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**PROCEEDINGS**

of

**the 6th International Symposium  
on Advanced Science Research**

*Frontiers of Nuclear and  
Radiochemistry*

**ASR2006**

October 26 – 27, 2006

Tokai, Ibaraki, JAPAN

Guest Editors

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The Chemical Society of Japan  
The Physical Society of Japan  
Atomic Energy Society of Japan



## Preface

The Sixth International Symposium on Advanced Science Research (ASR2006) was held on November 26 and 27, 2006 at the Advanced Science Research Center (ASRC), Japan Atomic Energy Agency (JAEA), Tokai, Japan. It was organized by ASRC in cooperation with The Japan Society of Nuclear and Radiochemical Sciences (JNRS). The 50th anniversary of the Radiochemistry Symposium (RCS) in Japan was also jointly celebrated by JNRS and ASRC in this symposium.

The scientific subjects are focused on the recent advances and future prospects in the frontiers of nuclear and radiochemistry. In the symposium, experts in nuclear and radiochemistry research and in the related fields got together to review and discuss what we have learned up-to-now and what we should pursue in the future. The following themes were taken up as major topics of the symposium:

- Superheavy Elements
- Nuclear Processes as Chemical Probes
- Application of Nuclear and Radiochemical Techniques
- Environmental Radiochemistry
- Actinide Sciences

More than 200 scientists including 19 foreign participants from 7 countries attended the symposium. The most recent frontier studies were highlighted by 21 invited talks and covered by 35 poster presentations.

On behalf of the Local Organizing Committee, I would like to thank all participants for coming to Tokai, for the contributions they gave to the symposium, and for the exciting and fruitful discussions. I hope that the participants enjoyed the symposium through lively discussion and through making new friends.

The Editors of the Proceedings invited the participants of ASR2006 to submit their contributions for publication in the Journal of Nuclear and Radiochemical Sciences issued by JNRS. The submitted manuscripts were subjected to the usual peer-review process and 23 accepted papers are placed in this issue. The contributions cover a fairly broad spectrum in recent advances of nuclear and radiochemistry.

I would like to take this opportunity to thank Professor Yoshihiko Hatano, Director of ASRC, for his continued interest, enthusiasm, and support that made this symposium possible. Many thanks go to Dr. M. Asai who volunteered for the chief-editor of the Proceedings and to Dr. A. Toyoshima, scientific secretary of this symposium. My special gratitude also goes to the Organizing Committee of the 50th Radiochemical Symposium (RCS), and to the chair and co-chairs of RCS, Drs. Z. Yoshida, S. Usuda, and N. Shinohara who kindly supported and jointly organized the ASR2006. I also thank to the staff of ASRC who with kind understanding and efficient work contributed to organizing this symposium.

Finally, I would like to express sincere gratitude to the support given by The Chemical Society of Japan, The Physical Society of Japan, and Atomic Energy Society of Japan.

Yuichiro Nagame  
Chair of ASR2006

## Welcome address

On behalf of all the members of our Advanced Science Research Center of Japan Atomic Energy Agency, it is my great pleasure to welcome all of you to this Symposium. As the director of our Center, I do hope all of you enjoy this opportunity both scientifically and socially.

This Symposium, the 6<sup>th</sup> International Symposium on Advanced Science Research (ASR2006), is entitled “Frontiers of Nuclear and Radiochemistry”, and chaired by Dr. Yuichiro NAGAME, a group leader at our center.

My own research fields are the collisions of photons, electrons, ions, and excited atoms with molecules in the gas phase and condensed phase, and also the interactions of ionizing radiation with matter. They are quite different from yours at this symposium. However, I am very sure that the research fields corresponding to the title of this symposium are quite important for us at our Center as well as our Japan Atomic Energy Agency in terms of one of the central parts of the research programs in progress at our center.

I am sure that this symposium will be very successful both scientifically and socially and will add further great progress to the entitled research fields in their future.

Finally, on behalf of the organizing committee members, I greatly acknowledge the Japan Society of Nuclear and Radiochemical Sciences, The Chemical Society of Japan, The Physical Society of Japan, and The Atomic Energy Society of Japan for their cooperative supports of this symposium.

Yoshihiko HATANO, Director  
Advanced Science Research Center  
Japan Atomic Energy Agency

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