

# The 6<sup>th</sup> International Symposium on Advanced Microscopy and Theoretical Calculations ( AMTC6 )

## Program

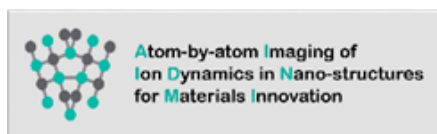


**June 14 ~ 15, 2019**  
**WINC AICHI, Nagoya, Japan**

**Organized by Japan Fine Ceramics Center (JFCC)**

Supported from JSPS KAKENHI

"Atom-by-atom imaging of ion dynamics in  
nanostructures for materials innovation"



# Invited Lectures

**Friday, June 14th, 2019**

9:50 – 10:00	<i>Opening Address</i>	AMTC Letters Page No.
<b>Session A-1</b>	<b>Advanced TEM, STEM Imaging for Materials Science 1</b> Chair: Koh Saitoh ( <i>Nagoya University</i> )	
10:00 – 10:30 Invited	<b>Juan-Carlos Idrobo (Oak Ridge National Laboratory)</b> A Glimpse into Electron Microscopy in the Quantum Information Era	2
10:30 – 11:00 Invited	<b>Naoya Shibata (The University of Tokyo)</b> Advanced DPC STEM imaging for materials research	4
11:00 – 11:20	<i>Coffee Break (20 min.)</i>	
<b>Session A-2</b>	<b>Advanced TEM, STEM Imaging for Materials Science 2</b> Chair: Takeharu Kato ( <i>JFCC</i> )	
11:20 – 11:50 Invited	<b>Scott D. Findlay (Monash University)</b> Structure Retrieval from Phase-contrast Scanning Transmission Electron Microscopy using Segmented and Pixelated Detectors	6
11:50 – 12:20 Invited	<b>Shunsuke Kobayashi (JFCC)</b> Characterization of the Intermediate Phase in Li Ion Battery Cathode Material LiFePO <sub>4</sub> by Scanning Transmission Electron Microscopy	8
12:20 – 13:50	<i>Lunch (90 min.)</i>	
<b>Keynote Lecture</b>	Chair: Yoshio Ukyo ( <i>JFCC</i> )	
13:50 – 14:20 Invited	<b>Jürgen Janek (Justus-Liebig-Universität Gießen)</b> Understanding Interface Instabilities and Kinetics in All-Solid State Batteries	68
<b>Session B-1</b>	<b>In situ Imaging and Analysis of Functional Materials 1</b> Chair: Tadahiro Kawasaki ( <i>JFCC</i> )	
14:20 – 14:50 Invited	<b>Haimei Zheng (Lawrence Berkeley National Laboratory)</b> In Situ Liquid Cell TEM Study of Dynamic Morphology Changes of Individual PbSe Nanocrystals during Superlattice Phase Transitions	72
14:50 – 15:10	<i>Coffee Break (20 min.)</i>	
<b>Session B-2</b>	<b>In situ Imaging and Analysis of Functional Materials 2</b> Chair: Toshiaki Tanigaki ( <i>Hitachi, Ltd.</i> )	
15:10 – 15:40 Invited	<b>Florent Houdellier (CEMES / Centre d'Élaboration de Matériaux et d'Études Structurales)</b> Ultrafast Transmission Electron Microscopy: Historical Development, Instrumentation and Applications	74
15:40 – 16:10 Invited	<b>Satoshi Hata (Kyushu University)</b> In-situ Straining and Electron Tomography System: Its Development and Performance	76
16:20 – 17:10	<i>Poster Session 1 (odd numbers) &amp; Coffee</i>	
17:10 – 18:00	<i>Poster Session 2 (even numbers) &amp; Coffee</i>	
18:30 – 20:30	<i>Banquet (Hotel Castle Plaza)</i>	

## Saturday, June 15th, 2019

<b>Session C-1</b>		
<b>Frontiers of Materials Science 1</b>		
Chair: Teiichi Kimura ( <i>JFCC</i> )		
9:30 – 10:00 Invited	<b>Yoshio Ukyo (<i>JFCC</i>)</b> Analysis of Fading Phenomena of Lithium Ion Batteries	118
10:00 – 10:30 Invited	<b>Kazuo Yamamoto (<i>JFCC</i>)</b> Direct Evaluation of Functional Devices by <i>Operando</i> Transmission Electron Microscopy	120
10:30 – 10:50	<i>Coffee Break (20 min.)</i>	
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<b>Frontiers of Materials Science 2</b>		
Chair: Yongzhao Yao ( <i>JFCC</i> )		
10:50 – 11:20 Invited	<b>Michael Lehmann (<i>Technische Universität Berlin</i>)</b> Off-axis Electron Holography for Imaging and Measuring of Electric Potentials in Semiconductor Nanostructures	122
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11:50 – 12:20 Invited	<b>Yukari Ishikawa (<i>JFCC</i>)</b> Characterization of Dislocations in Wide Bandgap Semiconductors	126
12:20 – 13:50	<i>Lunch (90 min.)</i>	
<b>Session D-1</b>		
<b>Modeling and Simulation 1</b>		
Chair: Masato Yoshiya ( <i>Osaka University</i> )		
13:50 – 14:20 Invited	<b>Chris G. Van de Walle (<i>University of California, Santa Barbara</i>)</b> Unusual Structures of Point Defects and Impurities in Sesquioxides	186
14:20 – 14:50 Invited	<b>Katsuyuki Matsunaga (<i>Nagoya University</i>)</b> Electronic and Atomic Structures of Dislocations in an Inorganic Semiconductor Showing Unexpected Large Plasticity at Room Temperature	188
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<b>Modeling and Simulation 2</b>		
Chair: Hiroki Moriwake ( <i>JFCC</i> )		
15:10 – 15:40 Invited	<b>Andrew M. Rappe (<i>University of Pennsylvania</i>)</b> New Approaches to Understanding the Ferroic Properties of Perovskite Oxide Solid Solutions	190
15:40 – 16:10 Invited	<b>Minoru Otani (<i>AIST / National Institute of Advanced Industrial Science and Technology</i>)</b> Electrochemical Reactions and Solvation Structures at Electrode/Electrolyte Interface using Density Functional Theory Calculation Combined with Implicit Solvation Theory	192
16:10 – 16:40 Invited	<b>Akihide Kuwabara (<i>JFCC</i>)</b> First Principles Calculations of Defect Formation Behavior in Proton Conductive Perovskite Oxides	194
16:50 – 17:00	<i>Closing Remarks</i>	

# Poster Presentations

**Odd numbers: June 14th, 16:20 ~ 17:10**

**Even numbers: June 14th, 17:10 ~ 18:00**

Poster No.	Advanced TEM, STEM Imaging for Materials Science	AMTC Letters Page No.
A01	<p>Nanodomain Structures in a Strained BaTiO<sub>3</sub> Film Detected Using Picoscale Cation Displacement Measurements</p> <p style="text-align: center;"><i>S. Kobayashi<sup>1</sup>, K. Inoue<sup>2</sup>, T. Kato<sup>1</sup>, Y. Ikuhara<sup>1,2,3</sup>, T. Yamamoto<sup>1,4</sup></i>  <sup>1</sup>JFCC, <sup>2</sup>Tohoku Univ., <sup>3</sup>The Univ. of Tokyo, <sup>4</sup>Nagoya Univ.</p>	10
A02	<p>Structure of Spinel-type Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub>(111) Surface Determined by Annular Dark-Field Scanning Transmission Electron Microscopy</p> <p style="text-align: center;"><i>M. Kitta<sup>1</sup>, K. Tada<sup>1</sup>, S. Tanaka<sup>1</sup>, M. Kohyama<sup>1</sup></i>  <sup>1</sup>AIST</p>	12
A03	<p>Atomic Structure, Electronic Structure and Photocatalytic Activity in a Ti<sup>4+</sup>/Ti<sup>3+</sup> Core-shell System</p> <p style="text-align: right;"><i>L. Lin<sup>1</sup>.</i>  <sup>1</sup>East China Normal Univ.</p>	14
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A05	<p>Atomic-Resolution STEM Imaging for Beam-Sensitive Li-Ion Battery Materials</p> <p style="text-align: center;"><i>K. Nakayama<sup>1</sup>, R. Ishikawa<sup>1,2</sup>, S. Kobayashi<sup>3</sup>, N. Shibata<sup>1,3</sup>, Y. Ikuhara<sup>1,3</sup></i>  <sup>1</sup>The Univ. of Tokyo, <sup>2</sup>PRESTO, <sup>3</sup>JFCC</p>	18
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