

PREFACE

We are pleased to announce the publication of SPring-8/SACLA Research Frontiers 2022. As a user promotion organization for SPring-8 and SACLA registered with the Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT), JASRI's mission is to support users and ensure the transparent and fair selection of experimental proposals. JASRI also manages SPring-8 and SACLA, which are owned by RIKEN. In other words, JASRI works closely with RIKEN to operate and maintain SPring-8 and SACLA and develop technologies related to synchrotron radiation science.

Despite the continued COVID-19 pandemic, the activity of SPring-8 and SACLA in FY2022 recovered to the level before COVID-19, except for restrictions on users from abroad according to the regulations of the Japanese government. Many precautionary measures have been implemented on-site for users. In FY2022, SPring-8 welcomed approximately 16,000 researchers. They performed more than 2,000 experiments and published approximately 1,000 research papers.



In 2022, a number of SPring-8 and SACLA users were awarded prestigious prizes for their scientific and technological achievements. The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology (Research Category) was awarded to the following three researchers: Professor Teruo Ono (Kyoto University) for research on the magnetization control of nanoscale magnetic materials. Professor Keiji Tanaka (Kyushu University) for the research on interfacial nanophysical properties of polymer functionalization. Professor Atsushi Wakamiya (Kyoto University) for research on high-performance solar cells using coated semiconductor materials.

This volume contains two comprehensive review articles. The first review is by Professor Akira Tsuchiyama (Ritsumeikan University) and Dr. Megumi Matsumoto (Tohoku University), who examined samples collected from the surface of the C-type asteroid 162173 Ryugu by the Japan Aerospace Exploration Agency (JAXA) spacecraft Hayabusa-2 and brought back to Earth in December 2020. This review describes the progress of research on the formation and evolution of 162173 Ryugu. The experiments were conducted using X-ray computed tomography (XCT) at SPring-8 BL20XU and BL47XU. The second review, presented by Dr. Shinji Kohara of the National Institute for Materials Science (NIMS), describes his recent work using high-energy X-ray diffraction at SPring-8 BLO4B2 to extract order from disordered materials.

In the main part of this volume, the active users of SPring-8 describe the essence of their results in various fields, including life science, physical science, chemical science, earth & planetary science, and industrial applications. In addition, principal activity reports on the SPring-8/SACLA facilities are included in the sections of Accelerators & Beamlines Frontiers and Facility Status.

I am very grateful to the many authors and experts who contributed their articles to this volume. Special thanks to Dr. Toyohiko Kinoshita, Ms. Marcia M. Obuti-Daté, and the members of the editorial board for their continuous efforts.

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