



## Foreward

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The 6th International Nuclear Chemistry Congress (INCC-6, <https://incc-6.lzqidian.com>) was held in 29th Aug–2nd Sept. 2022 in Lanzhou, China, and organized by Lanzhou University in cooperation with the Institute of Modern Physics, Chinese Academy of Science. The INCC is one of the series of international conferences in nuclear and radiochemistry, which was launched in 2005 by the International Nuclear Chemistry Society (INCS). The last three INCC were held in Sicily, Italy in Sep. 2011 (3rd –INCC), Meresias Beach, Brazil in Sep. 2014 (4th-INCC) and in Gothenburg, Sweden, in Sep. 2017 (5th-INCC), respectively. The INCC-6 was proposed to be held in Sept. 2020 in Lanzhou, China as the regular frequency of every 3 years. However, the COVID-19 pandemic occurred in the beginning of 2020, the conference has to be postponed for a few times until Aug. 2022. Since the pandemic was still not yet over, and travel restriction makes it difficult to be organized as a fully face-to-face conference. It was therefore held as a hybrid conference of both on-line and on-site.

The topics of the INCC-6 covers all aspects of nuclear and radiochemistry. In total, 186 abstracts were accepted and 193 presentations including 6 plenary, 34 invited, 72 oral and 81 posters were given in the conference by the researchers and students from 62 institutions in 19 countries, such as Canada, China, Czech Republic, Finland, France, Germany, Hungary, Japan, Korea, Lithuanian, Italy, Poland, Russia, Slovakia, Singapore, Switzerland, the Netherland, United kingdom and United States of America (Fig. 1). More than 300 people attended the conference including about 130 on-site participants (Fig. 2). In the opening session, Prof. Chunhua Yan, the president of Lanzhou University, gave a warm welcome speech with a brief introduction of Lanzhou

University, the president of the INCS, prof. Flavia Groppi gave a speech with a briefly introduction of the background and status of the INCS (Fig. 3). Six lectures in different topics in nuclear and radiochemistry were presented in the plenary session on 29th Aug. Prof. Zhifang Chai from Institute of High Energy Physics, Chinese Academy of Sciences reviewed the history, status and progress of nuclear and radiochemistry in China with his 60 years scientific career as example. Prof. Amares Chatt from Dalhousie University, Canada presented applications of nuclear analytical techniques in environmental, biological and medical research with a title on “speciation analysis using reactor neutrons and synchrotron radiation”. Prof. Yuichiro Nagame from Japan Atomic Energy Agency presented an overview on chemistry of heavy elements entitled on “chemistry of heavy actinides using their low-energy ion beam”. Prof. Xiaolin Hou from Lanzhou University and Institute of Earth Environment, China presented research progress on environmental radioactivity and radioecology in China entitled on “Environmental radioactivity in China: level, distribution and sources”. Prof. Xiaoyuan (Shawn) Chen from National University of Singapore presented an overview and progress in radiopharmaceutics entitled on “cancer radiotheranostics”. Prof. Thomas Albrecht-Schönzart from Florida University, USA presented a new progress on nuclear chemistry entitled on “the Quest for californium (II)” (Fig. 4).

Overall 34 invited lectures on the new progresses of different aspects of nuclear and radiochemistry were presented in 12 conference sessions. In the computing chemistry of radionuclides, a lecture on Theoretical actinide chemistry: progress and perspectives was presented by Prof. Jun Li. In the topic of nuclear chemistry, 2 lectures on chemical studies of the heaviest known elements: niobium (element 113), flerovium (element 114) and moscovium (element 115) by prof. Christoph E. Düllmann, and Pentavalent americium: preparation, stabilization and separation by prof. Chao Xu were presented. In the topic of separation materials and technology in nuclear and radiochemistry, 6 lectures entitled on Harvesting exotic radionuclides at PSI by Dr. Dorothea Schumann, Spontaneous multi-scale supramolecular assembly

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Fig. 1 Conference logo with 63 participating institutes and major members of the local organization committee



Fig. 2 Photo of on-site participants of the INCC-6 conference

in ionic liquid based extraction systems by prof. Xinghai Shen, Ultrafiltration separation of nanoscale Am (VI)-polyoxometalate clusters from lanthanides by prof. Shuao Wang, Research progress of SERS on uranyl ions and compounds by prof. Xiaolin Wang, Efficient extraction of U(VI) from water through photocatalytic or electrocatalytic strategy by prof. Xiangke Wang and Development of new extraction chromatographic materials for use in radioanalytical chemistry and isotope production by Dr. Steffen Happel were presented. In the topic of electrochemistry for separation of

radionuclides, 2 lectures on Actinide separation over lanthanides via aluminum/gallium cathode based electrolysis in LiCl-KCl eutectic by prof. Weiqun Shi and Radiochemistry in R & D of molten salt reactor by prof. Qingnuan Li were presented. In the topic of nuclear fuel cycle, a lecture entitled on Nuclear energy prospect and closed fuel cycle in China was presented by prof. Guoan Ye. In the topic of nuclear waste disposal and management, 2 lectures on Nuclear waste disposal and management by prof. Ju Wang and Aquatic chemistry of radionuclides in the context of nuclear waste

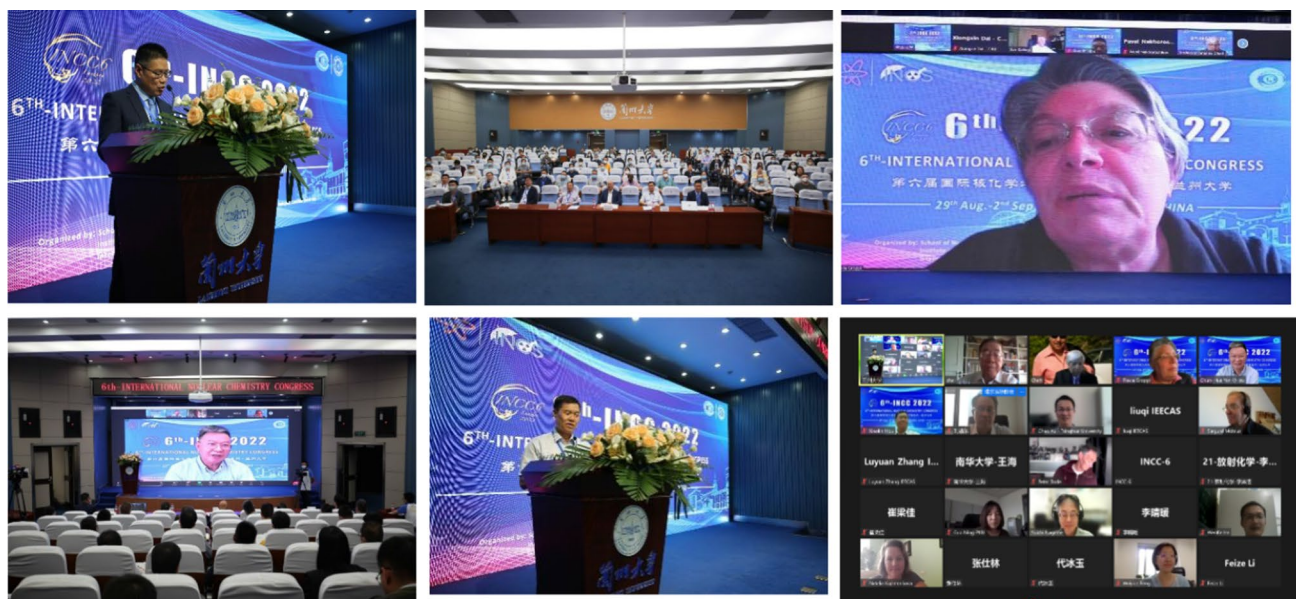


Fig. 3 Opening session of the INCC-6



Fig. 4 Presentations and discussion in the conference sessions

disposal: solubility, redox phenomena and thermodynamics by Dr. Xavier Gaona were presented. In the topic of decommissioning waste characterization, 2 lectures on Challenges in nuclear waste characterization—a laboratory's experiences over the last 30 years by prof. Phillip Warwick and Determination of actinides and  $^{93}\text{Zr}$  in radioactive waste samples by prof. Nora Vajda were given. In the topic of isotope

production and radiopharmaceutics, 6 lectures on Study of the medical isotopes production based on accelerator at IMP by prof. Zhi Qin, Terbium radionuclides production by deuteron beams irradiation for medical applications by prof. Groppi Flavia, Probing-to-perturbing: radiation-guided medicinal chemistry by prof. Zhibo Liu,  $^{211}\text{At}$ -labelled polydopamine nanoparticles for targeted alpha therapy of glioma

by prof. Feize Li, Development of PET tracers for detection of A $\beta$  and Tau in Alzheimer's disease by prof. Mengchao Cui, and Radiochemical separation and analysis of radio-nuclides for targeted alpha therapy by Dr. Xiongxin Dai were presented. In the topic of radioanalytical chemistry, 2 lectures on Radioanalysis in climate change studies: recent developments and impacts by prof. Pavel Povinec and Mass spectrometric analysis of actinides at attogram levels and its radioecological applications by Dr. Jian Zheng was presented. In the topic of environmental radioactivity and radioecology, 3 lectures on State-of-the-art characterization of radioactive 'hot' particles—what can we learn about their source, environmental behavior and impact by prof. Gareth Law, Chemistry of single hot particles from the Chernobyl exclusion zone: what can we learn on bioavailability of actinides and fission products? by prof. Clemens Walther and Development of nuclear propulsion systems as challenge to radioactivity monitoring systems by prof. Jerzy W. Mietelski were presented. In the topic of nuclear and radioanalysis, 4 lectures on Neutron activation analysis of samples difficult to assay by other methods by prof. Jan Kucera, Selection of cleaning procedure in NAA of nail clippings affects the ranking of the results in epidemiological studies by prof. Peter Pöde, Nuclear analytical chemistry at Heinz Maier-Leibnitz center (MLZ), Garching by Dr. Zsolt Revay and Advanced light source analytical techniques for exploring the biological behavior and fate of nanomaterials and nanomedicines by prof. Chunying Chen were presented. In the topic of education of nuclear and radiochemistry, a lecture entitled on Future perspectives of nuclear and radiochemistry education according to Chinese nuclear energy development was given by prof. Wangsuo Wu.

In addition, a special session was organized for celebrating the 80 years birthday of prof. Zhifang Chai and his 60 years professional career in nuclear and radiochemistry, a photo-film recording prof. Chai's professional and social activities was shown, many colleagues including Amares Chatt, Peter Bode, Yuichiro Nagame, Xiaoyuan (Shawn) Chen, Jian Zheng, Shuao Wang and Weiqun Shi reminisced and highlighted the professional contributions of Zhifang Chai in research and education of nuclear and radiochemistry. A general assembly of INCS members was organized on 31st Aug. 2022. Prof. Flavia Groppi gave an opening address and presented the work progress of INCS in the past 5 years. New board members and president of INCS were elected, the regional representatives of the INCS were nominated.

Ten best posters were selected from overall 81 poster presentations by the evaluation committee. They were awarded to Wenya Tai (Lanzhou University), Ning Chen (Institute of Earth Environment, CAS), Daming Zhang (Lanzhou University), Yawen Chen (Peking University), Qi Tan (Lanzhou University), Xinyi Shi (Lanzhou University), Ping Xu (University of Science and Technology of China), Bing

Wang (Institute of High Energy Physics, CAS), Zhaoqin Chu (Sichuan University), Juan Tong (Lanzhou University) in the closing ceremony.

Total 52 full papers presented in the conference were selected after a regular peer review process and are published in this special issue. These papers cover all aspects of nuclear and radiochemistry, which reflect the new progress in nuclear and radiochemistry researches. Here, we would like to thank all authors for their contributions and all peer reviewers for their professional and efficiently reviewing of these papers, which ensure the quality of the published papers.

We knew such a hybrid mode conference is not ideal, actually we were afraid that the difficulties such as various time difference cross the world and corresponding jetlag, possible internet interruption and other technical problem might worsen the quality of the conference. But, as commented by many colleagues, the conference went smoothly, successfully and fruitfully, the most of participants were satisfied and grateful to the conference. This should be attributed to the cooperation of all participants and great effort of the organization committee members. First of all, we would like to thank prof. Flavia Groppi as the president of INCS and Prof. Zhifang Chai and prof. Amares Chatt, as the Chairmen of Scientific Advisory Committee of the INCC-6 for their patient, encouragement, great support and helpful assistance and advices, as well as the members of the international advisory committee, organization committee and program committee of the INCC-6 for their great effort and strong support. We would like to express our appreciation for the great support of the host institutions, i.e. Lanzhou University (president, prof. Chunhua Yan), School of Nuclear Science and Technology (Dean, prof. Ximeng Chen, and director, prof. Yi Yang), and co-host Institute of Modern Physics, CAS (prof. Zhi Qin). Grateful thanks are specially dedicated to the local organization committee members in Lanzhou University, Keliang Shi, Zhijun Guo, Suwen Chen, Duoqiang Pan, Zhen Xu, Jiangang He, Tonghuan Liu, Yingge Cheng, Dan Lin, Zongyuan Chen, Shan Xing, Junqiang Yang, Xiaolan Zhao, Yin Wang, Kesheng Hu, Wei Liu, Fei Wu, Zhenpeng Cui, Qiang Jin, Wei Cao, Longlong Tian, Min Zhang, Pengcheng Zhang, Tianyi Jia, Qiang Wu, Shuyang Li, Xiaoyan Wei, Qingfeng Tang, Min Zhao, Yang Xu, Yanan Wang, Qian Zhao, etc. for their hard and productive work in the preparation and organization of the conference. We would like specially thank the technical support by Guoqing Wang and his team for their professional support for the smooth and successful on-line conference and on-site presentation and discussion. Last, but not least, we would like to thank all the participants and sponsors (Lanzhou Kent Chemical Technology Co., Ltd and Beijing UDLER Technologies Co., Ltd) for their contributions and support to the conference.

Xiaolin Hou, professor, Chairman of the INCC-6 conference.

Wangsuo Wu, professor, Chairman of the program committee of INCC-6.

Lanzhou, 24th Feb. 2023.

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