Beyond the Generation for Molten Salts Chemistry and Technology

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As a unique liquid material incorporating coulomb forces interacting between ions, molten salts have attracted many researchers and engineers not only in the field of electrochemistry, but across a wide range of fields of science and technologies with strong support from various energy and environment related industrial fields; such as surface finishing, metallurgy, metal refining, electrical engineering, liquid science, metallurgy, surface finishing, and nuclear power.

Nevertheless the molten salt field has been a unique field long researched by a limited number of researchers for long time. It is because the advantages offered by high temperature molten salts, such as the solubility of various oxides, are accompanied by difficulties in experiments, making accumulation of experiment know-how and experiment technologies essential.

Globally as well, molten salts has been a special field involving unique organized research societies which are supported by active researchers even today. During last half century in Japan, the aluminum electrolytic refining technology which was important in association with the changes in industrial structure triggered by energy shortages and globally promising in terms of high technological advantages, disappeared from Japanese industry. After the boom period, a transition of major topics occurred from molten carbonate fuel cells and nuclear fuel reprocessing to low-temperature molten salts, to as ionic liquids, as the current newly advanced material, and related research in succession.

The Molten Salt Committee in Japan was established in 1957 under the enthusiasm of young molten salt researchers. During the postwar industrial reconstruction period, information exchange between colleague researchers who focused on molten salts. The initial enthusiasm and academic tradition from the inception of the Molten Salt Committee was passed down over fifty years while persons from different fields beyond the engineers of the industrial field and the researchers of the academic world and continued interchange from viewpoints beyond specialized academic fields, thus broadening the research perspective, creating an atmosphere of learning from one another.

Last year, 2008 Joint Symposium on Molten Salts was held in Kobe in commemoration of “8th International Conference on Molten Salt Chemistry and Technology (MS8)” combining The 2nd Asian Conference on Molten Salt Chemistry and Technology, and 40th Symposium on Molten Salt Chemistry of Japan. 300 participants joined with 200 presented papers from 17 different countries. The conference was a success, giving many researchers the opportunity to participate in enthusiastic discussions. Beyond the high-temperature molten salt to low-temperature ionic liquid temperature range, meaningful opinions were exchanged based on a common awareness and common challenges related to the research methods, structural analysis, and application fields of molten salts as condensed substances and materials for coulomb interaction.

This volume has been edited as the special issue of the molten salts chemistry and technology as commemorative of 2008 Joint Symposium on Molten Salts. More than 50 original papers presented in the Symposium were included. The volume includes papers submitted from many researches inside and outside Japan, resulting in a substantial collection of writings. It is extremely pleased that this volume helps to define the direction for science and technology of molten salts and ionic liquids.

Finally, the Guest Editorial Committee of the special issue deeply appreciates the cooperation of the Editorial Committee of “Electrochemistry” for reviewing and publication process.