

Conference Call

Radiochemistry

by *Yuichiro Nagame*

The Asia-Pacific Symposium on Radiochemistry (APSORC) was first held in Kumamoto (Japan) in 1997 with the objective of disseminating, together with the other Asia-Pacific countries, the latest study of radiochemistry into the world. The successive symposia in Fukuoka (Japan), Beijing (China), and then in Napa (U.S.A.) have increasingly made APSORC more cosmopolitan. The APSORC13, the 5th Asia-Pacific Symposium on Radiochemistry, took place in Japan after an interval of twelve years, was jointly held with the 57th Radiochemistry Symposium organized by Japan Society of Nuclear and Radiochemical Sciences. The symposium was held at "Kanazawa Bunka Hall" 22-27 September 2013 with a record-breaking attendance of 375 participants from 25 countries.

As this is the first APSORC after the accident of Fukushima Daiichi Nuclear Power Plant, issues related to the accident were discussed extensively. The topics covered were:

1. Fukushima issues
2. Education in nuclear and radiochemistry
3. Nuclear forensics
4. Nuclear energy chemistry
5. Nuclear chemistry
6. Actinide chemistry
7. Environmental radiochemistry
8. Radiopharmaceutical chemistry and nuclear medicine
9. Nuclear probes for materials sciences
10. Activation analysis
11. Application of nuclear and radiochemical techniques

The scientific program consists of 343 contributions (108 oral and 235 poster presentations) including 8 plenary talks and 25 invited talks. Among them, 144

presentations (61 oral and 83 poster presentations) were given by overseas presenters.

The symposium began with a commendation of the George Hevesy Medal Award followed by an award lecture. The George Hevesy Medal Award is the premier international award of excellence in radioanalytical and nuclear chemistry. It is named after George de Hevesy (1885-1966), who received the Nobel Prize for Chemistry in 1943 for his work on the use of isotopes as tracers in the study of chemical processes. The Medal is awarded to an individual in recognition



Hevesy Medal Award: R. Dybczynski (right) and A. Chatt (left, presenter)

of excellence through outstanding, sustained career achievements in the fields of pure as well as applied nuclear and radiochemistry, in particular applications to nuclear analytical chemistry. It was established originally in 1968 by the Journal of Radioanalytical and Nuclear Chemistry (JRNC) and Professor Tibor Braun (Editor-in-Chief of JRNC). Professor Dr. Hab. Rajmund S. Dybczyński of the Institute of Nuclear Chemistry and Technology, Warszawa, Poland, has been selected to receive the Hevesy Medal Award 2013 (HMA-13) in recognition of his significant contributions to the field





Fukushima session: M. Yamamoto

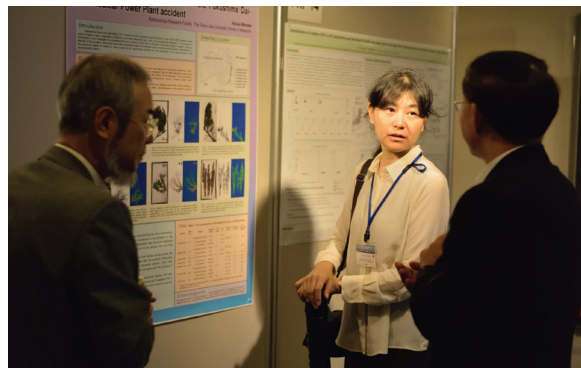
of radiochemical neutron activation analysis (RNAA), in particular for proposing the idea of "definitive" methods by RNAA, and to the certification of reference materials.

At the session on Fukushima issues, M. Yamamoto (Kanazawa University) gave a talk entitled "Overview of the Fukushima Daiichi Nuclear Power Plant (FDNPP) accident with amounts and nuclear compositions of the released radionuclides." This was to report a general description of the accident. I. McKinley (Switzerland), in his talk entitled "Fukushima challenges in perspective," emphasized the importance not only of decontamination of radioactive materials but also of distributing information on ongoing status of contamination and radiation education of general public. Other issues covered in the session include a report on radionuclides, such as iodine (I) and cesium (Cs), released in the early stage of the accident, current picture and emerging problems in decontamination of radioactive materials, migration behavior of radioactive I and Cs fallen into the environment, and so on. Furthermore, the following topics were discussed: the status of marine contamination and its future prospects using a model simulation based on the enormous amount of data on radioactive Cs released into the ocean, cross-reaction of nuclear fuel meltdown and water, research reports aiming at decommissioning plan of the disabled reactors, radioactivity measurement of waste, thermodynamic properties of melted fuel materials, etc. Issues related to the Fukushima accident were discussed broadly from ocean to lands, and extending to decontamination processes. The fact that 80 presentations (2 plenary talks and 5 invited talks, 14 oral presentations, and 59 poster presentations) were dealing with the issue represents much attention has been paid to the Fukushima issue.

In the session on Education in Nuclear and Radiochemistry, S. B. Clark (Washington State Univ.) covered importance of nuclear chemistry in the fields of nuclear energy, nuclear medicine and environmental related issues including radioactive disposals, and education of next generation radiochemists. In addition, an educational network system used in Europe called CINCH-II (Coordination of education and training In Nuclear Chemistry in Europe) was introduced. Nuclear forensics, a radiochemical analysis technique, is a newly developed research field in the last ten years, mainly in USA and Germany. This method is employed in analyses of confiscated illegal nuclear materials, aiming to specify an origin of the nuclear substance and a type of nuclear weapon used in the scene. Research on age determination of single Pu and Pu/U mixed oxide particles were reported at the session. From a nuclear security perspective, nuclear forensics plays a huge role. A few more presentations on this subject would be anticipated.

In the Nuclear Energy Chemistry session, Z. Chai (IHEP, China) talked about overview of nuclear energy chemistry in China, followed by A. Goswami (BARC, India) reporting a back-end process in India. Issues on a nuclear fuel cycle were discussed widely from chemical processes to technical development including separation of high-level liquid waste. In the actinide chemistry session, M. Denecke (UK) reported the latest result on speciation of actinide using synchrotron radiation. Recent progress in substantive actinide research including computational science, electrochemistry, and separation chemistry was represented in the session.

Topics related to superheavy elements, nuclear waste disposal and fuel cycle, radioisotope production, nuclear decay properties, and radiation detection technologies were discussed in the nuclear chemistry session. A plenary talk entitled "Advances in the production and chemistry of the heaviest elements" was



Poster session

given by A. Türler (Bern Univ.), presenting hot topics including naming of the newly found elements recognized by IUPAC and overview of gas-phase chemical research on element 114, flerovium (Fl). Atomic mass measurement of element 102, Nobelium (No) and 103, lawrencium (Lr) using SHIPTRAP, which is a combination device of a recoil separator, SHIP at GSI and an iron trap, was introduced as a newly innovative approach to the study of the heaviest elements. The study of more detailed physical and chemical properties of the heaviest elements by using atomic spectroscopic techniques is anticipated.

In the Environmental Radiochemistry session, S. Nagao (Kanazawa Univ.) gave a presentation on transport of particulate organic matter in river and coastal marine systems using radiocarbon. This serves as the application of radioisotopes in revealing environmental transport dynamics of particle materials. J. V. Kratz (Johannes Gutenberg Univ.) provided ultratrace analysis of long-lived radionuclides by resonance ionization mass spectrometry (RIMS). The session as a whole was substantial including presentations addressing Fukushima issues.

In the session of Radiopharmaceutical Chemistry and Nuclear Medicine, J. Hatazawa (Osaka Univ.) outlined the radiopharmaceutical development in the field of nuclear medicine and emphasized its significance in radiochemistry. He mentioned that it is worthwhile to challenge realization of "theranostics," a combination of diagnostics and therapeutics, for future radioactive drugs. S. Wilbur (Univ. Washington) reported on α -emitting radionuclides for medical use, which has drawn increasing attention recently. A particular focus was put on application of halogen, astatine ^{211}At , and its importance in radiochemistry. He emphasized, in regard to α -emitting radionuclides, that more active involvement of radiochemists in the research of At is necessary to actualize clinical application.

In the session on Nuclear probes for materials science, H. Ueno (RIKEN, Japan) gave a plenary talk reporting development of the RI (radioactive ion) beam factory in RIKEN (RIBF) and the recent progress of nuclear physics owing to it, and, furthermore, the future prospects of research plans. The highly informative talk shows a potency of material physics employing various types of nuclear spectroscopic methods using RI beams.

In the session on Activation analysis, A. Chatt (Canada) gave an invited talk on radioactive analytical speciation of arsenic, antimony and selenium. The session covered a broad range of the subject including the methods employing a prompt gamma-ray

measurement, and a characteristic X-ray measurement generated from muonic nuclei. In the session on application of nuclear and radiochemical techniques, H. Harada (JAEA, Japan) reported the research result and foresight with the neutron reaction measurement device (ANNRI) at the J-PARC facility. Results presented in the session ranged from those associated with facilities and measurements to the fields of nanoscience and nuclide analyses. In the closing session, six young scientists were awarded for their poster presentations. Five days of conference were wrapped up on a high note. Proceedings of the symposium will be published in *Journal of Radioanalytical and Nuclear Chemistry*.

It is important to remember that the success of the symposium is primarily due to the unstinting support of many people. The supports, including sponsorships provided by 10 Japanese academic societies and 5 associations (2 autonomous bodies) and IUPAC, industrial exhibitions, advertisements contributed by 5 industrial firms, 14 endowments and volunteer efforts in Kanazawa, realized the prestigious symposium.

The APSORC international committee meeting was held during the symposium. The next symposium in 2017 following Japan, China, and USA is to be hosted in Korea (Jeju).

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POLYCHAR 22

by Michael Hess

POLYCHAR 22 World Forum on Advanced Materials was hosted 7-11 April 2014, by the Department of Chemistry & Polymer Science of the University of Stellenbosch in South Africa. Thus, for the first time in its history, our Forum took place in Africa. Earlier the conferences took place in Denton, Texas, (1992-2003), Guimarães, Portugal (2004), Singapore (2005), Nara (2006), Buzios, Rio de Janeiro (2007), Lucknow (2008), Rouen (2009), Siegen (2010), Kathmandu (2011), Dubrovnik (2012), and Gwangju (2013).

There were eight Conference Sessions:

- Nanomaterials and Smart Materials (15 contributions)
- Physical Morphology (15)
- Biomaterials and Green Materials (11)
- Materials Properties in Relation to Performance (11)
- Property Prediction and Simulation (11)