The International Symposium on Innovative Materials for Processes in Energy Systems, IMPRES, organized by IMPRES Committee and the Division of Energy Engineering, the Society of Chemical Engineers, Japan (SCEJ), was held at Kyoto Research Park, Kyoto on 28th to 31st October, 2007.

The symposium was designed to aid in the establishment of a sustainable energy society by catalysing the development of innovative energy materials. The symposium concept owes a part of its origin to an energy road map project which was discussed by a project group in the Division of Energy Engineering, SCEJ (Kameyam and Kato, 2005; Kato, 2007). The road map named HONEBUTO Energy Road Map was based on chemical engineering technologies, and attempted to investigate the shape of an ideal energy society in the future. The authors of the group realized the importance of innovative energy materials for the realization of such a society from the discussion. Although innovative materials are developing now in any technology fields, material developments in energy fields are still needed and such development would benefit from a systematic approach. This symposium, IMPRES, is aimed at responding to such needs.

HONEBUTO ENERGY ROAD MAP

The HONEBUTO Energy Road Map was proposed by engineers from the division to show the direction of energy technology research and development for the future. The engineers suggested technological proposals and a developmental road map based on the stand points of their specialized research areas. Their technological proposals led to a charter coming from the HONEBUTO energy road map and were integrated into a concept of an ideal energy society named HONEBUTO dream town.

Charter from HONEBUTO Energy Road Map

The proposers discussed the ideal energy consumption society based on their road map proposals. The HONEBUTO Charter consisted of five proposals was submitted with consensus of all of the road map proposers.

The HONEBUTO Charter:
Proposal 1: Realising what we are lived in nature. Utilizing efficiently energy as the gift from nature.
Proposal 2: Developing efficient conversion and flow energy technologies for creation of new business opportunities.
Proposal 3: Developing energy materials for efficient energy conversion, storage and transportation.
Proposal 4: Developing flexible energy synergy society and utilizing perfectly quality of energy sources.
Proposal 5: Devising and improving our life style to enjoy energy consumption life accepting some inconveniences with a small continence.

HONEBUTO Dream Town and Innovative Energy Materials

HONEBUTO dream town reflecting the HONEBUTO Charter was depicted in a figure (Kato, 2007). Two towns for urban life and carbon neutral life were proposed in the HONEBUTO dream town. All of the road map proposals were analyzed comprehensively by the road map proposers. Common key terms were found out in technical goals, problems and solutions in the proposals. The key terms were categorized and arranged finally in a technology map by the discussion. The result of the arrangement was summarized in a figure which showed a map of technology development strategy for realization of the HONEBUTO dream town using common key terms extracted from all of proposals (Kato, 2007). The proposers awakened to the importance of innovative energy materials for the realization of the proposals. Innovative energy material developments are needed to satisfy technical targets, produce focused products, and finally establish HONEBUTO dream town. Then, the development of innovative energy materials was set the next practical target for a post-HONEBUTO project. The Symposium IMPRES was planned responding to the results of the road map projects.
THE SYMPOSIUM IMPRES AND THE SPECIAL ISSUE FOR IMPRES

The symposium is concerned with the application of novel materials in the field of energy systems. In particular, the symposium is concerned with gas–solid reaction processes in energy conversion. Materials for fuel cells, sorption heat pumps and other energy conversion and storage devices were selected for discussion topics because these technologies are expected for next generation energy technologies. The principles of these technologies have been already proposed yet the technologies still need development for practical use. These technologies need to address common concerns relating to material reactivity, heat and mass transfer characteristics, durability, stability under high-temperature and severe conditions and cost. To overcome the concerns cooperation is needed between researchers who have different research backgrounds and integration between existing knowledge for energy and material technologies. This symposium aims to bring workers focusing on different aspects of gas–solid reactions in energy conversion and promote an interchange of ideas across subjects, and finally to establish the new discipline of energy materials.

Research papers were submitted for IMPRES. Selected papers in the submitted papers have been published for the Special Issue for IMPRES in the Journal of Chemical Engineering of Japan (JCEJ). The papers were reviewed following the standard procedure for papers submitted to the regular issues of the JCEJ. On the behalf of IMPRES committee, we thank all of authors for their great contributions to the Symposium and the Special Issue.

We hope that we can advance the filed of innovative energy materials through this impressive meeting with published papers.

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