Rechargeable Batteries as Innovative Energy Storage Devices

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Since the invention of “electric piles” by Volta in 1800, batteries have never attracted as much attention as they do today. Rechargeable batteries based on the lithium-ion technology have contributed to the rapid development of portable electronic devices such as cellular phones, laptop computers, etc., since the early 1990’s. Rechargeable batteries are now regarded as innovative energy storage devices and are recognized as one of the key technologies that will reduce the emission of greenhouse gases. For example, large-scale rechargeable batteries have been intensively developed for automobile use such as hybrid, plug-in hybrid, and pure electric vehicles, and for use as electric energy storage systems in solar and wind power generation. Further efficient use of energy by means of the “smart grids” has been proposed, in which rechargeable batteries will play an essential role. Though the prospects of battery industries are thus encouraging, the responsibility and the task forced onto researchers and manufacturers are serious because development of innovative technologies is still needed for improving the specific energy density, the specific power density, the durability, and the safety, as well as reducing the cost to meet the demands of these applications. Such a great achievement cannot be accomplished by one talented researcher or one well-funded battery manufacturer (or auto manufacturer) or a big financial support from the government. Earnest discussion and close collaboration among many researchers and engineers not only in Japan, but also in all over the world are inevitable for developing the innovative technologies and thereby realizing a sustainable world based on rechargeable batteries.

Under these circumstances, The 50th Battery Symposium in Japan was held from November 30 to December 2, 2009 at Kyoto International Conference Center. In spite of the recent worldwide economic depression, a record number of 2,172 participants delegated from industry, universities and research organizations from all over the world attended the symposium, and 516 papers including 29 invited papers and one special lecture on batteries and fuel cells were presented. State-of-the-art technologies of batteries and battery materials in all over the world were presented and discussed with enthusiasm in eight parallel sessions including an international session entitled “International Session on Battery Technology for the Next 50 Years”. I hope that the symposium will leave an indelible mark on the history of battery R&D in the next 50 years.

To commemorate the success of the symposium, approximately 50 papers presented at the symposium were collected in this special issue. On behalf of the organizing committee, I would like to take this opportunity to express my sincere gratitude to all the authors and presenters, the session chairpersons, and the enthusiastic audience who contributed a great deal to the success of the symposium. I also acknowledge the co-operation of the guest editors and the reviewers, which allowed the efficient publication of this special issue.

The next symposium will be held from November 9 to 11, 2010 at Aichi Industry & Labor Center in Nagoya, which is chaired by Professor Yasuo Takeda, Mie University. See you again in Nagoya!