

Table of

Contents

PREFACE	1
----------------------	----------

HIGHLIGHTS

1. Materials Science	2
-----------------------------------	----------

- 1-1 Itinerant-to-Localized Transmutation of Electrons Across the Metal-to-Insulator Transition in V_2O_3
- 1-2 Evaluating a Crystallographically Heterogeneous Graphene/ $L1_0$ -FePd Interface with a Perpendicular Orbital Moment by Depth-Resolved X-Ray Magnetic Circular Dichroism
- 1-3 X-Ray Detection of Magnetic Octupole Order Producing a Large Anomalous Hall Effect
- 1-4 Characterization of the Electronic Structure in High-Hole Mobility SnO Film
- 1-5 Local Flexoelectricity and Magnetism in Strain-Gradient Rare-Earth Iron Garnet Thin Films
- 1-6 Unique Atomic Structure of Copper as the Origin of Fracture
- 1-7 Crystal Structure and Magnetism of Natural Mineral Henmilite from Fuka Mine, Okayama Prefecture
- 1-8 Demonstration of Metal-Insulator Transition Induced by Resonant Tunneling in Double Quantum Well Structures of Strongly Correlated Oxides

2. Chemical Science	18
----------------------------------	-----------

- 2-1 Photocleavable Regenerative Synthetic Elastomers for the On-Off Switching of Mechanical Properties
- 2-2 Janus-shaped Single-Chain Nanoparticles Formed by One-Shot Intrablock Cross-Linking of Linear Block Copolymer
- 2-3 The Labyrinth of Block Copolymers with Nanometer Scale: Conditions for Forming Ordered Bicontinuous Double-Diamond Structures
- 2-4 Topology-Transformable Block Copolymers Based on a Rotaxane Structure: Change in Microstructures and Bulk Properties with the Same Composition
- 2-5 Reversible Folding/Unfolding of Diarylethene-Incorporated Supramolecular Polymers by Light
- 2-6 Nanosized and Metastable Mo Oxides for Aqueous Li-Ion Batteries

3. Life Science	30
------------------------------	-----------

- 3-1 Structural Analysis of the TxCo-1 Antibody Effective Against the Toxic Conformer of Amyloid β
- 3-2 Crystal Structure Unveiled the Reaction Mechanism of Novel C-C Bond Cleavage Proteins
- 3-3 Anomalous Solution Scattering for Protein Structure Modeling
- 3-4 Molecular Mechanism of Specific Aminoacyl-tRNA Acetylation by *Salmonella* Typhimurium TacT
- 3-5 Structural Insight into SARS-CoV-2 Broadly Neutralizing Antibody, NT-193
- 3-6 SARS Coronavirus 3CL Protease Inhibitors with an Electrophilic Arylketone Warhead
- 3-7 Structure of Myosin XI, the Fastest Myosin Class
- 3-8 Observation of Autism Model Rat Brain by Phase-Contrast X-Ray CT

4. Instrumentation and Techniques	46
--	-----------

- 4-1 Data-driven Sensitivity Analysis in Surface Structure Determination by Total-Reflection High-Energy Positron Diffraction (TRHEPD)
- 4-2 Development of Full-Field X-Ray Multi-Contrast Zooming Optics
- 4-3 Real-Time Observation of Cobalt Surface Oxidation Reactions Proceeding in the Depth Direction by Wavelength-Dispersive Soft X-Ray Absorption Spectroscopy

5. Accelerator	52
-----------------------------	-----------

- 5-1 Conceptual Design of the Hybrid Ring: Towards Simultaneous Use of Two Synchrotron Radiation Beams
- 5-2 Ultra-Low Synchrotron Radiation-Stimulated Desorption from Pd/TiZrV Coated Cu Tubes
- 5-3 Injection Section Upgrading with the Septum-Magnet Replacement in KEK-PF Ring

OPERATION AND PROPOSALS

1. Outline of the Accelerators	58
2. Operation Summary	60
3. Experimental Stations	66
4. Summary of User Proposals	70

APPENDICES

Site and Organization	74
------------------------------------	-----------

Publication List is available on the PF's website (<https://www2.kek.jp/imss/pf/science/publ/pfhl/2021/>).