



## Preface

The Third International Conference on Materials for Advanced Technologies (ICMAT-2005) was held during July 3–8, 2005 at Singapore, as part of a continuing series of bi-annual conferences. It was combined with the 9th International Conference on Advanced Materials (ICAM 2005). There were 2250 delegates from 56 countries who presented more than 2000 papers at the 5-day conference. In addition to plenary, public and theme lectures, there were 25 symposia covering the frontier areas of materials science, engineering and technology. More than 50 vendors displayed equipment and products at the accompanying exhibition.

The symposium P on ‘Materials for rechargeable batteries, hydrogen storage and fuel cells’ has attracted large participation necessitating parallel sessions (PA and PB), indicating the importance of alternate energy sources and ‘hydrogen economy’. Lithium ion batteries (LIB) received great emphasis in PA. Recent developments in the understanding of the behaviour of second generation positive electrode (cathode) materials like  $\text{Li}(\text{Ni}_x\text{Mn}_x\text{Co}_{1-2x})\text{O}_2$ ,  $0 < x \leq 0.5$ , modified  $\text{LiMn}_2\text{O}_4$  and  $\text{LiFePO}_4$  were discussed. Aspects of the negative electrode (anode) materials including graphite, thin film silicon, metal nitrides, phosphides, antimonides, silicides and stannides were presented. In addition to the recent advances in the liquid electrolytes for use in LIB, considerable attention was paid to the Li-ion polymer electrolytes, and solid electrolytes based on crystalline, amorphous and glass-ceramics. The highlights were the description of fabrication and performance-testing of all-solid bulk and micro-LIBs for a variety of applications including ‘smart cards’.

The session PB focused on the hydrogen energy related technologies. Emphasis was given to hydrogen storage and fuel cells. Delegates from the main players in the field, such as General Motors and Toyota, researchers from national laboratories, institutes and universities of 13 countries presented the newest progresses in the related areas. The technical challenges in the utilization of hydrogen-based energy, especially in terms of development of novel solid-state hydrogen storage materials and higher operating temperature proton exchange membrane

fuel cells (PEMFC) were addressed. The symposium provided a forum for intellectually stimulating and engaging interactions among the delegates.

Of the more than 170 papers presented, including about 60 poster papers, a large number of Manuscripts were received for publication. These were duly subjected to the process of peer review. The accepted papers are being published as a special issue of the ‘*Journal of Power Sources*’. Thanks are due to all the authors for submitting the manuscripts before the deadline and to the large group of referees for their critical evaluation and suggestions for improving the Manuscripts, which greatly contributed to their quality as per the standards of the journal.

Thanks are due to the members of the international scientific and local organizing committees of the symposium who always readily rendered their valuable advice, help and encouragement. We take this opportunity to express our deep appreciation and thanks to Dr. M.V. Reddy, Dr. G.T. Wu and Dr. F.Y. Liu for their assistance in conference logistics and also in bringing out the Proceedings. Dr. G.-A. Nazri and Prof. E. Akiba deserve special thanks for their active participation in organizing this symposium.

We hope the special issue will be of interest not only to the active researchers in the field of Power Sources, but also to encourage and motivate youngsters to enter this exciting area.

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