Preface

Institute for Chemical Research (ICR) was founded in 1926 as the first research institute of Kyoto University with the founding vision to "Excel in the Investigation of Basic Principles of Chemistry and Their Applications." ICR is a successor to the Specialized Center for Chemical Research established at the College of Science of Kyoto Imperial University in 1915 for the study of a special medicinal substance called "Salvarsan," that is arsphenamine. Ever since, ICR has continuously carried out outstanding research and flourished as a large-scale organization with five research divisions and three research centers: Division of Synthetic Chemistry, Division of Materials Chemistry, Division of Biochemistry, Division of Environmental Chemistry, Division of Multidisciplinary Chemistry, Advanced Research Center for Beam Science, International Research Center for Elements Science (IRCELS), and Bioinformatics Center. Currently, almost 120 faculty members, 210 graduate students, and 60 researchers are engaged in research activities in 30 laboratories directed by fulltime professors and 5 laboratories supervised by visiting professors.

Research at ICR encompasses a wide range of scientific disciplines, including physics, biology, and informatics besides chemistry. Graduate schools to which our laboratories are affiliated as a "cooperative lab" cover a broad range of fields such as science, engineering, agriculture, pharmaceutical sciences, medicine, and informatics. These laboratories are spearheading cutting-edge research and yielding groundbreaking results in their special fields. Some of the research achievements last year are as follows: *1) Spin-transfer Torques for Domain Wall Motion in Antiferromagnetically-coupled Ferrimagnets; 2) Major Lithogenic Contributions to the Distribution and Budget of Iron in the North Pacific Ocean; 3) Ultra-long Coherence Times Amongst Room-temperature Solid-state Spins; 4) Raman Optical Activity on a Solid Sample: Identification of Atropisomers of Perfluoroalkyl Chains Having a Helical Conformation and No Chiral Center; 5) A Purified, Solvent-Intercalated Precursor Complex for Wide-Process-Window Fabrication of Efficient Perovskite Solar Cells and Modules; 6) Strigolactone Perception and Deactivation by a Hydrolase Receptor DWARF14*. Some other topics were also presented in the 119th ICR Annual Symposium on December 13, 2019.

The legacy of our founding philosophy continues today and describes the essence of our research activities. With the founding vision in mind, we have entrusted our scientists with the responsibility of choosing research topics within advanced chemistry-related fields. Thus, ICR members are actively involved in interdisciplinary research projects with bottom-up paradigms in order to create new knowledge and contribute to the future of materials-related fields. One of our major challenges is to design and create smart materials from the viewpoint of not only academic interest but also green innovation and establishment of a sustainable society. Toward the future, we have been collaborating with the Research Institute for Sustainable Humanosphere and the Institute of Advanced Energy since 2015 as part of the MEXT-supported joint research program. For the MEXT project of Integrated Research Consortium on Chemical Sciences (2016–2021), ICR (most importantly, IRCELS) has been making a significant contribution as one of the four core research institutions from Japanese national universities. We have also been collaborating with both domestic and overseas universities and research institutions (with 69 official international collaboration agreements) and functioning as a Joint Usage/Research Center (2010–2018) and an International Joint Usage/Research Center (2018–) certified by MEXT. On the basis of highly evaluated activity in collaboration with Fudan University, China, ICR was approved by Kyoto University in 2019 to establish an On-site Laboratory "Kyoto University Shanghai Lab" in Shanghai, China as part of a strategy implemented under the education ministry's Designated National University (DNU) program. In order to foster and secure young researchers through these activities, we also have original programs of unparalleled research and graduate education, including an in-house annual grant system named "ICR Grant for Promoting Integrated Research." These collaborative achievements ensure that ICR serves as a global research core in chemistry-oriented fields.

We hope this Annual Report will serve to update you on the progress of our research activities and globalization. Finally, we appreciate your continued encouragement and support.

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Director