

Foreword

Jacek Michalik,
Kohmei Halada

The 2nd Polish-Japanese Workshop on Materials Science “Materials for Sustainable Development in the 21st Century” was organized jointly by the Institute of Nuclear Chemistry and Technology (INCT, Warsaw) and the National Institute of Materials Science (NIMS, Tsukuba). The event was held in Warsaw from 12 to 15 October 2005 and gathered 24 participants from the National Institute of Materials Science, Chiba and Sophia Universities in Japan and from the Institute of Nuclear Chemistry and Technology, Institute of Physical Chemistry, Warsaw University of Technology and Jagiellonian University. The Workshop started with the opening address by Prof. J. Michalik, Deputy Director of INCT and presentation of NIMS international strategy by Dr. T. Fujita, General Manager, International Affairs Office, NIMS.

The main subject of the workshop – the studies of materials for sustainable development – was selected in accordance with the conclusions of the 1st Polish-

Japanese workshop which was held in 2004 in Warsaw University of Technology.

The workshop contributions – 11 from Japan and 13 from Poland – covered a broad area of materials science subjects, however, nearly all of them were related to the nanostructures. A couple of papers concerned the syntheses of various types of nanostructures as zirconia of enhanced thermal stability (Prof. Z. Sojka), doped ceria for fuel cells (Dr. T. Mori), fullerene nanowhiskers (Dr. K. Miyazawa), track-etched membranes with polypyrrolle nanotubules (Dr. W. Starosta) and metal nanoclusters generated radiolytically in zeolites (Prof. J. Michalik). Other papers dealt with improvement of materials properties by control of nanostructure. Prof. K. Kurzydłowski presented methods of severe plastic deformation to refine structure of metals and its alloys by formation of nano-sized grains. Dr. T. Mukai by the modification of grain structure achieved an extraordinary enhancement





of ductility in commercial magnesium alloys. Prof. K. Kakegawa reported his latest results on the consolidation of eutectic materials with nanostructures. The recent developments of radiation processing of materials were presented by INCT researchers. Prof. A. Chmielewski gave a general review of radiation technologies for fabrication of novel materials starting from the modification of polymers ending with radiation lithographies. The radiation effects had been described in semiconductors and polymer medical utensils (Mrs. I. Kałuska), in polyurethane-based materials for tissue engineering (Dr. G. Przybytniak) and in biological hydroxyapatites (Dr. J. Sadło).

Two workshop sessions were dedicated to environment friendly materials. The keynote lecture in that field was delivered by Dr. K. Halada, Director of Ecomaterials Center NIMS. He stressed the role of ecomaterials for support of sustainable society and presented recent developments in that area and the issues which should be solved in the future. The presentations were focused on the novel purification materials with smart function for removal of harmful cations and radionuclides (Dr. H. Yamada), application of membrane for environment protection (Dr. G. Zakrzewska-Trznadel), recycling processes of iron scarp with copper and aluminum alloys (Dr. Y. Osawa), catalytic cracking of polyolefines into liquid fuel (Dr. B. Tymiński), production of lead-free solder (Dr. K. Minagawa) and silica materials with biocidal activity (Ms. D. Chmielewska).

Four lectures were dedicated to the materials for special applications. Prof. K. Itatani presented novel

silicon nitride-based materials which can be utilized as bearings and engine components. Dr. A. Deptuła described novel catalysts and sorbents prepared by a complex sol-gel process, among them titanium hexacyanoferrate for ^{137}Cs sorption from cooling water of nuclear reactor and magnesium ferrite for catalytic decomposition of water. Water splitting process was also reported by Dr. J. Ye. She developed novel photocatalysts CaIn_2O_4 and CaBi_2O_4 active under visible light. The important problem of hydrogen storage was a subject of Prof. S. Filipek studies. He synthesized series of novel hydrides from AB_2 Laves phases with high hydrogen content.

Although the Workshop scope covered a wide area of topics, during the closing discussion opinions have been expressed that owing to the experience of Japanese scientists with nanomaterials syntheses and the expertise of Polish researchers with radiation modification of materials, the presentations brought many new informations for the participants from both countries.

Jacek Michalik
Deputy Director for Research
Institute of Nuclear Chemistry and Technology
Warsaw, Poland

Kohmei Halada
Director – General
Ecomaterials Center
National Institute for Materials Science
Tsukuba, Japan