

The Ninth International Conference on Materials Engineering for Resources

# ICMR2021 AKITA

## Conference Program

**October 21 Thu. – 22 Fri., 2021 ONLINE**



**Organized by**

The Society of Materials Engineering for Resources of JAPAN

**Co-Organized by**

Graduate School of Engineering Science, Akita University and

Graduate School of International Resource Sciences, Akita University and

Akita University International Center for Research and Education on Mineral and Energy Resources and

Akita University: JSPS Core-to-Core Program and

Akita University: JSPS Inter-University Exchange Project and

Akita University: Tohoku Initiative for Fostering Global Researchers for Interdisciplinary Sciences (TI-FRIS)

# ICMR2021 AKITA

## Conference Program Time Schedule

**October 21(Thursday)**

**9 : 00 ~ 9 : 10                      Opening Ceremony                      Room A**

**9 : 10 ~ 10 : 30                      Plenary Lectures                      Room A**

9:10~9:50	<b>PL-1 Courtney Young</b> <i>Invite Speaker by TI-FRIS</i>	Montana Technological University Review of the Mechanism for Orfom® D8 Depression of Chalcopyrite in Cu-Mo Separation during Cleaner Flotation
9:50~10:30	<b>PL-2 Nowshad Amin</b> <i>Keynote Speaker</i>	Universiti Tenaga Nasional Thin Film Photovoltaics (PV) of CdTe: Prospects & Challenges

10:30~10:50                      Break

**10 : 50 ~ 19 : 20                      Oral Presentation                      Room A · B · C**

	Room A	Room B		Room C
10:50~12:10	<b>Strategy of Environment, Resource, Advanced Mining Technology, Recycle and Energy</b>  <b>A-1, A-2, A-3, A-4</b>	10:50~12:10	10:50~11:20	<b>Biomaterials and Nanotechnology C-1*</b>
			11:20~11:50	<b>Engineering Materials for Sustainable Development C-2*</b>
			11:50~12:10	<b>Processing and Characterization of Functional Materials C-3</b>
12:10~13:00	Lunch Break	12:10~13:00	12:10~13:00	Lunch Break
13:00-14:55	<b>Special Session of Mining Informatics for Sustainable Resource Development in Central Asia:Core-to-Core Program</b> <b>A-5*, A-6*, A-7, A-8*, A-9</b>	13:00~13:40	13:00~14:30	<b>C-4*, C-5, C-6, C-7</b>
		13:40~14:40	14:30~14:50	Break
14:55~15:20	Break	14:40~15:00	Break	Break
15:20~16:20	<b>Special Session of Smart Mining Program with Sourthern African Countries</b> <b>A-10, A-11, A-12</b>	15:00~16:00	14:50~15:50	<b>C-8, C-9, C-10</b>
		16:00~16:20	15:50~16:10	Break
16:20~16:30	Break	16:20~17:20	16:10~17:30	<b>C-11, C-12, C-13, C-14</b>
16:30~17:45	<b>A-13*, A-14*, A-15*</b>	16:20~17:20		
17:45~18:00	Break			
18:00~19:20	<b>A-16, A-17, A-18, A-19</b>			

\* Keynote Speaker

## October 22(Friday)

9:00 ~ 14:20

**Poster Presentation**

**Room A · B · C**

**Room A**

**Room B**

**Room C**

9:00~10:10

**AP-1 ~ AP-7**

9:00~9:50

**BP-1 ~ BP-5**

9:00~10:10

**CP-1 ~ CP-7**

Break ( ~ 10:40)

10:40~11:40

**AP-8 ~ AP-13**

10:40~11:30

**BP-6 ~ BP-10**

10:40~11:50

**CP-8 ~ CP-14**

Lunch Break( ~ 13:00)

13:00~14:20

**AP-14 ~ AP-21**

13:00~13:50

**BP-11 ~ BP-15**

13:00~14:00

**CP-15 ~ CP-20**

Break ( ~ 14:40)

14 : 40 ~ 16:10

**Plenary Lecture**

**Room A**

14:40~15:10

PL-3

**Kenichi Oyaizu**

*Keynote Speaker*

Waseda University

Organic Functional Materials for Energy Storage

15:10~15:40

PL-4

**Richard Diaz Alorro**

*Invite Speaker by TI-FRIS*

Curtin University

Technospheric Mining: Resource Recovery from Technospheric Stocks and Anthropogenic Ores

15:40~16:10

PL-5

**Anna Littleboy**

*Keynote Speaker*

The University of Queensland

The sustainable supply of minerals needed for a low carbon future

16:10~16:20

Break

16:20 ~ 16:40

**Closing Ceremony**

**Room A**

# ICMR2021 AKITA

**October 21(Thursday)**

**Room A**

**9 : 00 – 9 : 10 Opening Ceremony**

**9 : 10 – 10 : 30 Plenary lecture**

Chairperson: **Atsushi Shibayama**

9:10-9:50 PL-1 Review of the Mechanism for Orfom<sup>®</sup> D8 Depression of Chalcopyrite in Cu-Mo Separation during Cleaner Flotation  
**Courtney Young**, **Simon Timbillah**, **Rick Ladouceur**, Montana Technological University, USA

Chairperson: **Seiji Kumagai**

9:50-10:30 PL-2 Thin Film Photovoltaics (PV) of CdTe: Prospects & Challenges  
**Nowshad Amin**, Universiti Tenaga Nasional, Malaysia

**October 22(Friday)**

**Room A**

**14 : 40 – 16 : 10 Plenary lecture**

Chairperson: **Kazuya Matsumoto**

14:40-15:10 PL-3 Organic Functional Materials for Energy Storage  
**Kenichi Oyaizu**, Waseda University

Chairperson: **Atsushi Shibayama**

15:10-15:40 PL-4 Technospheric Mining: Resource Recovery from Technospheric Stocks and Anthropogenic Ores  
**Richard Diaz Alorro**, Curtin University, Australia

15:40-16:10 PL-5 The Sustainable Supply of Minerals Needed for a Low Carbon Future  
**Anna Littleboy**, The University of Queensland, Australia

**16 : 20 – 16 : 40 Closing Ceremony**

# ICMR2021 AKITA

October 21(Thursday)

Oral Presentation

Room A

10 : 50 – 19 : 20 Oral Presentation

Session *Strategy of Environment, Resource, Advanced Mining Technology, Recycle and Energy*

Chairperson: **Sumio Kato**

- 10:50-11:10 A-1 Gas Adsorption Capability of Hybrid Polymers with Modified Cyclodextrin-Amorphous Silica  
**Fumio Hamada**, Vellore Instituted of Technology
- 11:10-11:30 A-2 Selective Separation of Platinum Group Metals by Precipitation Using Primary Amine Precipitants  
**Kazuya Matsumoto, Yuki Hata, Hiroshi Katagiri and Mitsutoshi Jikei**, Akita University
- 11:30-11:50 A-3 Cracking of Reinforced Concrete by Steam Pressure Cracking Agent  
**Osamu Kamiya, Mamoru Takahashi, Yasuyuki Miyano, Shinichi Ito, Kenji Murata, Makoto Kawano, Arata Maisawa, Junpei Nanao, Takashi Kazumi, Masanobu Nakatsu, Hiroyuki Mizuma and Yuichi Iwama**, Akita University
- 11:50-12:10 A-4 Asteroid Explorer Hayabusa2 Crater Forming Device's Technology  
**Kenji Murata**, Nippon-koki. Co., Ltd.

Lunch Break (12 : 10 ~ 13 : 00)

Session *Special Session of Mining Informatics for Sustainable Resource Development in Central Asia: Core-to-Core Program*

Chairperson: **Yasushi Watanabe ((A-5~A-7) , Youhei Kawamura (A-8~A-9)**

- 13:00-13:25 A-5 Application of SWIR Spectroscopy to Exploration  
**Imants Kavalieris and Khashgerel Bat-erdene**, Plus Minerals LLC, Mongolia
- 13:25-13:50 A-6 Future of Resources Extraction for Smart Materials: Challenges and Implications for the Mining Industry  
**Fidelis T Suorineni**, Nazarbayev University, Kazakhstan
- 13:50-14:10 A-7 Development of Underground Communication System: Case study of WSNs Node Deployment in a Kazakhstani Mine Site  
**Daniyar Malagazhdar, Hajime Ikeda, Takaya Shionoiri, Fidelis Suorineni, Youhei Kawamura**, Akita University

- 14:10-14:35 A-8 Investigation of Chemical Transformations During Roasting of Bioleaching Tailings in the Production of Gold  
**Hayrullo Hamidov**, Omon Fuzaylov, Jahongir Narzullayev and Rustam Khamidov, Navoi State Mining Institute, Uzbekistan
- 14:35-14:55 A-9 Copper Recovery from Chalcopyrite Concentrate by Oxidative Roasting and Acid Leaching  
**Narangarav Tumen-Ulzii, Ariunaa Garnaad, Alen Silam, Azzaya Tumendelger, Burmaa Gunchin, Nyamdelger Shirchinnamjil, Kazutoshi Haga, Atsushi Shibayama, Altansukh Batnasan**, Akita University

**Session *Special Session of Smart Mining Program with Southern African Countries***

Chairperson: **Andrea Agangi**

- 15:20-15:40 A-10 Assessment of the Long Term Resource Availability and the Total Material Requirement of Copper, Gold and Iron  
**Larona S. Teseletso and Tsuyoshi Adachi**, Akita University
- 15:40-16:00 A-11 Diagenetic-early Hydrothermal Origin for Cu-Pb-Zn-As Mineralization in Sediment-Hosted Zone 5 Cu-Ag deposit, Kalahari Copperbelt, NW Botswana  
**Mpho Keeditse, Yasushi Watanabe, Antonio Arribas, Takuya Echigo, Shogo Aoki**, Akita University
- 16:00-16:20 A-12 Dimensional Reduction of Rock Hyperspectral Signatures and Classification Based on a NCA Method  
**Brian B. Sinaice, Narihiro Owada, Hisatoshi Toriya, Elisha Shemang, Zibisani Bagai, Shinji Utsuki and Youhei Kawamura**, Akita University

Chairperson: **Tsuyoshi Adachi**

- 16:30-16:55 A-13 Petrogenesis and Mineralization of the 2.06 Ga Phalaborwa Complex, South Africa, from Mineral Compositions, Pb-S Isotopes and Imaging  
**Robert Bolhar, Loic Le Bras and Lorenzo Milani**, University of the Witwatersrand, South Africa
- 16:55-17:20 A-14 Partitioning and Distribution of Silver in Sediment-Hosted Cu-Ag Deposits: Evidence from the Ghanzi-Chobe Belt Portion of the Kalahari Copper Belt  
**Tebogo Kelepile, Thierry Bineli Betsi, Fulvio Franchi and Elisha Shemang**, Botswana International University of Science and Technology, Botswana
- 17:20-17:45 A-15 Optimization of Open Pit Design Using Maxflow Algorithm - A Case Study  
**Emmanuel K Chanda, Pathie M Musenge and Bunda Besa**, University of Zambia, Zambia

Chairperson: **Altansukh Batnasan**

- 18:00-18:20 A-16 Application of Nonnegative Matrix Factorization for Selecting Underground Mining Methods Based on Mining Projects Historical Data  
**Elsa Pansilvania Andre Manjate, Hisatoshi Toriya, Mahdi Saadat, Tsuyoshi Adachi, Youhei Kawamura and Bernardo Miguel Bene**, Akita University
- 18:20-18:40 A-17 Communication of Sensor Data in Underground Mining Environments: A Comparison and Optimization of Multiple Installation Sequences  
**Hajime Ikeda, Daniyar Malgazhdar, Oluwafemi Kolade, Takaya Shionoiri, Frederick Thomas Cawood, Youhei Kawamura**, Akita University
- 18:40-19:00 A-18 Visualization of 1D CNN Lithology Identification Model During Rotary Percussion Drilling Using Explainable Artificial Intelligence Grad-CAM  
**Lesego Senjoba, Yoshino Kosugi, Masaya Hisada, Hisatoshi Toriya, Tsuyoshi Adachi and Youhei Kawamura**, Akita University
- 19:00-19:20 A-19 Selective Leaching of Valuable Metals from a Smelter Slag by High-Pressure Oxidative Acid Leaching (HPOAL)  
**Labone L. Godirilwe, Kazutoshi Haga, Gwiranai Danha, Yasushi Takasaki, Atsushi Shibayama**, Akita University

# ICMR2021 AKITA

**October 21(Thursday)**

**Oral Presentation**

**Room B**

**10 : 50 – 17 : 20 Oral Presentation**

## Session *Engineering Materials for Sustainable Development*

Chairperson: **Seiji Kumagai**

- 10:50-11:20 B-1 Advanced Oxidation Process using Zeolite Compounds as the Heterogeneous Catalyst  
**Mikito Kitayama, Yoshio Ohta and Shuetsu Suzuki**, Fukuoka Institute of Technology
- 11:20-11:50 B-2 Transferred Type Arc Plasma with Argon Steam Mixture for Decomposition Process of Stable Matters  
**Masava Sugimoto, Wataru Kanou and Kenji Goya**, Akita Prefectural University
- 11:50-12:10 B-3 Study on Cement Stabilized Soil Method by Empty Fruit Bunches Fibers to Landslide Sludge Recycling  
**Delima Canny Valentine Simarmata, Hiroshi Takahashi and Tomoaki Satomi**, Tohoku University

Lunch Break (12 : 10 ~ 13 : 00)

Chairperson: **Hiroki Takahashi**

- 13:00-13:20 B-4 Study on the Strength Characteristics and Long-Term Stability of Fiber-Cement-Stabilized Soil Using Waste Gypsum Board Paper  
**Yu Sato, Tomoaki Satomi and Hiroshi Takahashi**, Tohoku university
- 13:20-13:40 B-5 Rice Husk as a Worthful Source of Battery Materials for High-performance Li-ion Battery Anodes  
**Yusuke Abe, Masaki Nemoto, Masahiro Tomioka and Seiji Kumagai**, Akita University

## Session *Materials and Intelligent Technologies in Super-Smart Society*

Chairperson: **Hiroshi Yokoyama**

- 13:40-14:00 B-6 Detection of Convallaria Keiskei Flowers using a Combination of Machine Learning and Fuzzy c-Means  
**Hikaru Shirai, Yoichi Kageyama, Daisuke Nagamoto, Yuki Kanamori, Naoki Tokunaga, Teruo Kojima and Masae Akisawa**, Akita University
- 14:00-14:20 B-7 Creating Water Quality Map through Neural Network Using Remote Sensing Data and Topographical Information of Lake Hosenko, Japan  
**Kai Matsui and Yoichi Kageyama**, Akita University



14:20-14:40 B-8 Analysis of Human Action in Infrared Images at Nighttime Using CNN  
**Yaru Liu, Kai Matsui, Yoichi Kageyama, Hikaru Shirai and Chikako Ishizawa**, Akita University

**Session *Strategy of Environment, Resource, Advanced Mining Technology, Recycle and Energy***

Chairperson: **Kazutoshi Haga**

- 15:00-15:20 AB-1 Pyrolysis Behavior of Polyvinyl Chloride with Sodium Hydroxide and Application to Copper Recovery from Multiwire Tinned Copper Cables  
**Takaaki Wajima**, Chiba University
- 15:20-15:40 AB-2 FEM-EK Process: A New Remediation Method of Contaminated Soil  
**Mahmudul Kabir, Ayaka Kumagai, Yusuke Sato, Michio Sato, Seiji Kumagai, Noboru Yoshimura**, Akita University
- 15:40-16:00 AB-3 Stability of Nanobubbles and Radical Degradation by Blowing Nanobubbles  
**Toyohisa Fujita, Zhenyao Han, Gjergj Dodbiba and Yuezhou Wei**, Guangxi University

Chairperson: **Takaaki Wajima**

- 16:20-16:40 AB-4 Real Option Analysis for Multi-Uncertainties at Short Term Tin Mine Planning  
**Mohammad Rahman Ardhiansyah, Tsuyoshi Adachi**, Akita University
- 16:40-17:00 AB-5 Separation of Sphalerite from Copper Ore by Flotation  
**Kazutoshi Haga, Reona Sato, Yasushi Takasaki, Kazuya Sunada, Tatsuru Takahashi, Tatsuhiro Ono, Refilwe Magwaneng, Kentaro Kudo, Taro Kamiya, Atsushi Shibayama**, Akita University
- 17:00-17:20 AB-6 Enrichment of Valuable Metals from Ferromanganese Cobalt-Rich Crust by Combining Enhanced Gravity Separation and Reverse Flotation  
**Gjergj Dodbiba, Cheng-En Lee, Yonggu Kim, Toyohisa Fujita**, The University of Tokyo

# ICMR2021 AKITA

**October 21(Thursday)**

**Oral Presentation**

**Room C**

**10 : 50 – 17 : 30 Oral Presentation**

*Session Biomaterials and Nanotechnology*

Chairperson: **Mitsutoshi Jikei**

10:50-11:20 C-1 Exploring Functions Based on Molecular Recognition - Collaboration between Biological and Artificial Systems

**Hiroyasu Yamaguchi, Takuma Adachi, Keisuke Murata, Kenji Kohara, and Akira Harada**, Osaka University

*Session Engineering Materials for Sustainable Development*

Chairperson: **Satoru Yoshimura**

11:20-11:50 C-2 Materials and Device Analyses of Dilute Nitride Intermediate Band Solar Cells

**Nazmul Ahsan and Yoshitaka Okada**, The University of Tokyo

11:50-12:10 C-3 Preparation and Dielectric Characterization of  $\text{Sr}_{1+x}\text{TaO}_{2+y}\text{N}_{1-z}$  Polycrystalline Thin Film

**Shuto Kano, Takeshi Shibahara, Yuji Umeda and Kumiko Yamazaki**, TDK Corporation

Lunch Break (12 : 10 ~ 13 : 00)

*Session Processing and Characterization of Functional Materials*

Chairperson: **Satoru Yoshimura**

13:00-13:30 C-4 Investigations on Spintronics  $\text{RFeO}_3$  Crystals Grown by Optical Floating Zone Technique

**P. Ramesh Babu, S. Kalainathan and Satoru Yoshimura**, VIT University, India

13:30-13:50 C-5 The Effect of Dispersion State of Cobalt Nanoparticles on Magnetic Characteristics of Composite Magnetic Materials

**Kyohei Takahashi, Toshiki Gushi and Isao Kanada**, TDK Corporation

13:50-14:10 C-6 Piezoelectric Properties of LiM-doped (M = V, Nb, Ta, or Zr) AlN Thin Films with Various Compositions

**Tomohiro Terada, Junichi Kimura, and Yukari Inoue**, TDK Corporation

14:10-14:30 C-7 Analysis of  $\text{Ce}^{3+}$  Ion in Ce Doped YAG Ceramic Phosphors

**Moeko Matsui and Tatsuya Terui**, TDK Corporation

Chairperson: **Sho Muroga**

- 14:50-15:10 C-8 Microstructure Analysis of Zn Added  $\text{Sm}_2\text{Fe}_{17}\text{N}_3$  Sintered Magnets  
**Hiroataka Yokota, Yoshitomo Tanaka, Ryuji Hashimoto, Shusuke Okada and Kenta Takagi**, TDK Corporation
- 15:10-15:30 C-9 Magnetic and Electrical Properties of  $(\text{Bi}_{1-x}\text{La}_x)(\text{Fe,Co})\text{O}_3$  Films Fabricated by a Pulsed DC Reactive Sputtering Method  
**Munusamy Kuppan and Satoru Yoshimura**, TDK Corporation
- 15:30-15:50 C-10 Development of  $(\text{Bi}_{0.5}\text{L}_{0.5})(\text{Fe}_{0.75}\text{Co}_{0.25})\text{O}_3$  ( $L = \text{La, Nd, Sm, Gd, Dy, Er}$ ) Films with Excellent Magnetic Properties for Magnetic Device Application  
**Kotaro Takeda, Daichi Yamamoto, Soumyaranjan Ratha, Munusamy Kuppan, Genta Egana, and Satoru Yoshimura**, Akita University

Chairperson: **Mitsutoshi Jikei**

- 16:10-16:30 C-11 Effective Separation of Alkane Vapors using Supramolecular Thiocalixarene Crystals  
**Manabu Yamada, Fumiya Uemura, Hiroshi Katagiri, and Fumio Hamada**, Akita University
- 16:30-16:50 C-12 Evaluation of Microwave-Frequency Magnetic Field Response of MFM Tip Coated by Superparamagnetic Co-GdO<sub>x</sub> Granular Alloy Film  
**Shunsuke Sato, Toru Matsumura, Hiroshi Sonobe and Hitoshi Saito**, Akita University
- 16:50-17:10 C-13 Mass Fabrication of Silver Nanofibers with Ultrahigh Aspect Ratios  
**Chiho Onodera, Xu Zhao and Mikio Muraoka**, Akita University
- 17:10-17:30 C-14 A Novel Method for Evaluating Mineral Liberation by Combining the Results of SEM-EDX and XRD Analysis  
**Tatsuya Shiozuka, Yonggu Kim, Yutaro Takaya and Gjergj Dodbiba**, The University of Tokyo

# ICMR2021 AKITA

**October 22(Friday)**

**Poster Presentation**

**Room A**

**9 : 00 – 14 : 20 Poster Presentation**

**Session AP1 9:00 – 10:10**

Chairperson: **Kazutoshi Haga**

- 9:00-9:10 AP-1 Mineralization Process Deduced from the Occurrence of a Yellow Ore from the Furutobe Deposit, Akita, Japan  
**Teruhiro Suzuki, Yasushi Watanabe, Takuya Echigo and Shogo Aoki**, Akita University
- 9:10-9:20 AP-2 PGE Mineralization in the Limpopo Mine, Eastern Limb of the Bushveld Complex, South Africa  
**Maki Birukawa, Yasushi Watanabe and Takuya Echigo**, Akita University
- 9:20-9:30 AP-3 Geology and Mineralization of the Kutessay II REE Deposit in Northern Tien Shan, Kyrgyzstan  
**Aizada Tenisbek, Yasushi Watanabe, Tenisbek Koilubaev and Patthana Bounliyong**, Akita University
- 9:30-9:40 AP-4 Characterization of Fe-T Oxides in Placer Deposits Along the SE Coast of the Papuan Peninsula, Papua New Guinea: in terms of Mineral Textures, Provenance and Petrogenesis  
**Leevsmon Hulijeli, Yasushi Watanabe and Osamu Nishikawa**, Akita University
- 9:40-9:50 AP-5 Incorporation of an Optimized Mine Schedule and Real Option Valuation of a Gold Mine  
**Ntshiri B. Tsae and Tsuyoshi Adachi**, Akita University
- 9:50-10:00 AP-6 Parametric Study on Landslides Using Frequency Ratio Model and GIS in Central Parts of Badakhshan Province, Afghanistan  
**Bashir Ahmad Jalali, Taeyoo Na, Hisatoshi Toriya, Itaru Kitahara, Youhei Kawamura**, Akita University
- 10:00-10:10 AP-7 Construction of Training Data in the Computational Domain and Deep Learning Identification Trials for Estimation of Fragmentation in Blast Muckpiles  
**Taiga Sato, Kohei Yoshino, Hisatoshi Toriya, Jang Hyongdoo, Itaru Kitahara and Youhei Kawamura**, Akita University

## Session AP2 10:40 – 11:40

Chairperson: **Gjergj Dodbiba**

- 10:40-10:50 AP-8 An Estimation Method of Fragmentation in Blast Muckpiles Using Deep Learning with Hierarchical Feature Extraction for 3D Point Cloud  
**Kohei Yoshino, Taiga Sato, Hisatoshi Toriya, Hidehiko Shishido, Jang Hyongdo, Youhei Kawamura, and Itaru Kitahara**, University of Tsukuba
- 10:50-11:00 AP-9 Effects of Operational Conditions on Fine Grindability and Wear of Grinding Beads in Limestone Bead Milling  
**Naoya Kotake, Shohei Ouchi, Motonori Iwamoto, Yasuyoshi Sekine and Susumu Gunji**, Yamagata University
- 11:00-11:10 AP-10 Simulation of Mineral Crushing with Electric pulse method by Using Equivalent Circuit Models  
**Kyosuke Fukushima, Kensuke Kanda, Naoko Obara, Mahmudul Kabir, Akira Otsuki**, Akita University
- 11:10-11:20 AP-11 New Kinetics Model for Estimating the Grade of Minerals in Froth Fraction after Flotation of Complex Materials  
**Kazumi Otake, Yonggu Kim, Humio Sasaki, Ryuji Nagoya, Yuuki Nagase, Kyouhei Sukou, Gjergj Dodbiba**, The University of Tokyo
- 11:20-11:30 AP-12 Gold Upgrading of Gold-Bearing Polymetallic Gold-Zinc-Lead Ore in Myanmar by Flotation  
**Nay Win Tun, Kazutoshi Haga and Atsushi Shibayama**, Akita University
- 11:30-11:40 AP-13 Removal of Impurity Components from Low-Grade Iron Ore by Alkaline Roasting and Mineral Processing Techniques  
**Atsushi Shibayama, Altansukh Batnasan, Hiroya Takeuchi, Kazutoshi Haga, Moritoshi Mizutani, Ken-ichi Higuchi**, Akita University

Lunch Break ( ~ 13 : 00)

## Session AP3 13:00 – 14:20

Chairperson: **Takaaki Wajima**

- 13:00-13:10 AP-14 Recovery of Carbon Fiber from Waste Carbon Fiber Reinforced Plastics using Sodium Hydroxide  
**Jotaro Takahashi and Takaaki Wajima**, Chiba University
- 13:10-13:20 AP-15 Synthesis of Layered Double Hydroxides from Waste Tire Combustion Ash for Phosphorus Removal  
**Yuki Sakai and Takaaki Wajima**, Chiba University
- 13:20-13:30 AP-16 Study on Microbial Fuel Cell (MFC) Using Biological Industrial Wastes  
**Hajime Ebitani, Naoko Obara, Mahmudul Kabir, Toshihide Takahashi**, Akita University

- 13:30-13:40 AP-17 Recycling of spent NCM cathode Lithium-ion Battery  
**Hao Chen, Toyohisa Fujita, Yuezhou Wei, Chunlin He and Kaituo Wang**, Guangxi University
- 13:40-13:50 AP-18 Development of rare earth elements recycling technology for rare earth magnets  
**Miki Osawa**, TDK corporation
- 13:50-14:00 AP-19 A novel flowsheet design for treatment of waste electrical and electronic equipment by combining several physical separation models  
**Yonggu Kim and Gjergj Dodbiba**, The University of Tokyo
- 14:00-14:10 AP-20 Synergistic Solvent Extraction of Critical Elements from PCBs  
**Diana Laura Gomez Sanchez and Gjergj Dodbiba**, The University of Tokyo
- 14:10-14:20 AP-21 Effective Palladium(II) Separation from a Leachate of Automotive Catalysts Using a Pincer-Type Extractant  
**Manabu Yamada, Toshiaki Ohira, Nao Watanabe and Atsushi Shibayama**, Akita University

# ICMR2021 AKITA

**October 22(Friday)**

**Poster Presentation**

**Room B**

**9 : 00 – 13 : 50 Poster Presentation**

Session BP1 9:00 – 9:50

Chairperson: **Seiji Kumagai**

- 9:00-9:10 BP-1 Study on Investigating the Range of Colors Imagined from Names for Application to CAPTCHAs  
**Chikako Ishizawa, Nozomu Kobayashi and Yoichi Kageyama**, Akita University
- 9:10-9:20 BP-2 Basic Study on the Perception of Location through Reverbed Voice  
**Sawako Nakajima, Yuji Sone and Kazutaka Mitobe**, Akita University
- 9:20-9:30 BP-3 Development of Asbestos Containing Serpentine Identification Method Using Hyper Spectral Imaging  
**Narihiro Owada, Nanto Tobita, Brian Sinaice, Shinji Utsuki, Youhei Kawamura**, Akita University
- 9:30-9:40 BP-4 Deep Learning as an Early Detection System for Rotary Percussion Drilling Malfunctions  
**Yoshino Kosugi, Hisatoshi Toriya, Mahdi Saadat, Tsuyoshi Adachi, Youhei Kawamura**. Akita University
- 9:40-9:50 BP-5 Application of Speech Section Extraction Method Using Lip and Voice  
**Etsuro Nakamura, Yoichi Kageyama and Satoshi Hirose**, Akita University

Session BP2 10:40 – 11:30

Chairperson: **Mahmudul Kabir**

- 10:40-10:50 BP-6 Versatility of Action-Recognition Approach using Simulated Working Data  
**Hechen Yun, Etsuro Nakamura, Yoichi Kageyama, Chikako Ishizawa, Nobuhiko Kato, Ken Igarashi and Ken Kawamoto**, Akita University
- 10:50-11:00 BP-7 Basic Examination of 3D Reconstruction of Trees for Simplifying Fruit Tree Growing Techniques  
**Takumi Okuyama, Masaki Ishii, Hidekatsu Ito and Kohji Dohsaka**, Akita Prefectural University
- 11:00-11:10 BP-8 Evaluation of a Facial Expression Recognition Method with Adaptive Learning Function Using Facial Feature Points  
**Masaya Kodaira, Masaki Ishii, Hidekatsu Ito, Kohji Dohsaka and Yoichi Kageyama**, Akita Prefectural University
- 11:10-11:20 BP-9 Micro Crack Detection Method Using Nonlinear Ultrasonic Lamb Waves of Lamé Mode  
**Makoto Fukuda and Kazuhiko Imano**, Akita University

11:20-11:30 BP-10 Identification of Fruiting Position for Flower Picking and Fruit Picking Operations with Enhanced Precision in Fruit Cultivation  
**Hibiki Sato, Masaki Ishii, Hidekatsu Ito and Kohji Dohsaka**, Akita Prefectural University

Lunch Break ( ~ 13 : 00)

**Session BP3 13:00 – 13:50**

Chairperson: **Sawako Nakajima**

- 13:00-13:10 BP-11 A Study on Feature Extraction of EEG Signals Related to Opening and Closing Movements of the Hand  
**Akito Takahashi, Motoshi Tanaka, Sho Muroga, Yoshitsugu Niiyama and Jianqing Wang**, Akita University
- 13:10-13:20 BP-12 A Study on Arrhythmia Extraction and Atrial Fibrillation Detection from Long-Term Holter-ECG  
**Hidefumi Kamozaawa, Motoshi Tanaka and Sho Muroga**, Akita University
- 13:20-13:30 BP-13 An Investigation on Recognition Method of Chord Sound of Acoustic Guitar  
**Yoshifumi Bando and Motoshi Tanaka**, Akita University
- 13:30-13:40 BP-14 A Study on Crosstalk Suppression and Insertion Loss in MSLs with Co-Zr-Nb Film  
**Takuma Kobayashi, Takahiro Mikami, Sho Muroga, Motoshi Tanaka**, Akita University
- 13:40-13:50 BP-15 A Study on Comfort Estimation of Color Lighting Space by Machine Learning of Brain Wave Information  
**Miho Kanbayashi, Motoshi Tanaka, Sho Muroga, Katsutoshi Saito and Yoshitsugu Niiyama**, Akita University



# ICMR2021 AKITA

October 22(Friday)

Poster Presentation

Room C

9 : 00 – 14 : 00 Poster Presentation

Session CP1 9:00 – 10:10

Chairperson: **Takayoshi Shindo**

- 9:00-9:10 CP-1 Construction of Recombinant Yeast for Biosynthesis of Rubber-Like Materials  
**Saki Yokota-Imai and Takeshi Gotoh**, Akita University
- 9:10-9:20 CP-2 Synthesis of Polylactic Acid-Poly(1,5-Dioxepan-2-One) Copolymers with Different Composition Ratios and Cell Culture Test  
**Vu Thi Xoan, Kazuya Matsumoto, Mitsutoshi Jikei and Masaki Hikida**, Akita University
- 9:20-9:30 CP-3 Development of Superacid-Mediated Controlled Friedel-Crafts Reaction and Its Application to Polymerizations  
**Masakazu Wakana, Kazuya Matsumoto and Mitsutoshi Jikei**, Akita University
- 9:30-9:40 CP-4 Preparation of Molybdenum Nitride and its Oxygen Reduction Activity  
**Hiroki Takahashi, Daiki Watanabe and Masami Taguchi**, Akita University
- 9:40-9:50 CP-5 Ammonia Oxidation Activity in Alkaline Solution of Pt Alloy Thin Film Electrodes  
**Hikaru Sato, Yuya Naito and Hiroki Takahashi**, Akita University
- 9:50-10:00 CP-6 Effect of Diamond Seed Attachment Processing on Synthesis of Diamond Films on Tungsten Carbide Substrate by Flame Combustion  
**Mamoru Takahashi and Osamu Kamiya**, Akita University
- 10:00-10:10 CP-7 Thermoelectric Properties of Carbon Nanohorn Monoliths  
**Ryu Obara, Yasunori Chonan, Takao Komiyama, Koji Kotani, Hiroyuki Yamaguchi, Shigeru Yamauchi, Yasushi Sugawara, Takashi Sekine, Shigeaki Sugiyama and Yuichi Momoi**, Akita Prefectural University

Session CP2 10:40 – 11:50

Chairperson: **Sumio Kato**

- 10:40-10:50 CP-8 Preparation of Iron Sulfide Films by PLD Techniques  
**Aimi Harima, Syunya Kaneko, Takao Komiyama, Yasunori Chonan, Koji Kotani, Hiroyuki Yamaguchi, Shigeru Yamauchi, Yasushi Sugawara, Takashi Sekine, Shigeaki Sugiyama**, Akita Prefectural University
- 10:50-11:00 CP-9 Optimization of Fiber Optic Cleaving Conditions for Broadband Mid-Infrared Light Source with Er/Dy Co-Doped Fluoride Fiber  
**Akira Mori, Masaya Sugimoto and Kenji Goya**, Akita Prefectural University

- 11:00-11:10 CP-10 Preparation of a Highly Selective Fluorine Adsorbent by Mechanochemical Treatment from Titanium Oxide  
**Shunsuke Dei and Takaaki Wajima**, Chiba University
- 11:10-11:20 CP-11 Recovery of Gold from Strong Acidic Solution using Sulfur-Impregnated Carbonaceous Bamboo  
**Ryoto Hashikawa and Takaaki Wajima**, Chiba University
- 11:20-11:30 CP-12 High Temperature Oxidation Behavior of CrMnFeCoNi High-Entropy Alloy  
**Yoshiyuki Sato and Yoshiki Iwata**, Akita University
- 11:30-11:40 CP-13 Effect of Annealing Treatment on Resistance Temperature Properties of Carbon Black/Polyethylene Composites  
**Masahiro Tomioka and Seiji Kumagai**, Akita University
- 11:40-11:50 CP-14 Dye Sensitized Solar Cells using Poly-Dopamin  
**Naomu Takahashi and Mikito Kitayama**, Fukuoka Institute of Technology

Lunch Break ( ~ 13 : 00)

### Session CP3 13:00 – 14:00

Chairperson: **Hitoshi Saito**

- 13:00-13:10 CP-15 Development of High Thermal Conductivity Silicon Nitride using Yttrium Disilicide  
**Ren Matsushima and Mikito Kitayama**, Fukuoka Institute of Technology
- 13:10-13:20 CP-16 Study on Electrical Properties of ZnO Micro Particles under Different Temperature Conditions  
**Tatsuya Suga, Mahmudul Kabir, Shinobu Tanaka, Yasunori Kasuga**, Akita University
- 13:20-13:30 CP-17 Effect of Surface Area of Activated Carbon with Positive Electrode on Rate Performance of Lithium-Ion Capacitor using Si Negative Electrode  
**Takuya Eguchi, Keiichiro Sawada, Masahiro Tomioka and Seiji Kumagai**, Akita University
- 13:30-13:40 CP-18 Aging of Electric Double-Layer Capacitor Under High Voltage Application  
**Yugo Kanamoto, Masahiro Tomioka and Seiji Kumagai**, Akita University
- 13:40-13:50 CP-19 Effect of Prelithiation Degree of Si Anode on the Charge-Discharge Performance of Lithium-Ion Capacitor  
**Ryoichi Sugawara, Takuya Eguchi, Masahiro Tomioka, Seiji Kumagai**, Akita University
- 13:50-14:00 CP-20 Electrochemical Performance of NCM Cathode Recycled from Waste Lithium-ion Batteries  
**Kensuke Sawa, Yusuke Abe, Seiji Kumagai, Ryohei Watanabe and Tatsuya Yodose**, Akita University

# ICMR2021 AKITA

## OUR SPONSORS AND PARTNERS

- **AKITA ZINC CO., LTD.**  
秋田製錬株式会社
- **DOWA HOLDINGS CO., LTD.**  
DOWA ホールディングス株式会社
- **KOSAKA SMELTING & REFINING CO., LTD.**  
小坂製錬株式会社
- **Mitsubishi Materials Corporation**  
三菱マテリアル株式会社
- **MITSUBISHI MATERIALS ELECTRONICS CHEMICALS CO., LTD.**  
三菱マテリアル電子化成株式会社
- **Non-Profit Organization Akita Environmental Remediation Consortium**  
NPO 法人秋田土壌浄化コンソーシアム
- **SANWA TEKKI CORPORATION**  
三和テッキ株式会社
- **TDK Corporation**  
TDK 株式会社
- **TOHOKU CHEMICAL Co., Ltd.**  
東北化学薬品株式会社

• AKITA ZINC CO., LTD.

秋田製錬株式会社



• DOWA HOLDINGS CO., LTD.

DOWA ホールディングス株式会社

DOWA		DOWA HOLDINGS CO., LTD. www.dowa.co.jp		
Environmental Management & Recycling DOWA ECO-SYSTEM CO., LTD.	Nonferrous Metals DOWA METALS & MINING CO., LTD.	Electronic Materials DOWA ELECTRONICS MATERIALS CO., LTD.	Metal Processing DOWA METALTECH CO., LTD.	Heat Treatment DOWA THERMOTECH CO., LTD.
Resource recycle	Zinc smelting	Fuel cell catalyst	Strips / Plating	Carburizing
Soil remediation	Complex combine	Silver / Carrier / Ferrite	Metal-Ceramics Substrates	Plasma nitriding
<b>DOWA Techno-Fund:</b> Dowa Holdings provides funding and other support for joint R&D, and will assist to energize and boost ongoing our and your R&D to new levels.				
<ul style="list-style-type: none"> <li>CO<sub>2</sub> capture, utilization, storage technologies</li> <li>Recycling of waste materials</li> <li>Hazardous materials detoxification</li> </ul>	<ul style="list-style-type: none"> <li>Energy saving recovery of precious metals</li> <li>Production of alternative fuels</li> <li>Separation and solidification technologies of repellent elements</li> </ul>	<ul style="list-style-type: none"> <li>Oxide-based all-solid-state lithium battery materials</li> <li>Manufacturing technology of magnetic particles for biosensing</li> <li>Semiconductor deposition tech.</li> </ul>	<ul style="list-style-type: none"> <li>Microstructure control technology</li> <li>Metal-ceramics/metal bonding technology</li> <li>Composition, microstructure and shape control of plating</li> </ul>	<ul style="list-style-type: none"> <li>High speed deposition technology for DLC films</li> <li>Composition, structure, and shape control technologies for DLC films</li> <li>NH<sub>3</sub>-H<sub>2</sub> burner control technology</li> </ul>



・ KOSAKA SMELTING & REFINING CO., LTD.

小坂製錬株式会社



・ Mitsubishi Materials Corporation

三菱マテリアル株式会社



金属事業カンパニー

- ・ 秋田製錬所
- ・ 直島製錬所
- ・ 生野事業所

- ・ 小名浜製錬所
- ・ マテリアルエコリファイン株
- ・ 細倉金属鉛業株
- ・ PT. Smelting 社

• **MITSUBISHI MATERIALS ELECTRONICS CHEMICALS CO., LTD.**

三菱マテリアル電子化成株式会社

 MITSUBISHI MATERIALS ELECTRONIC CHEMICALS CO.,LTD.



URL : <https://www.mmc-ec.co.jp/>

• **Non-Profit Organization Akita Environmental Remediation Consortium**

NPO 法人秋田土壌浄化コンソーシアム

**Non-Profit Organization  
Akita Environmental  
Remediation  
Consortium**

NPO 法人秋田土壌浄化コンソーシアム  
<http://www.cna.ne.jp/~akitadojyo/>



# • SANWA TEKKI CORPORATION

三和テッキ株式会社



# • TDK Corporation

TDK株式会社



Attractive Energy


あす、また世界をあたらしく。

IoTに5G通信、自動運転やロボットも私たちのフィールド。  
世界のあらゆる領域で未来をひきよせるテクノロジーのTDK。


Attracting Tomorrow 

• **TOHOKU CHEMICAL CO., LTD.**

東北化学薬品株式会社



Industrial Chemical product



Contract Gene Analysis



Clinical Investigating reagent

**TOHOKU CHEMICAL CO., LTD**

<https://www.t-kagaku.co.jp/>



# ORGANIZING COMMITTEE

## Honorary Chairpersons :

N. Yoshimura (Prof. Emeritus of Akita Univ.)

F. Hamada (Prof. VIT Univ.(India))

## General Chairperson :

A. Shibayama (President of SMER JAPAN, Akita Univ.)

## Executive Committee

Chairperson : M. Jikei (Akita Univ.)

## Finance Committee

Chairperson : M. Jikei (Akita Univ.)

## Program Committee

Chairperson : M. Jikei (Akita Univ.)

## Steering Committee

Chairperson : S. Kumagai (Akita Univ.)

## Awards Committee

Chairperson : S. Shibayama (Akita Univ.)

## Committee Members :

A. Agangi (Akita Univ.), Y. Enokido (TDK), H. Fujii (Akita Univ.), T. Fujita (Guangxi Univ.(China)),  
T. Goto (Akita Univ.), K. Haga (Akita Univ.), M. Hosaka (Akita Pref. Univ.), H. Iizuka (Yamagata Univ.),  
N. Iki (Tohoku Univ.), K. Imano (Akita Univ.), Y. Kageyama (Akita Univ.), O. Kamiya (Akita Univ.),  
S. Kato (Akita Univ.), Y. Kawamura (Hokkaido Univ.), K. Mitobe (Akita Univ.), M. Muraoka (Akita Univ.),  
K. Murata (Nippon koki), S. Naganawa (Akita Univ.), A. Nakamura (Mitsubishi Materials Electronic Chemicals),  
Y. Ohta (Before Fukuoka Inst. of Tech.), K. Oto (Saga Univ.), H. Saito (Akita Univ.), T. Shindo (Akita Univ.),  
A. Sugawara (DOWA Holdings), K. Tajima (Akita Univ.), M. Tago (Akita Univ.), H. Takahashi (Tohoku Univ.),  
R. Togashi (Akita Zinc), T. Wajima (Chiba Univ.), A. Yamamura (Akita Univ.), Y. Watanabe (Akita Univ.),  
S. Yoshimura (Akita Univ.), H. Zen (Mitsubishi Materials)



Edited by

The Programming Committee of ICMR2021 AKITA

The Society of Materials Engineering for Resources of JAPAN

In Akita University, Akita,010-8502 Japan

E-mail : [icmr@gipc.akita-u.ac.jp](mailto:icmr@gipc.akita-u.ac.jp)

Phone • Fax:+81-18-889-2439