

Preface to the special issue on “Hybridized Materials with Super Functions 2005”

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Editorial

Preface to the special issue on “Hybridized Materials
with Super Functions 2005”

The 21st Century COE (Center of Excellence) Program of the Ministry of Education, Culture, Sports, Science and Technology is a supporting system to formulate outstanding researches and to establish education centers. Fifty universities were selected in five fields, i.e., ‘Life Science’, ‘Chemistry and Materials Science’, ‘Information Science, and Electrical and Electronic Engineering’, ‘Humanities’, and ‘Interdisciplinary, Combined Fields and New Disciplines’. The 21st Century COE Program, ‘Creation of Hybridized Materials with Super-Functions and Formation of an International Research & Education Center’ of Nagaoka University of Technology, was awarded in the field of chemistry and materials science.

This program is based on world-class research fields in materials science, where our university has achieved acclaimed excellence, in the fields of, namely; light metals, ceramics and organic materials. Based on the concept of multiplicity, cooperation and harmonization, research groups in these fields that traverse traditional disciplines of learning is integrated to facilitate research and apply surface and interface control techniques to create hybridized materials with super-functions. For the first 2 years, all the research groups carry out research in their respective fields using new techniques and technologies that were previously unavailable. Easily formable and high toughness magnesium alloys, high functions ceramic sensors, supramolecular devices and catalysts for polymeric reactions and others have been developed. Furthermore, linking up with other support groups that have synergy technology for joining and processing, the research groups fruitfully utilize their mutual characters, particularly, freely applying surface and interface control techniques to create

hybridized materials. For the next three years ‘Harmonized Functional Materials Science and Engineering’ that results from scientific systematization and quantitative description of outcomes will be also established in order to initiate a broad development of hybridized materials. Furthermore, without merely obtaining new materials, obtained results will be applied to establish new industries.

On the other hand, the Japanese industry has been required to change its structure because of globalization of economy, which entails the development of high value-added products and movement of production facilities to foreign locations in Asia and Latin America. Therefore, an international research and education center will be established by our university for the development of a production network with those regions and for training new leaders in the fields of science and engineering with a creative and international way of thinking.

The special issue consisted of 17 regular articles on ‘Hybridized Materials with Super-Functions’ contains the latest results of our 21st century COE program. I hope that this issue might be a reference to guide a number of academic and industrial researchers for hybridized materials stimulating related researches to develop hybridized materials in the future. I am grateful to all of the authors for their contribution.

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