISAEM-2012. The regular papers cover new functions and new processing methods for a wide variety of advanced engineering materials, such as biomedical Ti and Co–Cr–Mo alloys, Fe-based alloys, Pt alloys, Al alloys and hydroxyapatite. In addition, a couple of papers reported on bone with a focus on preferential orientation of biological apatite and physical properties. We are grateful to all the authors for their contributions. We hope this special issue helps to solve important questions related to the environment, energy and the health and welfare of human beings.

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