

# Summit of Materials Science 2024 and GIMRT User Meeting 2024

Date: November 27-28, 2024  
Venue: IMR Auditorium, Tohoku University (Onsite)

## Day 1

| No.   | Time  |       | Name  | Affiliation                 | Title  |
|---|-------|-------|---|-----------------------------|--|
| Opening   |       |       |   |                             |  |
| ---   | 10:00 | 10:05 | Rie Umetsu                                      | IMR                         | Opening  |
| ---   | 10:05 | 10:20 | Takahiko Sasaki                                 | IMR                         | Welcome Address  |
| Session A Strong Correlation and Topology (Chair: Yusuke Nomura, IMR)               |       |       |   |                             |  |
| A-1   | 10:20 | 10:50 | Roser Maria Valentí                             | Goethe University Frankfurt | Strategies to Design Quantum Materials with Exotic Properties                            |
| A-2   | 10:50 | 11:20 | Yoshinori Onose                                 | IMR                         | Chirality Control and Detection in Metallic Helimagnets                                  |
| A-3   | 11:20 | 11:35 | Yoshihiro Okamura                               | The University of Tokyo     | Magneto-Optical Study on Topological Magnets   |
| A-4   | 11:35 | 11:50 | Takuya Aoyama                                   | Hiroshima University        | Piezomagnetism in Antiferromagnets with Broken Time-Reversal Symmetry                    |
| A-5   | 11:50 | 12:20 | Masaki Fujita                                   | IMR                         | Neutron Scattering Study on Spin Excitations Coupled with Charge and Lattice Dynamics    |
| ---   | 12:20 | 13:50 | Lunch Break (Photo Session @1st Building Lobby) |                             |  |
| Session B Energy Materials (Chair: Hidemi Kato, IMR)                                |       |       |   |                             |  |
| B-1   | 13:50 | 14:20 | Tetsuya Uda                                     | Kyoto University            | Lithium-Ion Battery Recycling through Comminution in Water in Inert Atmosphere           |
| B-2   | 14:20 | 14:50 | Andreas Züttel                                  | EPFL                        | Power Plant Units for CO <sub>2</sub> Neutral Energy Security                            |
| B-3   | 14:50 | 15:20 | Tetsu Ichitsubo                                 | IMR                         | Development of Metal-Anode Battery and Dual Ion Battery Systems with Multivalent Cation  |
| B-4   | 15:20 | 15:50 | Kozo Fujiwara                                   | IMR                         | Fundamental and Applied Research on Crystal Growth                                       |
| ---   | 15:50 | 16:00 | Break   |                             |  |
| Session C Computational Materials Science and Informatics (Chair: Momoji Kubo, IMR) |       |       |   |                             |  |
| C-1   | 16:00 | 16:30 | Maria Clelia Righi                              | University of Bologna       | Advancing Solid Interface and Lubricants by First Principles                             |
| C-2   | 16:30 | 17:00 | Emi Minamitani                                  | Osaka University            | Elucidating Structure-Property Correlation in Amorphous Materials by Persistent Homology |
| C-3   | 17:00 | 17:30 | Yu Kumagai                                      | IMR                         | Defects in Semiconductors: A First-Principles Investigation                              |
| C-4   | 17:30 | 17:45 | Kazushi Fujimoto                                | Kansai University           | Mechanical Response Mechanisms during Compression Fracture of Polymer Particles          |
| PS  | 17:45 | 19:00 | Poster Session @2nd Building Lobby              |                             |  |
| MX  | 19:00 | 20:30 | Mixer @Lounge                                   |                             |  |

## Day 2

| No.  | Time  |       | Name               | Affiliation               | Title  |
|--|-------|-------|--------------------|---------------------------|--|
| Session D Structural Materials (Chair: Kenta Yamanaka, IMR)  |       |       |                    |                           |  |
| D-1  | 9:30  | 10:00 | Young-Kook Lee     | Yonsei University         | Hydrogen Embrittlement of High-Strength Martensitic Steel  |
| D-2  | 10:00 | 10:30 | Tadashi Furuhara   | IMR                       | Alloying Effects on Microstructure Development in High Strength Steels – from Bulk to Surface                        |
| D-3  | 10:30 | 11:00 | Martin Luckabauer  | University of Twente      | Tailoring Omega Transformation Kinetics in Beta Titanium Alloys for Biomedical Applications                          |
| ---  | 11:00 | 11:10 | Break              |                           |  |
| Session E Nuclear Materials (Chair: Dai Aoki, IMR)   |       |       |                    |                           |  |
| E-1  | 11:10 | 11:40 | Jean-Pascal Brison | CEA-Grenoble              | Field and Pressure Tuning of the Superconducting Pairing Mechanisms in UTe <sub>2</sub>                              |
| E-2  | 11:40 | 12:10 | Ryuta Kasada       | IMR                       | Redesigning, Restructuring and Reviving Nuclear Materials Research in Japan towards a New Concept of Irradiation 3.0 |
| E-3  | 12:10 | 12:25 | Hiroyuki Kazama    | Osaka University          | Gas-Phase Oxidation of Actinide Ions in Triple Quadrupole Inductively Coupled Plasma Mass Spectrometry               |
| E-4  | 12:25 | 12:40 | Sayuri Takatori    | Okayama University        | Spectroscopy of Thorium-229 Nuclear Clock Transition in <sup>229</sup> Th:CaF <sub>2</sub> Crystal                   |
| ---  | 12:40 | 13:40 | Lunch Break        |                           |  |
| Session F Frontier in Metal and New Materials (Chair: Eiji Akiyama, IMR)                             |       |       |                    |                           |  |
| F-1  | 13:40 | 14:10 | Eun Soo Park       | Seoul National University | High Entropy Alloy Foam: Open a New Era of Thermal Protection Utilizing Metals                                       |
| F-2  | 14:10 | 14:40 | Hidemi Kato        | IMR                       | Dissimilar Joining of Immiscible Metals by Eutectic Melting Induced Liquid Metal Dealloying                          |
| F-3  | 14:40 | 15:10 | Hitoshi Miyasaka   | IMR                       | Chemo-Switchable MOF Magnets   |
| ---  | 15:10 | 15:20 | Break              |                           |  |
| Session G Functional Magnetic, Electronic and Semiconducting Materials (Chair: Yoshinori Onose, IMR) |       |       |                    |                           |  |
| G-1  | 15:20 | 15:50 | Kiyonori Suzuki    | Monash University         | Ultra-Low Core Loss of Nanocrystalline Soft Magnetic Alloys Brought about by Near-Zero Magnetostriction              |
| G-2  | 15:50 | 16:20 | Takeshi Seki       | IMR                       | Control of Magneto-Elasticity in Magnetic Thin Films   |
| G-3  | 16:20 | 16:35 | Takamasa Hirai     | NIMS                      | Elastocaloric Kirigami Temperature Modulator   |
| G-4  | 16:35 | 16:50 | Yoshitaro Nose     | Kyoto University          | Processing for Group IV Chalcogenides with 2D Structure Based on Thermodynamics                                      |
| ---  | 16:50 | 17:00 | Closing            |                           |  |

# Poster Session

| Number | Name                            | Affiliation                          | Title  |
|--------|---------------------------------|--------------------------------------|--|
| PS01   | Mayurkumar Ashwinbhai Makhesana | Nirma University                     | Synthesis and Characterization of Metallic Nanoparticles via Laser Ablation Synthesis in Solution and Aerosol Jet Printing               |
| PS02   | Anna Kosogor                    | Institute of Magnetism NASU and MESU | Magnetic Properties, Phase Diagram and Low-Temperature Specific Heat of $\text{Ni}_{50}\text{Mn}_{50-x}\text{Sb}_x$ Alloys               |
| PS03   | Yoichi Ikeda                    | IMR                                  | Current Status of a Triple-Axis Neutron Spectrometer 6G-TOPAN  |
| PS04   | Shigeru Okada                   | Kanagawa University                  | Syntheses and Properties of Single-Phase $\text{RuB}_2$ Material by Arc Melt Method  |
| PS05   | Yulin Xie                       | IMR                                  | High-Throughput Investigation of Cr-N Cluster Formation in Fe-35Ni-Cr System during Low-Temperature Nitriding                            |
| PS06   | Taiki Miura                     | IMR                                  | Effect of Ligament Crystal Ordering on Porous Structure Formation and Coarsening in Liquid Metal Dealloying                              |
| PS07   | Toyoto Sato                     | IMR                                  | Hydrogen Absorption Reactions and Crystal Structure of $(\text{Y}, \text{Mg})\text{Co}_3$  |
| PS08   | Kenji Yoshino                   | University of Miyazaki               | Development of Low-Temperature Non-Vacuum Growth of ZnO Protective Film for Mg-Ion Battery   |
| PS09   | Kaoru Kouzu                     | Kokushikan University                | Syntheses and Its Properties of $R(\text{Al}, \text{Mo})\text{B}_4$ ( $R$ =Rare Earth) Compounds by High-Temperature Al Melt Method      |
| PS10   | Takeshi Hagiwara                | Kanagawa University                  | Synthesis of $\text{AlMgB}_{14}$ Crystal Using Magnesium Fluoride by Al-Self Flux and Its Physicochemical Properties                     |
| PS11   | Hong-Fei Zhao                   | IMR                                  | Search for Short-Range Ordering in Medium-Entropy Alloys (Mn-Co-Ni and Cr-Co-Ni) via Neutron Scattering                                  |
| PS12   | Zaskia Alifia                   | University of Toyama                 | Nanoparticle Synthesis of $\text{BiVO}_4/\text{Ag}$ for Enhanced Dye Photodegradation Illuminated by Visible Light                       |
| PS13   | Hiroya Ishii                    | IMR                                  | Effects of Composition and Processing on the Microstructures, Mechanical Properties and Corrosion Behavior of Biodegradable Fe-Mn Alloys |
| PS14   | Takumi Yamazaki                 | IMR                                  | Figure of Merit of Transverse Thermoelectric Conversion for Magnetic Thin Film Measured by All-in-One Evaluation Method                  |
| PS15   | Hidetoshi Masuda                | IMR                                  | Nonreciprocal Electronic Transport Induced by Current-Induced Deformation of Helimagnetic Structure in $\text{YMn}_6\text{Sn}_6$         |
| PS16   | Hsiao-Yi Chen                   | IMR                                  | Development of an Ab Initio Method for Non-Coplanar Chiral Magnets and Response Properties   |
| PS17   | Rico Pohle                      | IMR                                  | Spin Nematics Meet Spin Liquids: Exotic Phases in the Spin-1 Bilinear-Biquadratic Model with Kitaev Interactions                         |
| PS18   | Yoichi Nii                      | IMR                                  | Gigahertz Topological Surface Acoustic Wave on a Nano-Scaled Honeycomb Phononic Crystal  |

| Number | Name                      | Affiliation              | Title   |
|--------|---------------------------|--------------------------|---|
| PS19   | Hiroshi Kakinuma          | IMR                      | Microscopic Imaging of Hydrogen Diffusion in Metals Using Polyaniline   |
| PS20   | Junyi Luo                 | IMR                      | Anisotropy of Critical Current Density Properties of the High-Performance SS/Ag-Sheathed $\text{Ba}_{1-x}\text{K}_x\text{Fe}_2\text{As}_2$ Tapes              |
| PS21   | Chanhyeon Lee             | IMR                      | Emergent $\sqrt{3} \times \sqrt{3}$ Type Gapless Quantum Spin Liquid in Spin-1/2 Random Kagome Antiferromagnet $\text{YCu}_3(\text{OD})_{6.5}\text{Br}_{2.5}$ |
| PS22   | Yuji Seki                 | Keio University          | Theoretical Calculation of Transport Coefficients in Infinite-Layer Nickelates  |
| PS23   | Koji Inoue                | IMR                      | Effects of P on Formation and Growth of Mn-Ni-Si Clusters in Low-Cu Reactor Pressure Vessel Steel   |
| PS24   | Haruka Yoshino            | IMR                      | Ultrafast Luminescence Sensing with Selective Adsorption of Carbon Disulfide in an Au(I) Metal-Organic Framework  |
| PS25   | Satoshi Iguchi            | IMR                      | Magneto-Optical Detection of Altermagnetism in Organic Antiferromagnet  |
| PS26   | Oleksandr Prokhnenko      | Helmholtz-Zentrum Berlin | Magnetic Order and Spin Dynamics in Natural Mineral Brochantite $\text{Cu}_4\text{SO}_4(\text{OH})_6$   |
| PS27   | Qingxin Liu               | IMR                      | Dynamical Spin Reordering in a Hybrid Layered Ferrimagnet with Biferrocenium Radicals   |
| PS28   | Ke Ji                     | IMR                      | Intra-Lattice Hydrogen Bonds-Related Charge Manipulations Associated with Guest Removal in Charge Transferred Layered Metal-Organic Frameworks                |
| PS29   | Tetsuya Furukawa          | IMR                      | Thermoelectric Properties of an Ambient-Pressure Organic Dirac Electron System $\alpha$ -(BETS) $_2\text{I}_3$  |
| PS30   | Ali Md. Arafat            | Tohoku University        | High-Resolution Spatial Mapping of $\pi$ -Radical Spin States in Single-Molecule Magnets with Electron Spin Resonance   |
| PS31   | Tsutomu Nojima            | IMR                      | Research on Polar Superconductivity in Ion-Gated $\text{SrTiO}_3$   |
| PS32   | Yixin Su                  | IMR                      | Reactive Molecular Dynamics Simulations Revealing the Impact of Carbon Nanotube (CNT) Volume Fraction on the Mechanical Properties of SiC/CNT Composites      |
| PS33   | Muhammad Khalish Nuryadin | IMR                      | Disorder Effect Induced by X-ray Irradiation on a Monomer Mott Insulator $(\text{BEDT-TTF})\text{Cu}[\text{N}(\text{CN})_2]_2$                                |
| PS34   | Shiori Sugiura            | IMR                      | Disorder Effect to the High-Field FFLO Phase in Layered Organic Superconductor $\kappa$ -(BEDT-TTF) $_2\text{Cu}(\text{NCS})_2$                               |
| PS35   | Yuta Kimoto               | IMR                      | Observation of Spin Motive Force and Conduction Noise in a Sliding Helimagnetic Structure   |
| PS36   | Ryo Kawakami              | University of Tsukuba    | Synthesis and Characterization of Polyaniline Type Metal-Doped Magnetic Conjugated Polymers   |