

Program Overview

Room /Time	Evergreen Ballroom & Foyer	Grand Ballroom A-C	Grand Ballroom A-G	Grand Ballroom E-G	Grand Ballroom H-K	Regency Ballroom A-C
SuP	Poster Sessions					
MoM			PS1-MoM: ALD Plenary Session PS2-MoM: ALE Plenary Session			
MoA		AA1-MoA: ALD for Biological and Space Applications AA2-MoA: ALD for Solar Cells, Fuel Cells, and H ₂ Storage		AF2-MoA: ALD Precursors I AF3-MoA: Growth and Characterization I	AF1-MoA: ALD Growth Mechanisms I AF4-MoA: Growth Mechanisms II	ALE1-MoA: Energy-enhanced ALE ALE2-MoA: ALE of Compound Semiconductors
MoP	Poster Sessions					
TuM		AF1-TuM: In-Situ Characterization of ALD Processes AF3-TuM: Growth and Characterization II		AA1-TuM: ALD for Catalysts, Electrocatalysts, and Photocatalysts AA2-TuM: ALD for Batteries I	AF2-TuM: ALD Precursors II AS1-TuM: Area-Selective ALD Techniques	ALE1-TuM: ALE: Gas-phase and/or Thermal ALE ALE2-TuM: Alternative Methods to ALE
TuA		AA3-TuA: ALD for Memory Applications I AF-TuA: Plasma ALD: Growth and Characterization		AA1-TuA: Emerging Applications I AA2-TuA: ALD for Batteries II	AS1-TuA: Area-Selective ALD by Area-Deactivation AS2-TuA1: Area-Selective ALD: Combinations with Etching	ALE1-TuA: Modeling & Instrumentation I ALE2-TuA: Modeling & Instrumentation II
TuP	Poster Sessions					
WeM		EM1-WeM: Molecular Layer Deposition EM2-WeM: Organic-Inorganic Hybrid Materials		AM1-WeM: Spatial ALD, Fast ALD, and Large-Area ALD EM3-WeM: Epitaxial Growth and III-V Materials	AA1-WeM: ALD for Memory Applications II AA2-WeM: ALD for ULSI Applications I	ALE1-WeM: Integration & Application of ALE ALE2-WeM: Materials Selective ALE
WeA		AA1-WeA: Emerging Applications II		NS-WeA: 2D Nanomaterials by ALD (including Transition Metal Dichalcogenides)	AA2-WeA: ALD for ULSI Applications II	EM1-WeA: Ternary and Quaternary Oxide Materials

Sunday Evening Poster Sessions, July 21, 2019

Atomic Layer Etching

Room Evergreen Ballroom & Foyer - Session ALE-SuP

Atomic Layer Etching Poster Session

6:00pm

ALE-SuP1 Mechanistic Thermal Desorption Studies of Thermal Dry Etching Reactions for Cobalt and Iron Thin Films, *Mahsa Konh, A. Teplyakov*, University of Delaware

ALE-SuP2 Mechanistic Study of the Thermal Atomic Layer Etch of Tungsten Metal Using O₂ and WCl₆, *Suresh Kondati Natarajan, M. Nolan*, Tyndall National Institute, Ireland; *P. Theofanis, C. Mokhtarzadeh, S.B. Clendinning*, Intel Corp.

ALE-SuP3 Using Etching of the Atomic Layer to Remove Damaged Layers Obtained by Plasma-Chemical Etching with Subsequent Growth of GaAs Quantum Dots by the Method of Droplet Epitaxy, *Victor Klimin, A. Rezvan, O. Ageev*, Southern Federal University, Russia

ALE-SuP4 Atomic Layer Etching of Silicon Using a Conventional ICP Etch Chamber for Failure Analysis Applications, *John Mudrick, R. Shul, K.D. Greth, R. Goeke, D. Adams*, Sandia National Laboratories

ALE-SuP5 Study of the Chemical Fabrication Process of NSOM Probes and the Modification of its Surface for Sensing Applications, *Muhammad Nazmul Hussain, J. Woehl*, University of Wisconsin-Milwaukee

ALE-SuP6 A Mechanistic Study of the HF Pulse in the Thermal Atomic Layer Etch of HfO₂ and ZrO₂, *Rita Mullins, S. Kondati Natarajan, M. Nolan*, Tyndall National Institute, Ireland

ALE-SuP7 Atomic Precision Processing of Aluminum Mirrors for Enhanced Ultra-violet Optical Properties, *Scott Walton, A. Kozen*, U.S. Naval Research Laboratory; *J. del Hoyo, M. Quijada*, NASA Goddard Space Flight Center; *D. Boris*, U.S. Naval Research Laboratory

ALE-SuP8 Surface Reaction Analysis for Atomic-Layer Etching and Deposition by Means of Beam Experiments, *Kazuhiro Karahashi, T. Ito, S. Hamaguchi*, Osaka University, Japan

ALE-SuP9 Atomic Layer Etching of SiO₂ and Si₃N₄ with Fluorocarbon, Hydrofluorocarbon and Fluoroether Compounds, *H. Chae, Yongjae Kim, T. Cha, Y. Cho*, Sungkyunkwan University (SKKU), Republic of Korea

ALE-SuP10 Cyclic Etching of Copper Thin Films using Two Sequential Steps, *Eun Tack Lim, J.S. Choi, J.S. Ryu, M.H. Cha, C.W. Chung*, Inha University, Republic of Korea

ALE-SuP11 Analysis of Mechanisms Involved in Cryogenic ALE, *Thomas Tillocher, G. Antoun, P. Lefauchaux, R. Dussart*, GREMI Université d'Orléans/CNRS, France; *K. Yamazaki, K. Yatsuda*, Tokyo Electron Limited, Japan; *J. Faguet, K. Maekawa*, TEL Technology Center, America, LLC

ALE-SuP12 Study on Dry Etching Characteristics of Germanium Oxide by Atomic Layer Deposition, *Donghyuk Shin, J. Jeong, H. Song, H. Park, D.-H. Ko*, Yonsei University, Republic of Korea

ALE-SuP13 Laser Isotropic Atomistic Removal of Germanium, *D. Paeng, He Zhang, Y.S. Kim*, Lam Research Corp.

ALE-SuP14 Anisotropic Atomic Layer Etching of Tungsten using Reactive Ion Beam, *Doo San Kim, J.E. Kim, W.O. Lee, Y.J. Gill, B.H. Jeong, G.Y. Yeom*, Sungkyunkwan University, Republic of Korea

Monday Morning, July 22, 2019

Room Grand Ballroom A-G		
8:30am		Plenary Session Session PS1-MoM ALD Plenary Session Moderators: Sumit Agarwal, Colorado School of Mines, Dennis Hausmann, Lam Research Corp.
8:45am	INVITED: PS1-MoM2 Atomic Scale Processing: From Understanding to Innovation, <i>Erwin Kessels</i> , Eindhoven University of Technology, Netherlands	
9:00am	Invited talk continues.	
9:15am	Invited talk continues.	
9:30am	INVITED: PS1-MoM5 Elucidating the Mechanisms for Atomic Layer Growth through In Situ Studies, <i>Jeffrey W. Elam</i> , Argonne National Laboratory	
9:45am	Invited talk continues.	
10:00am	Invited talk continues.	
10:15am	Break & Exhibits	
10:30am	Break & Exhibits	
10:45am		
11:00am	INVITED: PS2-MoM11 Mapping the Future Evolution of Atomic Scale Processing to enable the World of Artificial Intelligence, <i>Eric A. Joseph</i> , IBM T.J. Watson Research Center	Plenary Session Session PS2-MoM ALE Plenary Session Moderators: Craig Huffman, Micron Technology, Gottlieb S. Oehrlein, University of Maryland
11:15am	Invited talk continues.	
11:30am	Invited talk continues.	
11:45am		
12:00pm		

Monday Afternoon, July 22, 2019

Room Grand Ballroom A-C		
1:30pm	AA1-MoA1 Atomic Layer Deposition on Pharmaceutical Particles for Inhaled Drug Delivery, <i>Damiano La Zara</i> , Delft University of Technology, Netherlands; <i>D. Zhang, M.J. Quayle, G. Petersson, S. Folestad</i> , AstraZeneca, Sweden; <i>J.R. van Ommen</i> , Delft University of Technology, Netherlands	ALD Applications Session AA1-MoA ALD for Biological and Space Applications Moderators: Elton Graugnard, Boise State University, Mato Knez, CIC nanoGUNE
1:45pm	AA1-MoA2 The Use of Atomic Layer Deposition to Increase the Availability of Medical Radio-Isotopes, <i>Ruud van Ommen</i> , <i>J. Moret, B. Wolterbeek, E. Pidko, A. Denkova</i> , Delft University of Technology, Netherlands	
2:00pm	AA1-MoA3 Atomic Layer Deposition for Biosensing Applications, <i>O. Graniel, Matthieu Weber, S. Balme, P. Miele, M. Bechelany</i> , Institut Européen des Membranes, France	
2:15pm	AA1-MoA4 Multi-layer Stacked ALD Coating for Hermetic Encapsulation of Implantable Biomedical Microdevices, <i>Joonsoo Jeong</i> , Pusan National University, Republic of Korea; <i>S. Sigurdsson, F. Laiwalla</i> , Brown University; <i>R. Ritasalo, M. Pudas, T. McKee, T. Pilvi</i> , Picosun Oy, Finland; <i>A. Nurmikko</i> , Brown University	
2:30pm	AA1-MoA5 Modification of Spaceflight Radiator Coating Pigments by Atomic Layer Deposition for Thermal Applications, <i>Vivek Dwivedi</i> , NASA Goddard Space Flight Center; <i>R. Adomaitis, H. Salami, A. Uy</i> , University of Maryland; <i>M. Hasegawa</i> , NASA Goddard Space Flight Center	
2:45pm	AA1-MoA6 Novel Atomic Layer Deposition Process/Hardware for Superconducting Films for NASA Applications, <i>Frank Greer, D. Cunnane</i> , Jet Propulsion Laboratory	
3:00pm	AA1-MoA7 Fluoride-based ALD Materials System for Optical Space Applications, <i>John Hennessy</i> , Jet Propulsion Laboratory, California Institute of Technology	
3:15pm	AA1-MoA8 Atomic Layer Deposition of Aluminum Fluoride for use in Astronomical Optical Devices, <i>Alan Uy, H. Salami, A. Vadapalli, C. Grob, R. Adomaitis</i> , University of Maryland; <i>V. Dwivedi</i> , NASA Goddard Space Flight Center	
3:30pm	Break & Exhibits	
3:45pm	Break & Exhibits	
4:00pm	AA2-MoA11 Nucleation Layer for Atomic Layer Deposition Enabling High Efficiency and Flexible Monolithic All-Perovskite Tandem Solar Cells, <i>Axel F. Palmstrom, G. Eperon, T. Leijtens</i> , National Renewable Energy Laboratory; <i>R. Prasanna</i> , Stanford University; <i>S. Nanayakkara, S. Christensen, K. Zhu</i> , National Renewable Energy Laboratory; <i>M. McGehee</i> , University of Colorado Boulder; <i>D. Moore, J.J. Berry</i> , National Renewable Energy Laboratory	ALD Applications Session AA2-MoA ALD for Solar Cells, Fuel Cells, and H₂ Storage Moderators: Christophe Detavernier, Ghent University, Nicholas Strandwitz, Lehigh University
4:15pm	AA2-MoA12 Perovskite Solar Cells Fabricated using Atomic Layer Deposited Doped ZnO as a Transparent Electrode, <i>Louise Ryan, M. McCarthy, S. Monaghan, M. Modreanu, S. O'Brien, M. Pemble, I. Povey</i> , Tyndall National Institute, Ireland	
4:30pm	AA2-MoA13 Metal Oxide Barrier and Buffer Layers by Atomic Layer Deposition and Pulsed-Chemical Vapor Deposition for Semi-Transparent Perovskite Solar Cells, <i>Helen Hejin Park, T. Eom, R.E. Agbenyeke, S.M. Yeo, G.J. Kim, S.S. Shin, T.-Y. Yang, N.J. Jeon, Y.K. Lee, C.G. Kim, T.-M. Chung, J. Seo</i> , Korea Research Institute of Chemical Technology (KRICT), Republic of Korea	
4:45pm	AA2-MoA14 Particle Atomic Layer Deposition of Tungsten Nitride Environmental Barrier Coatings from Bis(t-butylimido)bis(dimethylamino)tungsten(VI) and Ammonia, <i>Sarah Bull, A. Weimer</i> , University of Colorado - Boulder	
5:00pm	AA2-MoA15 Atomic Layer Deposition on Mg(BH ₄) ₂ : A Route to Improved Automotive H ₂ Storage, <i>Noemi Leick</i> , National Renewable Energy Laboratory; <i>K. Gross</i> , H ₂ Technology Consulting LLL; <i>T. Gennett, S. Christensen</i> , National Renewable Energy Laboratory	
5:15pm	AA2-MoA16 Plasmonic Mediated Hydrogen Desorption from Metal Hydrides, <i>Katherine Hurst, A. Gauldin, M. Martinez, N. Leick, S. Christensen, T. Gennett</i> , National Renewable Energy Laboratory	
5:30pm	AA2-MoA17 Surface Modification of Solid Oxide Fuel Cell Cathodes by Atomic Layer Deposition, <i>Dong Hwan Kim, H.J. Choi, J. Koo</i> , Korea University, Republic of Korea; <i>J.H. Park, J.-W. Son</i> , Korea Institute of Science and Technology (KIST), Republic of Korea; <i>J.H. Shim</i> , Korea University, Republic of Korea	

Monday Afternoon, July 22, 2019

Room Grand Ballroom E-G		
1:30pm	INVITED: AF2-MoA1 The Materials Supplier Challenge: Flawless Execution from Precursor Design to High Volume Manufacturing, <i>Madhukar B. Rao</i> , Versum Materials	ALD Fundamentals Session AF2-MoA ALD Precursors I Moderators: Daniel Alvarez, RASIRC, Charles H. Winter, Wayne State University
1:45pm	Invited talk continues.	
2:00pm	AF2-MoA3 Precursor and Co-Reactant Selection: A Figure of Merit, <i>Seán Barry, M. Griffiths</i> , Carleton University, Canada	
2:15pm	AF2-MoA4 Designing Thermal Atomic Layer Deposition Processes for Gold Metal using New Organogold Precursors and Co-reagents, <i>Matthew Griffiths, G. Bačić, A. Varga, S. Barry</i> , Carleton University, Canada	
2:30pm	AF2-MoA5 A New Carbene Based Silver Precursor Applied in APP-ALD Yielding Conductive and Transparent Ag Films: A Promising Precursor Class for Ag Metal ALD, <i>Nils Boysen</i> , Ruhr University Bochum, Germany; <i>T. Hasselmann, D. Theirich, T. Riedl</i> , University of Wuppertal, Germany; <i>A. Devi</i> , Ruhr University Bochum, Germany	
2:45pm	AF2-MoA6 Transition Metal β -ketoiminates: A Promising Precursor Class for Atomic Layer Deposition of Binary and Ternary Oxide Thin Films, <i>Dennis Zywitzki, A. Devi</i> , Ruhr University Bochum, Germany	
3:00pm	AF2-MoA7 A New and Promising ALD Process for Molybdenum Oxide Thin Films: From Process Development to Hydrogen Gas Sensing Applications, <i>Jan-Lucas Wree</i> , Ruhr University Bochum, Germany; <i>M. Mattinen</i> , University of Helsinki, Finland; <i>E. Ciftyürek, K.D. Schierbaum</i> , Heinrich Heine University Düsseldorf, Germany; <i>M. Ritala, M. Leskelä</i> , University of Helsinki, Finland; <i>A. Devi</i> , Ruhr University Bochum, Germany	
3:15pm	AF2-MoA8 Atomic Layer Deposition of Gallium Oxide Thin Films using Pentamethylcyclopentadienyl Gallium and Combinations of H ₂ O and O ₂ Plasma, <i>Fumikazu Mizutani, S. Higashi</i> , Kojundo Chemical Laboratory Co., Ltd., Japan; <i>M. Inoue, T. Nabatame</i> , National Institute for Materials Science, Japan	
3:30pm	Break & Exhibits	
3:45pm	Break & Exhibits	
4:00pm	AF3-MoA11 Understanding Elemental Steps of ALD on Oxidation Catalysts, <i>Kristian Knemeyer, M. Piernavieja Hermida, R. Naumann d'Alnoncourt</i> , Technische Universität Berlin, Germany; <i>A. Trunschke, R. Schlögl</i> , Fritz Haber Institute of the Max Planck Society, Germany; <i>M. Driess</i> , Technische Universität Berlin, Germany; <i>F. Rosowski</i> , BASF SE, Germany	ALD Fundamentals Session AF3-MoA Growth and Characterization I Moderators: Somilkumar Rathi, Eugenius, Inc., Sumit Agarwal, Colorado School of Mines
4:15pm	AF3-MoA12 Advanced Lateral High Aspect Ratio Test Structures for Conformality Characterization by Optical Microscopy, <i>Oili Ylivaara, P. Hyttinen</i> , VTT Technical Research Centre of Finland Ltd, Finland; <i>K. Arts</i> , Eindhoven University of Technology, Netherlands; <i>F. Gao</i> , VTT Technical Research Centre of Finland Ltd, Finland; <i>W.M.M. Kessels</i> , Eindhoven University of Technology, Netherlands; <i>R. Puurunen</i> , Aalto University, Finland; <i>M. Utriainen</i> , VTT Technical Research Centre of Finland Ltd, Finland	
4:30pm	AF3-MoA13 Dopant Concentration Analysis of ALD Thin Films in 3D Structures by ToF-SIMS, <i>A.M. Kia, Wenke Weinreich</i> , Fraunhofer-Institut für Photonische Mikrosysteme (IPMS), Germany; <i>M. Utriainen</i> , VTT Technical Research Centre of Finland Ltd, Finland; <i>R. Puurunen</i> , Aalto University, Finland; <i>N. Haufe</i> , Fraunhofer-Institut für Photonische Mikrosysteme (IPMS), Germany	
4:45pm	AF3-MoA14 Metallic Ruthenium Coating on SiO ₂ Powder by Atomic Layer Deposition using H ₂ O Reactant., <i>Chi Thang Nguyen</i> , Incheon National University, Republic of Korea	
5:00pm	AF3-MoA15 Low Energy Ion Scattering Study of Pt@Al ₂ O ₃ Nanoparticle Coarsening, <i>Philipp Brüner</i> , IONTOF GmbH, Germany; <i>E. Solano</i> , ALBA Synchrotron Light Source, Spain; <i>C. Detavernier, J. Dendooven</i> , Ghent University, Belgium	
5:15pm	AF3-MoA16 Physical and Electrical Characterization of ALD Chalcogenide Materials for 3D Memory Applications, <i>Vijay K. Narasimhan, V. Adinolfi, L. Cheng, M.E. McBriarty</i> , Intermolecular, Inc.; <i>M. Utriainen, F. Gao</i> , VTT Technical Research Centre of Finland Ltd, Finland; <i>R. Puurunen</i> , Aalto University, Finland; <i>K. Littau</i> , Intermolecular, Inc.	
5:30pm	AF3-MoA17 The Tailoring of the Single Metal Atom-Oxide Interface, <i>Bin Zhang, Y. Qin</i> , Institute of Coal Chemistry, Chinese Academy of Sciences, China	

Monday Afternoon, July 22, 2019

Room Grand Ballroom H-K		
1:30pm	AF1-MoA1 Hybrid Computational Fluid Dynamics / Machine Learning Approaches to Reactor Scale Simulations and Optimization of ALD, ALEt, and LPCVD Processes, <i>Angel Yanguas-Gil</i> , S. Letourneau, A. Lancaster, J.W. Elam, Argonne National Laboratory	ALD Fundamentals Session AF1-MoA ALD Growth Mechanisms I Moderators: Simon Elliot, Schrödinger, Inc., Angel Yanguas-Gil, Argonne National Laboratory
1:45pm	AF1-MoA2 Scalable Kinetic Monte-Carlo Model for Parasitic Reactions in Silicon Nitride Growth using 3DMAS Precursor, <i>Gem Shoute</i> , T. Muneshwar, Synthergy Inc., Canada; D. Barlage, K. Cadien, University of Alberta, Canada	
2:00pm	INVITED: AF1-MoA3 Diffusion and Aggregation in Island-Growth and Area-Selective Deposition, <i>Fabio Grillo</i> , ETH Zurich, Switzerland	
2:15pm	Invited talk continues.	
2:30pm	AF1-MoA5 Surface Kinetics in ALD and ALE: Computing the Cooperative Effect by Automated Enumeration of Reaction Pathways with Spectator Adsorbates, <i>Thomas Mustard</i> , Schrödinger, Inc.; S. Elliot, Schrödinger, Inc.; T. Hughes, A. Bochevarov, L. Jacobson, S. Kwak, Schrödinger, Inc.; T. Morisato, Schrödinger K.K., Japan; J. Gavartin, Schrödinger, Inc., UK; S. Pandiyan, Schrödinger, Inc., India; M. Halls, Schrödinger, Inc.	
2:45pm	AF1-MoA6 An Immiscible Fluids Approach for Correctly Predicting Agglomerate Dynamics during Particle Atomic Layer Deposition (Particle ALD), <i>Julia Hartig</i> , A. Weimer, University of Colorado - Boulder	
3:00pm	INVITED: AF1-MoA7 The Time-Resolved Interface between ALD and CVD, <i>Henrik Pedersen</i> , Linköping University, Sweden	
3:15pm	Invited talk continues.	
3:30pm	Break & Exhibits	
3:45pm	Break & Exhibits	
4:00pm	INVITED: AF4-MoA11 Monolithic Integration of Single Crystal Perovskites on Semiconductors with ALD, <i>John Ekerdt</i> , University of Texas at Austin	ALD Fundamentals Session AF4-MoA Growth Mechanisms II Moderators: Viljami Pore, ASM, Mikko Ritala, University of Helsinki
4:15pm	Invited talk continues.	
4:30pm	AF4-MoA13 Introducing the Concept of Pulsed Vapor Phase Copper-free Surface Click-chemistry using the ALD Technique, <i>Iva Saric</i> , R. Peter, M. Kolympadi Markovic, I. Jelovica Badovinac, University of Rijeka, Croatia; C. Rogero, Materials Physics Center (CSIC-UPV/EHU), Spain; M. Ilyn, Donostia International Physics Center (DIPC), Spain; M. Knez, CIC nanoGUNE, Spain; G. Ambrozic, University of Rijeka, Croatia	
4:45pm	AF4-MoA14 Surface Enhanced Raman Spectroscopy Studies of Aluminum ALD Precursors for Al ₂ O ₃ Growth, <i>Michael Foody</i> , Illinois Institute of Technology	
5:00pm	AF4-MoA15 Atomic Layer Deposition of Aluminum, Hafnium and Zirconium Oxyfluoride Films with Tunable Stoichiometry, <i>Neha Mahuli</i> , J. Wallas, S.M. George, University of Colorado - Boulder	
5:15pm	AF4-MoA16 Fundamental Study on the SiO ₂ Growth Mechanism of Electronegativity Difference of Metal-O in the High-k Underlayers by PE-ALD Method, <i>Erika Maeda</i> , Shibaura Institute of Technology, Japan; T. Nabatame, National Institute for Materials Science, Japan; M. Hirose, Shibaura Institute of Technology, Japan; M. Inoue, A. Ohi, N. Ikeda, National Institute for Materials Science, Japan; M. Takahashi, K. Ito, Osaka University, Japan; H. Kiyono, Shibaura Institute of Technology, Japan	
5:30pm	AF4-MoA17 Low Temperature Aluminium Nitride Deposition: Comparing Hydrazine and Ammonia, <i>Aswin L.N. Kondusamy</i> , S.M. Hwang, A.T. Lucero, Z. Qin, X. Meng, The University of Texas at Dallas; D. Alvarez, J. Spiegelman, RASIRC; J. Kim, The University of Texas at Dallas	

Monday Afternoon, July 22, 2019

Room Regency Ballroom A-C		
1:30pm	INVITED: ALE1-MoA1 Atomic Layer Etching – Advancing Its Application with a New Regime, <i>Samantha Tan, W. Yang, K.J. Kanarik, Y. Pan, R. Gottscho</i> , Lam Research Corp.	Atomic Layer Etching Session ALE1-MoA Energy-enhanced ALE Moderators: Keren J. Kanarik, Lam Research Corp., Harm Knoops, Oxford Instruments Plasma Technology
1:45pm	Invited talk continues.	
2:00pm	ALE1-MoA3 Control of the Interface Layer in ALE Process by Alternating O ₂ Plasma with Fluorocarbon Deposition for High Selectivity Etching, <i>Takayoshi Tsutsumi, A. Kobayashi</i> , Nagoya University, Japan; <i>N. Kobayashi</i> , ASM Japan K.K., Japan; <i>M. Hori</i> , Nagoya University, Japan	
2:15pm	ALE1-MoA4 Self-limiting Atomic Layer Etching of SiO ₂ using Low Temperature Cyclic Ar/CHF ₃ Plasma, <i>Stefano Dallorto</i> , Lawrence Berkeley National Laboratory; <i>A. Goodyear, M. Cooke</i> , Oxford Instruments Plasma Technology, UK; <i>S. Dhuey</i> , Lawrence Berkeley National Laboratory; <i>J. Szornel</i> , Lawrence Livermore National Laboratory; <i>I. Rangelow</i> , Ilmenau University of Technology, Germany; <i>S. Cabrini</i> , Lawrence Berkeley National Laboratory	
2:30pm	ALE1-MoA5 Evolution of Photoresist Layer Structure and Surface Morphology in a Fluorocarbon-Plasma-Based Atomic Layer Etching Process, <i>Adam Pranda, K-Y. Lin, S. Gutierrez Raza, J. Fourkas, G.S. Oehrlein</i> , University of Maryland	
2:45pm	ALE1-MoA6 Optimized Radical Composition of C ₄ F ₈ /Ar Plasma to Improve Atomic Layer Etching of SiO ₂ , <i>Young-Seok Lee, J.-J. Lee, S.-W. Yoo, S.-H. Lee, I.-H. Seong, C.-H. Cho, S.-J. Kim, J.-P. Son, S.-J. You</i> , Chungnam National University, Korea	
3:00pm	ALE1-MoA7 Atomic Layer Etching of Silicon Nitride with Ultrahigh Etching Selectivity over Silicon and Oxide Materials by Utilizing Novel Etch Gas Molecule, <i>Xiangyu Guo</i> , American Air Liquide; <i>N. Stafford</i> , Air Liquide; <i>V. Pallem</i> , American Air Liquide	
3:15pm	ALE1-MoA8 Atomic Layer Etching at Low Substrate Temperature, <i>Gaëlle Antoun, T. Tillocher, P. Lefaucheux, R. Dussart</i> , GREMI Université d'Orléans/CNRS, France; <i>K. Yamazaki, K. Yatsuda</i> , Tokyo Electron Limited, Japan; <i>J. Faguet, K. Maekawa</i> , TEL Technology Center, America, LLC	
3:30pm	Break & Exhibits	
3:45pm	Break & Exhibits	
4:00pm	INVITED: ALE2-MoA11 Developments of Atomic Layer Etch Processes and their Applications in Fabricating III-V Compound Semiconductor Devices, <i>Xu Li, Y.-C. Fu, S.-J. Cho, D. Hemakumara, K. Floras, D. Moran, I. Thayne</i> , University of Glasgow, UK	Atomic Layer Etching Session ALE2-MoA ALE of Compound Semiconductors Moderators: David Boris, U.S. Naval Research Laboratory, Ishii Yohei, Hitachi High Technologies
4:15pm	Invited talk continues.	
4:30pm	ALE2-MoA13 GaN and Ga ₂ O ₃ Thermal Atomic Layer Etching Using Sequential Surface Reactions, <i>N. Johnson, Y. Lee, Steven M. George</i> , University of Colorado - Boulder	
4:45pm	ALE2-MoA14 Selective GaN Etching Process using Self-limiting Cyclic Approach for Power Device Applications, <i>Frédéric Le Roux, N. Posseme, P. Burtin, S. Barnola, A. Torres</i> , Univ. Grenoble Alpes, CEA, LETI, France	
5:00pm	ALE2-MoA15 ALE of GaN (0001) by Sequential Oxidation and H ₂ /N ₂ Plasma, <i>Kevin Hatch, D. Messina, H. Fu, K. Fu, X. Wang, M. Hao, Y. Zhao, R. Nemanich</i> , Arizona State University	
5:15pm	ALE2-MoA16 Comparative Study of Two Atomic Layer Etching Processes for GaN, <i>Cédric Mannequin, C. You</i> , University of Tsukuba, Japan; <i>G. Jacopin, T. Chevolleau, C. Durand</i> , University Grenoble-Alpes, France; <i>C. Vallée</i> , LTM-UGA, France; <i>C. Dussarat, T. Teramoto</i> , Air Liquide Laboratories, Japan; <i>H. Mariette</i> , University Grenoble-Alpes, France; <i>K. Akimoto, M. Sasaki</i> , University of Tsukuba, Japan; <i>E. Gheeraert</i> , University Grenoble-Alpes, France	
5:30pm	ALE2-MoA17 Chlorinated Surface Layer of GaN in Quasi Atomic Layer Etching of Cyclic Processes of Chlorine Adsorption and Ion Irradiation, <i>Masaki Hasegawa, T. Tsutsumi</i> , Nagoya University, Japan; <i>A. Tanide</i> , SCREEN Holdings Co., Ltd.; <i>H. Kondo, M. Sekine, K. Ishikawa, M. Hori</i> , Nagoya University, Japan	

ALD Fundamentals

Room Evergreen Ballroom & Foyer - Session AF1-MoP Precursor Synthesis and Process Development Poster Session 5:45pm

AF1-MoP1 Atomic Layer Deposition of Molybdenum Films from Molybdenum Pentachloride Precursor, **Changwon Lee**, S.-W. Lee, M.-S. Kim, Versum Materials, Republic of Korea; S. Ivanov, Versum Materials, Inc.

AF1-MoP2 Atomic Layer Deposition of Silver Metal Films: Synthesis and Characterization of Thermally Stable Silver Metal Precursors, **Harshani J. Arachchilage**, C.H. Winter, Wayne State University

AF1-MoP3 Atomic Layer Deposition of Lanthanum Oxide Using Heteroleptic La Precursors, **Daehyeon Kim**, J. Lee, W. Noh, Air Liquide Laboratories Korea, South Korea

AF1-MoP4 Synthesis and Thermal Characterization of New Molybdenum Precursors for Atomic Layer Deposition of Molybdenum Metal, **Michael Land**, Carleton University, Canada; K. Robertson, Saint Mary's University, Canada; S. Barry, Carleton University, Canada

AF1-MoP6 A Novel Hf Precursor with Linked Cyclopentadienyl-Amido Ligand for Thermal Atomic Layer Deposition of HfO₂ Thin Film, **Jeong do Oh**, M.-H. Nim, J.-S. An, J.-H. Seok, J.-W. Park, Hansol Chemical, Republic of Korea

AF1-MoP7 Atomic Layer Deposition of WS₂ using a New Metal-Organic Precursor and H₂S Molecules, **Deok Hyun Kim**, D.K. Nandi, S.-H. Kim, Yeungnam University, Republic of Korea

AF1-MoP8 Recent Advances in the Development of Metal Organic Precursors for Atomic Layer Deposition, **Anjana Devi**, L. Mai, D. Zywitzki, S.M.J. Beer, N. Boysen, D. Zanders, J.-L. Wree, M. Wilken, H. Parala, Ruhr University Bochum, Germany

AF1-MoP9 Synthesis of Group VI Oxyhalide Adducts and Mo Metal Film Growth on TiN Surfaces, **David Ermert**, R. Wright Jr., T. Baum, Entegris, Inc.

AF1-MoP10 Gallium Precursor Development for ALD Film Applications, **Atsushi Sakurai**, M. Hatase, N. Okada, A. Yamashita, ADEKA Corporation, Japan

AF1-MoP11 Design and Optimization of Heteroleptic Zirconium Precursors by Density Function Theory Calculation, **Romel Hidayat**, Sejong University, Republic of Korea; J.-H. Cho, H.-D. Lim, B.-I. Yang, J.J. Park, W.-M. Chae, DNF Co. Ltd, Republic of Korea; H.-L. Kim, Sejong University, Republic of Korea; S.I. Lee, DNF Co. Ltd, Republic of Korea; W.-J. Lee, Sejong University, Republic of Korea

AF1-MoP12 Low Temperature Plasma-Enhanced Atomic Layer Deposition of ZnO from a New Non-Pyrophoric Zn Precursor, **Lukas Mai**, F. Mitschker, P. Awakowicz, A. Devi, Ruhr University Bochum, Germany

AF1-MoP13 Homoleptic and Heteroleptic Yttrium Precursor: Tuning of Volatility, Reactivity and Stability for ALD Applications, **Sebastian Markus Josef Beer**, A. Devi, Ruhr University Bochum, Germany

AF1-MoP14 Gallium ALD Precursor Development based on Mechanistic Study, **M. Foody**, Y. Zhao, **Adam Hock**, Illinois Institute of Technology

AF1-MoP15 Fluorine Doping of Aluminium Oxide Through In-situ Precursor Synthesis: Theory, Design and Application., **Ben Peek**, University of Liverpool, UK

ALD Fundamentals

Room Evergreen Ballroom & Foyer - Session AF2-MoP Precursor Selection and Growth Optimization Poster Session 5:45pm

AF2-MoP1 Atomic Layer Deposition of Cyclopentadienyl Based Hf Precursor With Various Oxidants, **Jooho Lee**, D. Kim, W. Noh, Air Liquide Laboratories Korea, South Korea

AF2-MoP2 Atomic Layer Deposition of Magnesium Oxide Thin Films by using Bis(ethylcyclopentadienyl)magnesium Precursor and H₂O, O₂ Plasma and O₃ Reactants, **Moo-Sung Kim**, S.-W. Lee, Versum Materials Korea, Republic of Korea; S. Ivanov, Versum Materials, Inc.

AF2-MoP3 Comparative Study between CpTi(OMe)₃ and CpTi(NMe₂)₃ for Atomic Layer Deposition of Titanium Oxide, **Jaemin Kim**, S. Kim, R. Hidayat, Y. Choi, H.-L. Kim, W.-J. Lee, Sejong University, Republic of Korea

AF2-MoP4 Tin Nitride Atomic Layer Deposition using Hydrazine, **Ann Greenaway**, A. Tamboli, S. Christensen, National Renewable Energy Laboratory

AF2-MoP5 Growing Polycrystalline Indium Oxide Film by Atomic Layer Deposition, **Chien-Wei Chen**, ITRC, NARL, Republic of China

AF2-MoP6 Low Temperature Tin Oxide by Atomic Layer Deposition, **Yu-Chiao Lin**, B.-H. Liu, Y.-S. Yu, C.-C. Kei, C.-L. Lin, National Applied Research Laboratories, Republic of China

AF2-MoP7 Dielectric ALD with Hydrogen Peroxide: Comparative Study of Growth and Film Characteristics for Anhydrous H₂O₂, H₂O₂/H₂O Mixtures and H₂O, **Daniel Alvarez**, RASIRC; K. Andachi, G. Tsuchibuchi, K. Suzuki, Taiyo Nippon Sanso Corporation; J. Spiegelman, RASIRC

AF2-MoP8 Atomic Layer Deposition of Carbon Doped Silicon Oxide and Effect of Thermal Treatment or Hydrogen Plasma Treatment on The Films, **Meiliang Wang**, H. Chandra, X. Lei, A. Mallikarjunan, K. Cuthill, M. Xiao, M. Rao, Versum Materials, Inc.

AF2-MoP9 DFT Study on Atomic Layer Deposition of Al₂O₃ with Various Oxidants, **Seunggi Seo**, T. Nam, Yonsei University, Republic of Korea; H.B.R. Lee, Incheon National University, Republic of Korea; B. Shong, Hongik University, Republic of Korea; H. Kim, Yonsei University, Republic of Korea

AF2-MoP10 Effect of Heteroleptic Structure on Atomic Layer Deposited HfO₂ Using Hf(N(CH₃)₂)₄ and CpHf(N(CH₃)₂)₃ Precursors, **Sung Min Park**, B.-E. Park, S. Lee, H. Yoon, Yonsei University, Republic of Korea; M.Y. Lee, S.-H. Kim, Yeungnam University, Republic of Korea; H. Kim, Yonsei University, Republic of Korea

AF2-MoP11 Effect of Co-Reactant on the Atomic Layer Deposition of Copper Oxide, **Jason Avila**, N. Nepal, V. Wheeler, U.S. Naval Research Laboratory

AF2-MoP12 A Systematic Study on Atomic Layer Deposition of ZrO₂ Thin Films, **X. Wang**, J. Cai, **Xiangbo Meng**, University of Arkansas

AF2-MoP13 Hydrophobic SiO_x Thin Film Deposition using Low-Temperature Atomic Layer Deposition, **Taewook Nam**, H. Kim, Yonsei University, Republic of Korea

AF2-MoP14 Characteristics of High-temperature ALD SiO₂ Thin Films Using a Si Precursor with Excellent Thermal Stability, **Jae-Seok An**, J.-R. Park, M.-H. Nim, Hansol Chemical, Republic of Korea; Y. Kim, J. Gu, S. Kim, Sejong University, Republic of Korea; J.-H. Seok, J.-W. Park, Hansol Chemical, Republic of Korea; W.-J. Lee, Sejong University, Republic of Korea

AF2-MoP15 Developing Routes Toward Atomic Layer Deposition of Tungsten using Fluorine-Free W Precursor and Various Reactants with Density Functional Theory, **Tae Hyun Kim**, D.K. Nandi, M.Y. Lee, Yeungnam University, Republic of Korea; R. Hidayat, S. Kim, W.-J. Lee, Sejong University, Republic of Korea; S.-H. Kim, Yeungnam University, Republic of Korea

AF2-MoP16 ALD HfO₂ with Anhydrous H₂O₂ in a 300 mm Cross-flow Reactor – Comparison with H₂O and O₃ Oxidants, **Steven Consiglio**, R. Clark, C. Wajda, G. Leusink, TEL Technology Center, America, LLC

AF2-MoP17 Atomic Layer Deposition of Copper (I) Chloride using Liquid 1-Chlorobutane Precursor, **Richard Krumpolec**, D. Cameron, D. Bača, J. Humlíček, O. Čaha, Masaryk University, Czech Republic

AF2-MoP18 Number Effect of Si Atoms Contained in Precursor for SiN Atomic Layer Deposition, **Seungbae Park**, H. Ji, H. Yang, S. Yoon, DUKSAN Techopia company, Republic of Korea; I.-S. Park, Hanyang University, Republic of Korea

ALD Fundamentals

Room Evergreen Ballroom & Foyer - Session AF3-MoP Growth Mechanisms and In Situ Studies Poster Session 5:45pm

AF3-MoP1 Langasite Crystal Microbalance (LCM) for In-situ Process Monitoring of ALD up to 440 °C, **Masafumi Kumano**, Tohoku University, Japan; K. Inoue, Piezo Studio, Japan; K. Hikichi, Technofine co. Ltd, Japan; M. Shimizu, S. Tanaka, Tohoku University, Japan

AF3-MoP2 In-Situ Process Monitoring of Precursor Delivery Using Infra-Red Spectroscopic Method, **Robert Wright**, T. Baum, Entegris, Inc.

AF3-MoP3 Quantitative Analysis of High-k ALD Precursors for Trace Elemental Impurities by Inductively Coupled Plasma – Mass Spectrometry (ICP-MS), **Jinjin Wang**, L. Mey-Ami, F. Li, Air Liquide Electronics – Balazs NanoAnalysis

Monday Evening Poster Sessions, July 22, 2019

AF3-MoP4 Numerical Studies of the Fluid Dynamics and Chemical Kinetics of Spatial Atomic Layer Deposition of Al₂O₃, *Dongqing Pan*, University of North Alabama

AF3-MoP5 Mechanistic Understanding of Dicholosalane Thermal Decomposition during Atomic Layer Deposition of Silicon Nitride, *Gyeong Hwang, G. Hartmann*, University of Texas at Austin; *P. Ventzek*, Tokyo Electron America Inc.; *T. Iwao, K. Ishibashi*, Tokyo Electron Ltd.

AF3-MoP6 New Challenges of the Channeled Spectroscopic Ellipsometry for ALD Applications, *Gai Chin*, ULVAC Inc., Japan

AF3-MoP7 In-situ Ellipsometric Analysis of the Plasma Influence on Atomic Layer Deposited AlN Thin Films, *Necmi Biyikli, S. Ilhom, D. Shukla, A. Mohammad, B. Willis*, University of Connecticut

AF3-MoP8 Reaction Mechanisms of Thermal and Plasma-Modified ALD Growth Studied by In-Situ Mass Spectrometry, *Thomas J. Larrabee, L.B. Ruppalt*, U.S. Naval Research Laboratory

AF3-MoP10 In-situ Quartz Crystal Microbalance Study of Poly(3,4-ethylenedioxythiophene) (PEDOT) by Oxidative Molecular Layer Deposition (o-MLD), *Jungsik Kim, A. Volk*, North Carolina State University

ALD Fundamentals

Room Evergreen Ballroom & Foyer - Session AF4-MoP

Plasma Enhanced ALD Poster Session

5:45pm

AF4-MoP1 Low-temperature Atomic Layer Deposition of Yttrium Oxide using tris(butylcyclopentadienyl)yttrium and a Plasma-Excited Humidified Argon, *Kentaro Saito, K. Yosida, K. Kanomata, M. Miura, B. Ahmad, K. Shigeru, F. Hirose*, Yamagata University, Japan

AF4-MoP2 Plasma Enhanced Atomic Layer Deposition of Silicon Nitride Thin Film by Organosilane Precursor and Process Engineering, *Se-Won Lee, C. Lee, M.-S. Kim*, Versum Materials Korea, Republic of Korea; *S. Yi, X. Lei*, Versum Materials, Inc.

AF4-MoP3 Understanding the Effect of Plasma Gas Chemistry and Reactor Pressure on the Crystallinity of AlN Films Grown via Plasma-Assisted Atomic Layer Deposition, *Saidjafarzoda Ilhom, D. Shukla, A. Mohammad, N. Biyikli, B. Willis*, University of Connecticut

AF4-MoP4 Plasma Enhanced Atomic Layer Deposition of Aluminum and Aluminum Fluoride, *Daniel Messina, Z. Haung, B. Eller, F. Koeck, P. Scowen, R. Nemanich*, Arizona State University

AF4-MoP5 High-temperature Hollow Cathode Plasma Enhanced Atomic Layer Deposition of Silicon Nitride (SiN_x) Thin Films using Hexachlorodisilane (HCDS), *Su Min Hwang, A.L.N. Kondusamy, Q. Zhiyang, H.S. Kim, J. Kim*, University of Texas at Dallas; *X. Zhou, B.K. Hwang*, Dow Chemicals

AF4-MoP6 Effects of Ion Bombardment in Plasma Enhanced Atomic Layer Deposition Processes, *Hu Li*, Tokyo Electron Technology Solutions Ltd., Japan; *T. Ito*, Osaka University, Japan; *M. Kagaya, T. Moriya*, Tokyo Electron Technology Solutions Ltd., Japan; *K. Karahashi, S. Hamaguchi*, Osaka University, Japan; *M. Matsukuma*, Tokyo Electron Technology Solutions Ltd., Japan

AF4-MoP8 Microwave Generated Plasma Enhanced Atomic Layer Deposition of Oxides, *Ji Hye Kim, Y.D. Tak, Y.B. Lee*, ISAC Research Inc., Republic of Korea; *A. Poruba, J. Dalak*, SVCS Process Innovation s.r.o., Czech Republic; *H.S. Park*, ISAC Research Inc., Republic of Korea

AF4-MoP9 Epitaxial Growth of GaN by Plasma-Enhanced Atomic Layer Deposition, *Sanjie Liu, X. Zheng*, University of Science and Technology Beijing, China

AF4-MoP10 Improving Plasma Enhanced Atomic Layer Deposition of Silicon Nitride with A Halodisilane, *B.K. Hwang, C. Lee, Xiaobing Zhou, A.E. Foss*, DuPont; *T.L. Sunderland, A.R. Millward*, Dow Chemicals; *S.M. Hwang, J.Y. Kim, A.T. Lucero, A.L.N. Kondusamy*, University of Texas at Dallas

AF4-MoP11 Characteristics of Silicon Nitride Film Deposited by Multi-electrode VHF (162 MHz)-PEALD, *Ki Hyun Kim, K.S. Kim, Y.J. Ji, J.Y. Byun*, Sungkyunkwan University, Republic of Korea; *A.R. Ellingboe*, Dublin City University; *G.Y. Yeom*, Sungkyunkwan University, Republic of Korea

AF4-MoP12 Characteristics of Low Damage Cobalt Films Deposited by Very High Frequency Plasma Enhanced Atomic Layer Deposition, *Changhoon Song, W.K. Yeom, Y. Shin, G.W. Kim, G.Y. Yeom*, Sungkyunkwan University, Republic of Korea

ALD Fundamentals

Room Evergreen Ballroom & Foyer - Session AF5-MoP

Characterization of ALD Films Poster Session

5:45pm

AF5-MoP1 Film Thickness and Trace Metal Analysis of Compound Semiconductor Stacks through Direct Film Stripping (DFS) followed by ICP-MS/OES, *Vijay (Jaya) Chowdhury, J. Huang*, ChemTrace; *P. Sun*, UCT - ChemTrace; *E. Appiah*, ChemTrace

AF5-MoP2 Overview of Doctoral Theses on Atomic Layer Deposition Worldwide - Outcome of the Virtual Project on the History of ALD, *J. Aarik*, University of Tartu, Estonia; *J. Aav, E. Ahvenniemi*, Aalto University, Finland; *A.R. Akbashev*, Stanford University; *S. Ali*, Aalto University, Finland; *M. Bechelany*, Institut Européen des Membranes, France; *M. Berdova*, Aalto University, Finland; *I. Badalov*, St. Petersburg State Institute of Technology, Russian Federation; *S. Boyadjiev*, Bulgarian Academy of Sciences, Bulgaria; *D. Cameron*, Masaryk University, Czech Republic; *N. Chekurov*, Oxford Instruments Analytical Oy, Finland; *R. Cheng*, Huazhong University of Science and Technology, China; *M. Chubarov*, The Pennsylvania State University; *V. Cremers*, Ghent University, Belgium; *A. Devi*, Ruhr University Bochum, Germany; *V.E. Drozd*, St. Petersburg State Institute of Technology, Russian Federation; *L. Elnikova*, Institute for Theoretical and Experimental Physics, Russian Federation; *G. Gottardi*, Fondazione Bruno Kessler, Center for Materials and Microsystems, Italy; *J. Ruud van Ommen*, Delft University of Technology, Netherlands; *R. Puurunen*, Aalto University, Finland

AF5-MoP3 Nanoscale Chemical Characterization of Ultrathin Films via PIFM, *Sung Park, D. Nowak, W. Morrison*, Molecular Vista

AF5-MoP4 The Effect of Impurities on Film Properties in the Y(MeCp)₃/O₃ Process, *J. Kalliomäki, T. Lehto, M. Kääriä, T. Sarnet, Jani Kivioja*, Picosun Oy, Finland

AF5-MoP6 Internal Photoemission Spectroscopy Measurement of Barrier Heights between ALD Ru and Al₂O₃, *Melanie Jenkins, M.H. Hayes, K. Holden, J.F. Conley, Jr.*, Oregon State University

AF5-MoP7 Growth and Characterization: Low Temperature ALD, *Biröl Kuyel, A. Alphonse, K.P. Hong, J. Marshall*, Nano-Master, Inc.

AF5-MoP8 Etch Rate Characterization of Oxide ALD Films, *Martin M. Winterkorn, H.J. Kim, J. Provine, F. Prinz, T.W. Kenny*, Stanford University

AF5-MoP10 Structural Aspects of Nanometer Size Amorphous Materials, *Yaël Etinger-Geller, A. Katsman, B. Pokroy*, Technion - Israel Institute of Technology, Israel

ALD for Manufacturing

Room Evergreen Ballroom & Foyer - Session AM-MoP

ALD for Manufacturing Poster Session

5:45pm

AM-MoP1 Cobalt Precursor Supply Chain - Ethics and Risks, *Andreas Wilk, A. Frey, O. Briel*, Umico AG & Co. KG, Germany; *D. Zeng*, Umico AG & Co. KG

AM-MoP2 Homogeneous and Stress Controlled PEALD Films for Large Optics, *Hassan Gargouri, F. Naumann, S. Golka*, SENTECH Instruments GmbH, Germany; *K. Pfeiffer*, Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Germany; *V. Beladiya*, Friedrich Schiller University, Germany; *A. Szeghalmi*, Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Germany

AM-MoP3 Sensing Response of ZnO Nanotube Gas Sensor Synthesized on Porous Substrate by Atomic Layer Deposition, *Pengtao Lin, K. Zhang, H. Baumgart*, Old Dominion University

AM-MoP4 Temperature-based Control of Liquid Precursor Delivery for ALD Processes, *Egbert Woelk, CeeVeeTech; K. Kimmerle, B. Kimmerle*, NSI; *J. Maslar*, National Institute of Standards and Technology

AM-MoP5 Design and Manufacturing of ICP-Type Remote Plasma ALD, *Dohyun Go, J.W. Shin, B.C. Yang, H.J. Kim*, Seoul National University of Science and Technology, Republic of Korea

AM-MoP6 ACS™ (Atomically Clean Surface™) Cleaning and Analytical Validation of Recycled ALD Chamber Parts for the Semiconductor Industry, *Russell Parise, I. Iordanov, B. Quinn*, UCT - QuantumClean; *P. Sun*, UCT - ChemTrace

AM-MoP8 Process Control and Mass Delivery Optimization from Low Vapor Pressure Precursors, *Jeffrey Spiegelman, C. Ramos, D. Alvarez, Z. Shamsi*, RASIRC

AM-MoP9 Scaling Low-temperature Thermal ALD of SiO₂ to Batch, *J. Kalliomäki, M. Mäntymäki, T. Lehto, S. Shukla, M. Kääriä, T. Sarnet, Juhana Kostamo*, Picosun Oy, Finland

AM-MoP10 A Novel Technique for Pulsed Liquid Source Vapor Delivery for ALD and Short Pulse CVD, *Kathleen Erickson, E. Ellsworth, MSP - A Division of TSI*

Emerging Materials

Room Evergreen Ballroom & Foyer - Session EM-MoP

Emerging Materials Poster Session

5:45pm

EM-MoP1 Structure and Magnetism of Electrospun α -Fe₂O₃ Nanofibers SiO₂-Coated by ALD, *F. Pantò*, CNR-Istituto di Tecnologie Avanzate per l'Energia (ITAE), Italy; *H. Raza*, Humboldt-Universität zu Berlin, Germany; *A.M. Ferretti*, CNR-Istituto di Scienze e Tecnologie Molecolari (ISTM), Italy; *C. Triolo*, Università di Messina, Italy; *A. Ponti*, CNR-Istituto di Scienze e Tecnologie Molecolari, Italy; *S. Patanè*, Università di Messina, Italy; *N. Pinna*, Humboldt-Universität zu Berlin, Germany; *Saveria Santangelo*, Università Mediterranea, Italy

EM-MoP2 Fluidized Bed Molecular Layer Deposition of Ultrathin Poly(ethylene terephthalate) Films on TiO₂ P25 Nanoparticles, *Damiano La Zara*, *M. Bailey*, *D. Benz*, Delft University of Technology, Netherlands; *M.J. Quayle*, *G. Petersson*, *S. Folestad*, AstraZeneca, Sweden; *J.R. van Ommen*, Delft University of Technology, Netherlands

EM-MoP3 Fabrication and Characterization of Organic-Inorganic Hybrid Thin Films, *Chu Huang*, Hanyang University, Republic of Korea

EM-MoP4 High Performance Encapsulation Polymer-Al₂O₃ Hybrid Thin Layer by Atomic Layer Infiltration, *Hong Rho Yoon*, *J. Park*, *N.V. Long*, *C. Huang*, Hanyang University, Republic of Korea

EM-MoP5 ALD of Metal Oxides Fabricated by using La(NO₃)₃·6H₂O Oxidant and their Applications, *In-Sung Park*, *S.Y. Kim*, *T. Lee*, *S. Seong*, *Y.C. Jung*, *J. Ahn*, Hanyang University, Republic of Korea

EM-MoP6 Bringing Higher Etch-resistance to Metal-infiltrated Polymer, *Norikatsu Sasao*, *K. Asakawa*, *S. Sugimura*, Toshiba Memory Corporation

EM-MoP7 Magnetic and Electric Properties of Atomic Layer Deposited ZrO₂-based Thin Films, *Kristjan Kalam*, *H. Seemen*, *P. Ritslaid*, *T. Jõgiaas*, *M. Rähn*, *A. Kasikov*, *A. Tamm*, *K. Kukli*, *M. Mikkor*, University of Tartu, Estonia; *J. Link*, *R. Stern*, National Institute of Chemical Physics and Biophysics, Estonia; *S. Dueñas*, *H. Castán*, University of Valladolid

EM-MoP8 Vapor Phase Infiltration as a New Approach in the Fabrication of Advanced Hybrid Thermoelectric Materials, *Jaime DuMont*, *M. Knez*, CIC nanoGUNE, Spain

EM-MoP9 Low-temperature Atomic Layer Deposition of Aluminum Oxide on Polymeric Powder Feedstocks for Improved Powder Rheology, *John Miller*, *C. Gillespie*, *J. Chesser*, Lawrence Livermore National Laboratory; *A. Scheppe*, United States Air Force Academy; *A. Nelson*, *N. Teslich*, *A. Lange*, *S. Elhadj*, *R. Reeves*, Lawrence Livermore National Laboratory

EM-MoP10 Atomic Layer Deposition of Molybdenum Oxide Carbide and Molybdenum Carbide Films, *Michael D. Overbeek*, *C.H. Winter*, Wayne State University

EM-MoP11 Solid Phase Epitaxy of ALD-Grown PrAlO₃ Films, *Navoda Jayakodiarachchi*, *W.L.I. Waduge*, Wayne State University; *Y. Chen*, *P. Zuo*, *T.F.T. Kuech*, *S.E. Babcock*, *P.G. Evans*, University of Wisconsin-Madison; *C.H. Winter*, Wayne State University

EM-MoP12 Homogenous Distribution of Dopants in ALD Films: Tin-Doped Zinc Oxide (ZTO) Case Study, *Tiratna Muneshwar*, *D. Barlage*, *K. Cadien*, University of Alberta, Canada

EM-MoP13 Uniform, Thermal ALD of Al₂O₃ and ZnO on Zirconia Particles, *Dhruv Shah*, *D. Patel*, *J. O'Tani*, *M. Linford*, Brigham Young University

EM-MoP14 Composition Control of Ge-Sb-Te Film by Supercycles of ALD GeSb and ALD Sb Followed by Tellurization Annealing, *Yewon Kim*, *J. Lee*, Sejong University, Republic of Korea; *S.J. Baik*, Hankyong National University, Republic of Korea; *W. Koh*, UP Chemical Co., Ltd., Republic of Korea; *W.-J. Lee*, Sejong University, Republic of Korea

EM-MoP15 Study on The Crystallinity and The Dielectric Constant of Zr_xGe_{1-x}O₂ Films using Mixed Zr - Ge Precursor by Atomic Layer Deposition, *Ju Young Jeong*, *Y. Han*, *H. Sohn*, Yonsei University, Korea; *H. Noh*, *H. Park*, SK Hynix Inc

Tuesday Morning, July 23, 2019

Room Grand Ballroom A-C		
8:00am	AF1-TuM1 Surface Chemistry during ALD of Nickel Sulfide, <i>Xinwei Wang</i> , Peking University, China	ALD Fundamentals Session AF1-TuM In-Situ Characterization of ALD Processes Moderators: Christophe Vallée, LTM-UGA, Erwin Kessels, Eindhoven University of Technology
8:15am	AF1-TuM2 In situ and In vacuo Studies on Plasma Enhanced Atomic Layer Deposited Cobalt Films, <i>Johanna Reif</i> , <i>M. Knaut</i> , <i>S. Killge</i> , <i>N.A. Hampel</i> , <i>M. Albert</i> , <i>J.W. Bartha</i> , Technische Universität Dresden, Germany	
8:30am	AF1-TuM3 Investigation of PEALD Grown HfO ₂ Thin Films via Near Ambient Pressure XPS: Precursor Tuning, Process Design and a New In-situ Examination Approach for Studying Film Surfaces Exposed to Reactive Gases, <i>David Zanders</i> , Ruhr University Bochum, Germany; <i>E. Ciftyurek</i> , Heinrich Heine University Düsseldorf, Germany; <i>C. Bock</i> , <i>A. Devi</i> , Ruhr University Bochum, Germany; <i>K.D. Schierbaum</i> , Heinrich Heine University Düsseldorf, Germany	
8:45am	AF1-TuM4 Surface Science Studies of GaN Substrates Subjected to Plasma-Assisted Atomic Layer Processes, <i>Samantha G. Rosenberg</i> , ASEE; <i>D.J. Pennachio</i> , University of California, Santa Barbara; <i>E.C. Young</i> , <i>Y.H. Chang</i> , <i>H.S. Inbar</i> , University of California Santa Barbara; <i>J.M. Woodward</i> , U.S. Naval Research Laboratory; <i>Z.R. Robinson</i> , SUNY College at Brockport; <i>J. Grzeskowiak</i> , University at Albany-SUNY; <i>C.A. Ventrice, Jr.</i> , SUNY Polytechnic Institute; <i>C.J. Palmstrøm</i> , University of California Santa Barbara; <i>C.R. Eddy, Jr.</i> , U.S. Naval Research Laboratory	
9:00am	AF1-TuM5 Infrared and Optical Emission Spectroscopy on Atmospheric-Pressure Plasma-Enhanced Spatial ALD of Al ₂ O ₃ , <i>Maria Antonietta Mione</i> , <i>R. Engeln</i> , <i>W.M.M. Kessels</i> , Eindhoven University of Technology, Netherlands; <i>F. Roozeboom</i> , Eindhoven University of Technology and TNO, Netherlands	
9:15am	AF1-TuM6 Fingerprinting of ALD Reaction Products with Time-Resolved In situ Mass Spectrometry, <i>Andreas Werbrouck</i> , <i>F. Mattelaer</i> , <i>J. Dendooven</i> , <i>C. Detavernier</i> , Ghent University, Belgium	
9:30am	INVITED: AF1-TuM7 Studying Pt and Pd Nanoparticle ALD through X-ray based In situ Characterization, <i>Jolien Dendooven</i> , <i>J.-Y. Feng</i> , Ghent University, Belgium; <i>E. Solano</i> , ALBA Synchrotron Light Source, Spain; <i>R. Ramachandran</i> , <i>M. Minjauw</i> , <i>M. Van Daele</i> , Ghent University, Belgium; <i>D. Hermida-Merino</i> , ESRF European Synchrotron, France; <i>A. Coati</i> , Synchrotron SOLEIL, France; <i>C. Detavernier</i> , Ghent University, Belgium	
9:45am	Invited talk continues.	
10:00am	Break & Exhibits	
10:15am	Break & Exhibits	
10:30am	Break & Exhibits	
10:45am	AF3-TuM12 Enabling Nucleation Phenomena Studies of ALD Deposited Films by In-situ High-Resolution TEM, <i>Stephanie Burgmann</i> , <i>A. Dadlani</i> , <i>A. Bin Afif</i> , Norwegian University of Science and Technology, Norway; <i>J. Provine</i> , Aligned Carbon; <i>A.T.J. van Helvoort</i> , <i>J. Torgesen</i> , Norwegian University of Science and Technology, Norway	ALD Fundamentals Session AF3-TuM Growth and Characterization II Moderators: Jolien Dendooven, Ghent University, Henrik Pedersen, Linköping University
11:00am	AF3-TuM13 In-situ ellipsometric analysis of plasma assisted ALD grown-stoichiometric and crystalline AlN films, <i>Adnan Mohammad</i> , <i>D. Shukla</i> , <i>S. Ilhom</i> , <i>B. Willis</i> , University of Connecticut; <i>B. Johs</i> , Film Sense LLC; <i>A.K. Okyay</i> , Stanford University; <i>N. Biyikli</i> , University of Connecticut	
11:15am	AF3-TuM14 Film Properties of ALD SiNx Deposited by Trisilylamine and N ₂ Plasma, <i>Markus Bosund</i> , <i>E. Salmi</i> , <i>K. Niiranen</i> , Beneq Oy, Finland	
11:30am	AF3-TuM15 Comparison of Properties of Conductive Nitride Films Prepared by PEALD using Quartz and Sapphire Plasma Sources, <i>I. Krylov</i> , <i>X. Xu</i> , <i>K. Weinfeld</i> , <i>Valentina Korchnoy</i> , <i>D. Ritter</i> , <i>M. Eizenberg</i> , Technion - Israel Institute of Technology, Israel	
11:45am	AF3-TuM16 Role of Hydrogen Radicals in the Surface Reactions of Trimethyl-Indium (TMI) with Ar/N ₂ Plasma in Hollow-Cathode Plasma-Assisted ALD, <i>Saidjafarzoda Ilhom</i> , <i>A. Mohammad</i> , <i>D. Shukla</i> , <i>N. Biyikli</i> , <i>B. Willis</i> , University of Connecticut	

Tuesday Morning, July 23, 2019

Room Grand Ballroom E-G		
8:00am	INVITED: AA1-TuM1 ALD for Solar Fuels: Rendering Halide Perovskites Acid-Compatible + Precision Cluster Electrocatalysts, <i>Alex Martinson, I.S. Kim, M. Pellin</i> , Argonne National Laboratory	ALD Applications Session AA1-TuM ALD for Catalysts, Electrocatalysts, and Photocatalysts Moderators: Jeffrey W. Elam, Argonne National Laboratory, Parag Banerjee, University of Central Florida
8:15am	Invited talk continues.	
8:30am	AA1-TuM3 Plasma-Assisted ALD of Cobalt Phosphate: Process Development and Electro-Catalytic Activity Towards Oxygen Evolution Reaction, <i>V. Di Palma</i> , Eindhoven University of Technology, Netherlands; <i>G. Zafeiropoulos, R. van de Sanden</i> , Dutch Institute for Fundamental Energy Research; <i>W.M.M. Kessels</i> , Eindhoven University of Technology, Netherlands; <i>M. Tsampas</i> , Dutch Institute for Fundamental Energy Research; <i>Mariadriana Creatore</i> , Eindhoven University of Technology, Netherlands	
8:45am	AA1-TuM4 Improved Electrochemical Activity of Pt Catalyst Fabricated by Vertical Forced-Flow Atomic Layer Deposition, <i>Tzu-Kang Chin, T.-P. Perng</i> , National Tsing Hua University, Republic of China	
9:00am	AA1-TuM5 Improved Catalyst Selectivity and Longevity using Atomic Layer Deposition, <i>C. Marshall</i> , Argonne National Laboratory; <i>A. Dameron, R. Tracy</i> , Forge Nano; <i>C. Nicholas, L. Abrams, P. Barger</i> , Honeywell UOP; <i>T. Li, Lu Zheng</i> , Argonne National Laboratory	
9:15am	AA1-TuM6 Enhancing CO ₂ C Activity for C ₂₊ Oxygenate Production from Syngas using ALD Promoters, <i>Sindhu Nathan, J. Singh, A. Asundi, S.F. Bent</i> , Stanford University	
9:30am	AA1-TuM7 Atomic Layer Deposition of Bismuth Vanadate Core-Shell Nanowire Photoanodes, <i>Ashley Bielinski, S. Lee, J. Brancho, S. Esarey, A. Gayle, E. Kazyak, K. Sun, B. Bartlett, N.P. Dasgupta</i> , University of Michigan	
9:45am	AA1-TuM8 Improved Photocatalytic Efficiency by Depositing Pt and SiO ₂ on TiO ₂ (P25) using Atomic Layer Deposition in a Fluidized Bed, <i>Dominik Benz, H. Nugteren, H. Hintzen, M. Kreutzer, R. van Ommen</i> , Delft University of Technology, Netherlands	
10:00am	Break & Exhibits	
10:15am	Break & Exhibits	
10:30am	Break & Exhibits	
10:45am	AA2-TuM12 Atomic Layer Deposition of Glassy Lithium Borate-Carbonate Electrolytes for Solid-State Lithium Metal Batteries, <i>E. Kazyak, A. Davis, S. Yu, K.-H. Chen, A. Sanchez, J. Lasso, T. Thompson, A. Bielinski, D. Siegel, Neil P. Dasgupta</i> , University of Michigan	ALD Applications Session AA2-TuM ALD for Batteries I Moderators: Neil P. Dasgupta, University of Michigan, Noemi Leick, National Renewable Energy Laboratory
11:00am	AA2-TuM13 ALD Interlayers for Stabilization of Li ₁₀ GeP ₂ S ₁₂ Solid Electrolytes Against Li Metal Anodes, <i>Andrew Davis</i> , University of Michigan; <i>K. Wood</i> , National Renewable Energy Laboratory; <i>R. Garcia-Mendez, E. Kazyak, K.-H. Chen, J. Sakamoto</i> , University of Michigan; <i>G. Teeter</i> , National Renewable Energy Laboratory; <i>N.P. Dasgupta</i> , University of Michigan	
11:15am	AA2-TuM14 ALD and MLD on Lithium Metal – A Practical Approach Toward Enabling Safe, Long Lasting, High Energy Density Batteries, <i>Andrew Lushington</i> , Arradance; <i>Y. Zhao, L. Goncharova, Q. Sun, R. Li, X. Sun</i> , University of Western Ontario, Canada	
11:30am	AA2-TuM15 Synergistic Effect of 3D Current Collectors and ALD Surface Modification for High Coulombic Efficiency Lithium Metal Anodes, <i>Kuan-Hung Chen, A. Sanchez, E. Kazyak, A. Davis, N.P. Dasgupta</i> , University of Michigan	
11:45am	AA2-TuM16 Atomic Layer Deposition FeS@CNT from Elemental Sulfur as an Electrode for Lithium-Ion batteries, <i>Hongzheng Zhu, J. Liu</i> , University of British Columbia, Canada	

Tuesday Morning, July 23, 2019

Room Grand Ballroom H-K		
8:00am	AF2-TuM1 Characterizing Water Delivery for ALD Processes, <i>James Maslar, B. Sperling, W. Kimes</i> , National Institute of Standards and Technology; <i>W. Kimmerle, K. Kimmerle</i> , NSI; <i>E. Woelk</i> , CeeVeeTech	ALD Fundamentals Session AF2-TuM ALD Precursors II Moderators: Jin-Seong Park, Hanyang University, Seán Barry, Carleton University
8:15am	AF2-TuM2 A Nickel Chloride Adduct Complex as a Precursor for Low-Resistivity Nickel Nitride Thin Films with Tert-butylhydrazine as a Coreactant, <i>K. Väyrynen, T. Hatanpää, M. Mattinen, M.J. Heikkilä, K. Mizohata, J. Räisänen</i> , University of Helsinki, Finland; <i>J. Link, R. Stern</i> , National Institute of Chemical Physics and Biophysics, Estonia; <i>M. Leskelä, Mikko Ritala</i> , University of Helsinki, Finland	
8:30am	AF2-TuM3 Simple, Rationally Designed Aluminum Precursors for the Deposition of Low-impurity AlN Films, <i>Sydney Buttera, S. Barry</i> , Carleton University, Canada; <i>H. Pedersen</i> , Linköping University, Sweden	
8:45am	AF2-TuM4 Atomic Layer Deposition of Lead(II) Sulfide at Temperatures Below 100 °C, <i>Georgi Popov</i> , University of Helsinki, Finland; <i>G. Bačić</i> , Carleton University, Canada; <i>M. Mattinen, M. Vehkamäki, K. Mizohata, M. Kemell</i> , University of Helsinki, Finland; <i>S. Barry</i> , Carleton University, Canada; <i>J. Räisänen, M. Leskelä, M. Ritala</i> , University of Helsinki, Finland	
9:00am	AF2-TuM5 Development and Characterization of a Novel Atomic Layer Deposition Process for Transparent p-Type Semiconducting Nickel Oxide using Ni(^t Bu ² DAD) ₂ and Ozone, <i>Kanner Holden</i> , Oregon State University; <i>C.L. Dezelah</i> , EMD Performance Materials; <i>J.F. Conley, Jr.</i> , Oregon State University	
9:15am	AF2-TuM6 Blocking Thermolysis in Diamido Plumbylenes, <i>Goran Bacic</i> , Carleton University, Canada; <i>D. Zanders</i> , Ruhr University Bochum, Germany; <i>I. Frankel</i> , Carleton University, Canada; <i>J. Masuda</i> , Saint Mary's University, Canada; <i>T. Zeng</i> , Carleton University, Canada; <i>B. Mallick, A. Devi</i> , Ruhr University Bochum, Germany; <i>S. Barry</i> , Carleton University, Canada	
9:30am	AF2-TuM7 ALD of Sc ₂ O ₃ with Sc(cp) ₃ and a Novel Heteroleptic Precursors, <i>T. Ivanova, Perttu Sippola</i> , ASM, Finland; <i>G. Verni, Q. Xie</i> , ASM, Belgium; <i>M. Givens</i> , ASM, Finland	
9:45am	AF2-TuM8 A Novel Self-limited Atomic Layer Deposition of WS ₂ based on the Chemisorption and Reduction of bis(t-butylimido)bis(dimethylamino) Complexes, <i>Nicola Pinna</i> , Humboldt-Universität zu Berlin, Germany	
10:00am	Break & Exhibits	
10:15am	Break & Exhibits	
10:30am	Break & Exhibits	
10:45am	INVITED: AS1-TuM12 Overview of Wet And Dry Selective Processes Driven by Area Activation or Deactivation Down to Below 20nm Critical Dimensions, <i>Silvia Armini</i> , IMEC, Belgium	Area Selective ALD Session AS1-TuM Area-Selective ALD Techniques Moderator: Adrie Mackus, Eindhoven University of Technology
11:00am	Invited talk continues.	
11:15am	AS1-TuM14 Electron-Enhanced Atomic Layer Deposition (EE-ALD) of Cobalt Metal Films at Room Temperature, <i>Zach Sobell, A. Cavanagh, S.M. George</i> , University of Colorado - Boulder	
11:30am	AS1-TuM15 Area Selective Atomic Layer Deposition on Molecular Design, <i>Akihiro Nishida, T. Yoshino, N. Okada, A. Yamashita</i> , ADEKA Corporation, Japan	
11:45am	AS1-TuM16 From Surface Dependence in Atomic Layer Deposition to Area-Selective Deposition of TiN in Nanoscale Patterns, <i>Annelies Delabie</i> , IMEC, Belgium; <i>D. Carbajal</i> , UNAM; <i>J. Soethoudt, B.T. Chan, E. Altamirano Sanchez, B. Meynaerts, J.-W. Clerix, S. Van Elshocht</i> , IMEC, Belgium	

Tuesday Morning, July 23, 2019

Room Regency Ballroom A-C	
8:00am	INVITED: ALE1-TuM1 Analyses of Hexafluoroacetylacetone (Hfac) Adsorbed on Transition Metal Surfaces, <i>Tomoko Ito, K. Karahashi, S. Hamaguchi</i> , Osaka University, Japan
8:15am	Invited talk continues.
8:30am	ALE1-TuM3 Thermal Atomic Layer Etching of Silicon Nitride using an Oxidation and "Conversion-Etch" Mechanism, <i>Aziz Abdulagatov, S.M. George</i> , University of Colorado - Boulder
8:45am	ALE1-TuM4 Thermal Dry Atomic Layer Etching of Cobalt with Sequential Exposure to Molecular Chlorine and Diketones, <i>M. Konh, C. He, X. Lin</i> , University of Delaware; <i>X. Guo, V. Pallem</i> , American Air Liquide; <i>R. Opila, Andrew Teplyakov, Z. Wang, B. Yuan</i> , University of Delaware
9:00am	ALE1-TuM5 Spontaneous Etching of B ₂ O ₃ and TiO ₂ by HF: Removal Reaction in WO ₃ ALE and TiN ALE, <i>Austin Cano</i> , University of Colorado - Boulder; <i>S.K. Natarajan</i> , Tyndall National Institute, Ireland; <i>J. Clancey</i> , University of Colorado - Boulder; <i>S. Elliot</i> , Schrödinger Inc; <i>S.M. George</i> , University of Colorado - Boulder
9:15am	ALE1-TuM6 Thermal Based Atomic Layer Etching of Aluminum Oxide and Titanium Nitride, <i>Varun Sharma, T. Blomberg, M. Tuominen, S. Haukka</i> , ASM, Finland
9:30am	ALE1-TuM7 Thermal Atomic Layer Etching of Amorphous and Crystalline Hafnium Oxide, Zirconium Oxide and Hafnium Zirconium Oxide, <i>Jessica A. Murdzek, S.M. George</i> , University of Colorado - Boulder
9:45am	ALE1-TuM8 Isotropic Atomic Layer Etching of Cobalt with Smooth Etched Surfaces by using Cyclic Repetition of Plasma Oxidation and Organometallization, <i>Sumiko Fujisaki</i> , Hitachi R&D Group, Japan
10:00am	Break & Exhibits
10:15am	Break & Exhibits
10:30am	Break & Exhibits
10:45am	ALE2-TuM12 Atomic Layer Etching for Germanium using Halogen Neutral Beam =Comparison between Br and Cl Chemistry=, <i>T. Fujii, Daisuke Oho</i> , Tohoku University, Japan; <i>S. Noda</i> , National Institute of Advanced Industrial Science and Technology, Japan; <i>Y. Tanimoto, D. Sato, H. Kurihara</i> , Showa Denko K.k.; <i>W. Mizubayashi, K. Endo</i> , National Institute of Advanced Industrial Science and Technology, Japan; <i>Y. Li</i> , National Chiao Tung University; <i>Y.-J. Lee</i> , National Nano Device Laboratories; <i>T. Ozaki, S. Samukawa</i> , Tohoku University, Japan
11:00am	
11:15am	ALE2-TuM14 A New Etching / Passivation Process in Cyclic Mode for Spacer Etching in 3D CMOS Integrations, <i>O. Pollet</i> , CEA-LETI, France; <i>N. Posseme</i> , Univ. Grenoble Alpes, CEA, LETI, France; <i>V. Ah-Leung, Valentin Bacquie</i> , CEA-LETI, France
11:30am	ALE2-TuM15 Atomic Layer Etching of Transition Metals with Gas Cluster Ion Beam Irradiation and Acetylacetone, <i>Noriaki Toyoda, K. Uematsu</i> , University of Hyogo, Japan
11:45am	ALE2-TuM16 Atomic Layer Etching at Atmospheric Pressure, <i>Eugen Shkura, D. Theirich, K. Brinkmann, T. Haeger</i> , University of Wuppertal, Germany; <i>J. Schneidewind, M. Siebert</i> , SENTECH Instruments GmbH, Germany; <i>T. Riedl</i> , University of Wuppertal, Germany

**Atomic Layer Etching
Session ALE1-TuM**
ALE: Gas-phase and/or Thermal ALE
Moderators: Steven M. George, University of Colorado - Boulder, Venkateswara Pallem, American Air Liquide

**Atomic Layer Etching
Session ALE2-TuM**
Alternative Methods to ALE
Moderators: Jean-François de Marneffe, IMEC VZW, Satoshi Hamaguchi, Osaka University

Tuesday Afternoon, July 23, 2019

Room Grand Ballroom A-C		
1:30pm	AF-TuA1 Low Temperature High Quality Silicon Dioxide by Neutral Beam Enhanced Atomic Layer Deposition, <i>Hua-Hsuan Chen, D. Ohori, T. Ozaki</i> , Tohoku University, Japan; <i>M. Utsuno, T. Kubota, T. Nozawa</i> , ASM Japan K.K., Japan; <i>S. Samukawa</i> , Tohoku University, Japan	ALD Fundamentals Session AF-TuA Plasma ALD: Growth and Characterization Moderators: Hyeongtag Jeon, Hanyang University, Jiyoung Kim, The University of Texas at Dallas
1:45pm	AF-TuA2 Radical Surface Recombination Probabilities during Plasma ALD of SiO ₂ , TiO ₂ and Al ₂ O ₃ Determined from Film Conformality, <i>Karsten Arts</i> , Eindhoven University of Technology, Netherlands; <i>M. Utraiainen</i> , VTT Technical Research Centre of Finland, Finland; <i>R. Puurunen</i> , Aalto University, Finland; <i>W.M.M. Kessels</i> , Eindhoven University of Technology, Netherlands; <i>H. Knoops</i> , Oxford Instruments Plasma Technology, UK	
2:00pm	AF-TuA3 A Robust Method for In-situ Gas Monitoring of ALD Processes using Optical Emission Spectroscopy of a Pulsed Remote Plasma, <i>Joe Brindley, B. Daniel, V. Bellido-Gonzalez</i> , Gencoa Limited, UK; <i>R. Potter, B. Peek</i> , University of Liverpool, UK	
2:15pm	AF-TuA4 Near Room Temperature Plasma Enhanced Atomic Layer Deposition of Gold Metal, <i>Michiel Van Daele</i> , Ghent University, Belgium; <i>M. Griffiths</i> , Carleton University, Canada; <i>A. Raza</i> , Ghent University - IMEC, Belgium; <i>M. Minjaaw</i> , Ghent University, Belgium; <i>S. Barry</i> , Carleton University, Canada; <i>R. Baets</i> , Ghent University - IMEC, Belgium; <i>C. Detavernier, J. Dendooven</i> , Ghent University, Belgium	
2:30pm	AF-TuA5 Low-Temperature Deposition of Gallium Oxide and Aluminum Oxide with Arrays of Microcavity Plasma Enhanced Atomic Layer Deposition, <i>Jinhong Kim, A. Mironov, S.-J. Park, J.G. Eden</i> , University of Illinois at Urbana-Champaign	
2:45pm	AF-TuA6 The Effects of Varying Plasma Conditions on Plasma Assisted Atomic Layer Epitaxy, <i>David Boris, V. Wheeler, N. Nepal, S.G. Rosenberg, J. Avila, J.M. Woodward, V. Anderson, S. Walton, C.R. Eddy, Jr.</i> , U.S. Naval Research Laboratory	
3:00pm	INVITED: AF-TuA7 Plasma-Enhanced Atomic Layer Epitaxy of Ultra-wide Bandgap Ga ₂ O ₃ and (Al _x Ga _{1-x}) ₂ O ₃ Films, <i>Virginia Wheeler, N. Nepal, D. Boris, S. Walton, S. Qadri, J. Avila, D. Meyer, B. Downey, V. Gokhale</i> , U.S. Naval Research Laboratory; <i>L. Nyakiti</i> , Texas A&M University; <i>M. Tadjer</i> , U.S. Naval Research Laboratory; <i>M. Goorsky</i> , University of California Los Angeles; <i>C.R. Eddy Jr.</i> , U.S. Naval Research Laboratory	
3:15pm	Invited talk continues.	
3:30pm	Break & Exhibits	
3:45pm	Break & Exhibits	
4:00pm	INVITED: AA3-TuA11 Doped Hi-K ALD Films of HfO _x and ZrO _x for Advanced Ferroelectric and Anti-Ferroelectric Memory Device Applications; <i>Niloy Mukherjee, J. Mack, S. Rathi</i> , Eugenius, Inc.; <i>Z. Wang, A. Gaskell, N. Tasneem, A. Khan</i> , Georgia Institute of Technology; <i>M. Dopita, D. Kriegner</i> , Charles University	ALD Applications Session AA3-TuA ALD for Memory Applications I Moderators: Scott B. Clendenning, Intel Corp., Adrien LaVoie, Lam Research Corp.
4:15pm	Invited talk continues.	
4:30pm	AA3-TuA13 ALD of La-Doped HfO ₂ Films for Ferroelectric Applications, <i>Tatiana Ivanova, P. Sippola, M. Givens</i> , ASM, Finland; <i>H. Sprey</i> , ASM, Belgium; <i>T.M. Büttner, P. Polakowski, K. Seidel</i> , Fraunhofer IPMS-CNT, Germany	
4:45pm	AA3-TuA14 Characterization of Multi-Domain Ferroelectric ZrO ₂ Thin Films for Negative Capacitance and Inductive Responses, <i>Yu-Tung Yin, P.-H. Cheng, Y.-S. Jiang, J. Shieh, M.J. Chen</i> , National Taiwan University, Republic of China	
5:00pm	AA3-TuA15 Scaling Ferroelectric Hf _{0.5} Zr _{0.5} O ₂ on Metal-Ferroelectric-Metal (MFM) and Metal-Ferroelectric-Insulator-Semiconductor (MFIS) Structures, <i>Jaidah Mohan, H. Hernandez-Arriaga, H.S. Kim, A. Khosravi, A. Sahota</i> , The University of Texas at Dallas; <i>R. Wallace</i> , University of Texas at Dallas; <i>J. Kim</i> , The University of Texas at Dallas	
5:15pm	AA3-TuA16 Interface Characteristics of MIM Capacitors using Vanadium Nitride Electrode and ALD-grown ZrO ₂ High-k Dielectric Film, <i>Jae Hyung Choi, Y. Kim, H.I. Lee, H.-J. Lim, K. Hwang, S.W. Nam, H.-K. Kang</i> , Samsung Electronics, Republic of Korea	

Tuesday Afternoon, July 23, 2019

Room Grand Ballroom E-G		
1:30pm	INVITED: AA1-TuA1 Atomic Layer Deposition of Indium Gallium Zinc Oxide (IGZO) Semiconductor Thin Films: From Precursor to Thin Film Transistor Application, <i>Jin-Seong Park</i> , Hanyang University, Republic of Korea	ALD Applications Session AA1-TuA Emerging Applications I Moderators: Anjana Devi, Ruhr University Bochum, Han-Bo-Ram Lee, Incheon National University
1:45pm	Invited talk continues.	
2:00pm	AA1-TuA3 ALD Growth of Ultra-thin Co Layers on the Topological Insulator Sb ₂ Te ₃ , <i>Emanuele Longo</i> , R. Mantovan, R. Cecchini, CNR-IMM Unit of Agrate Brianza, Italy; M.D. Overbeek, Wayne State University; M. Longo, CNR-IMM Unit of Agrate Brianza, Italy; L. Lazzarini, CNR-IMEM, Italy; M. Fanciulli, Università degli Studi di Milano-Bicocca, Italy; C.H. Winter, Wayne State University; C. Wiemer, CNR-IMM Unit of Agrate Brianza, Italy	
2:15pm	AA1-TuA4 Modifying Interfacial Chemistry of Cellulose-Reinforced Epoxy Resin Composites using Atomic Layer Deposition (ALD), <i>Jamie Wooding</i> , Y. Li, K. Kalaizidou, M. Losego, Georgia Institute of Technology	
2:30pm	AA1-TuA5 Atomic Layer Deposition of Au Nanoparticles on Titania, <i>Fatemeh S.M. Hashemi</i> , Delft University of Technology, Netherlands; F. Grillo, ETH Zurich, Switzerland; V. Ravikummar, D. Benz, A. Shekhar, Delft University of Technology, Netherlands; M. Griffiths, S. Barry, Carleton University, Canada; J.R. van Ommen, Delft University of Technology, Netherlands	
2:45pm	AA1-TuA6 Multi-layer Protective Coatings on Silver for Protection of Historic Silver Artifacts, <i>E. Breitung</i> , Metropolitan Museum of Art; S. Creange, Rijks Museum, Netherlands; G. Pribil, J.A. Woollam; A. Bertuch, <i>Ritwik Bhatia</i> , Veeco-CNT	
3:00pm	AA1-TuA7 Nonlinear Optical Properties of TiO ₂ -Based ALD Thin Films, <i>Theodosia Gougousi</i> , R. Kuis, I. Basaldua, P. Burkins, J.A. Kropp, A. Johnson, University of Maryland, Baltimore County	
3:15pm	AA1-TuA8 Atomic Layer Deposition to Alter the Wetting and Thermal Properties of Lumber, <i>Shawn Gregory</i> , C. McGettigan, E. McGuinness, D. Rodin, S. Yee, M. Losego, Georgia Institute of Technology	
3:30pm	Break & Exhibits	
3:45pm	Break & Exhibits	
4:00pm	AA2-TuA11 Tunable Electrical Properties of Lithium Fluoride Thin Films using Different Fluorine Sources, <i>Devika Choudhury</i> , A. Mane, J.W. Elam, Argonne National Laboratory	ALD Applications Session AA2-TuA ALD for Batteries II Moderator: Yong Qin, Institute of Coal Chemistry, Chinese Academy of Sciences
4:15pm	AA2-TuA12 The Role of Al ₂ O ₃ ALD Precursor Chemistry on the Electrochemical Performance of Lithium Ion Battery Cathode Materials, <i>Donghyeon Kang</i> , A. Mane, J.W. Elam, Argonne National Laboratory; R.F. Warburton, J.P. Greeley, Purdue University	
4:30pm	AA2-TuA13 Spatial Atomic Layer Deposition of Hybrid Nanolaminates for High Capacity Li-ion Battery Electrodes, <i>E. Balder</i> , L. Haverkate, M. Tulodziecki, F. van den Bruele, S. Unnikrishnan, <i>Paul Poedt</i> , TNO/Holst Center, Netherlands	
4:45pm	AA2-TuA14 Lithium Organic Thin Films for Various Battery Components, <i>Juho Heiska</i> , M. Karppinen, Aalto University, Finland	
5:00pm	AA2-TuA15 ALD Infiltration of LiCoO ₂ for High Rate Lithium Ion Batteries, <i>Ian Povey</i> , M. Modreanu, S. O'Brien, Tyndall National Institute, Ireland; T. Teranishi, Y. Yoshikawa, M. Yoneda, A. Kishimoto, Okayama University, Japan	
5:15pm	AA2-TuA16 ALD Al ₂ O ₃ and MoS ₂ Coated TiO ₂ Nanotube Layers as Anodes for Lithium Ion Batteries, <i>H. Sopha</i> , University of Pardubice, Czech Republic; A. Tesfaye, Ecole Nationale Supérieure des Mines de Saint-Etienne, France; R. Zazpe, University of Pardubice, Czech Republic; T. Djenizian, Ecole Nationale Supérieure des Mines de Saint-Etienne, France; <i>Jan Macak</i> , University of Pardubice, Czech Republic	

Tuesday Afternoon, July 23, 2019

Room Grand Ballroom H-K		
1:30pm	AS1-TuA1 Elucidating Mechanisms of Selective ALD of Al ₂ O ₃ by a Comparative Study of Precursors, <i>Il-Kwon Oh</i> , T.-L. Liu, Stanford University; <i>T. Sandoval</i> , Technical University Federico Santa Maria; <i>R. Tonner</i> , Philipps-Universität Marburg, Germany; <i>S.F. Bent</i> , Stanford University	Area Selective ALD Session AS1-TuA Area-Selective ALD by Area-Deactivation Moderators: Rong Chen, Huazhong University of Science and Technology, Jessica Kachian, Intel Corp.
1:45pm	AS1-TuA2 Area-Selective Atomic Layer Deposition using Dodecanethiols: Comparison of Monolayer versus Multilayer, <i>Tzu-Ling Liu</i> , Stanford University; <i>K. Nardi</i> , <i>N. Draeger</i> , <i>D. Hausmann</i> , Lam Research Corp.; <i>S.F. Bent</i> , Stanford University	
2:00pm	AS1-TuA3 Mechanism for Breakdown in Selectivity During Area-Selective Atomic Layer Deposition of ZrO ₂ on a SiO ₂ Surface Functionalized with a Blocking Layer, <i>Wanxing Xu</i> , Colorado School of Mines; <i>P.C. Lemaire</i> , <i>K. Sharma</i> , <i>D. Hausmann</i> , Lam Research Corp.; <i>S. Agarwal</i> , Colorado School of Mines	
2:15pm	AS1-TuA4 Area Selective Chemical Vapor Deposition of Co from the Co (CO) Precursor: Use of Ammonia to Afford Dielectric-Dielectric Selectivity, <i>Zhejun Zhang</i> , <i>S. Liu</i> , <i>G. Giralami</i> , <i>J. Abelson</i> , University of Illinois at Urbana-Champaign	
2:30pm	AS1-TuA5 Area-Selective ALD of Silicon Oxide using Inhibitors in Four-step Cycles for Metal/Dielectric Selectivity, <i>Marc Merckx</i> , <i>R. Jongen</i> , Eindhoven University of Technology, Netherlands; <i>A. Marnett</i> , TNO/Holst Center, Netherlands; <i>D. Hausmann</i> , Lam Research Corp.; <i>W.M.M. Kessels</i> , <i>A.J.M. Mackus</i> , Eindhoven University of Technology, Netherlands	
2:45pm	AS1-TuA6 Selective Area Growth of Deactivating Polymers, <i>Rudy Wojtecki</i> , IBM Research - Almaden; <i>T. Pattison</i> , University of Melbourne, Australia; <i>A. Hess</i> , <i>N. Arellano</i> , <i>A. Friz</i> , IBM Research - Almaden	
3:00pm	AS1-TuA7 Area-Selective ALD of ZnO Films Patterned by Electrohydrodynamic Jet Printing of Polymers with Sub-Micron Resolution, <i>Tae Cho</i> , <i>N. Farjam</i> , <i>C. Pannier</i> , <i>C. Huber</i> , <i>O. Trejo</i> , <i>C. Allemang</i> , <i>E. Kazyak</i> , <i>R. Peterson</i> , <i>K. Barton</i> , <i>N.P. Dasgupta</i> , University of Michigan	
3:15pm	AS1-TuA8 Selective Deposition of Silicon Nitride, <i>Han Wang</i> , <i>B. Hendrix</i> , <i>T. Baum</i> , Entegris Inc.	
3:30pm	Break & Exhibits	
3:45pm	Break & Exhibits	
4:00pm	AS2-TuA111 Area-Selective Deposition and Smoothing of Ru by Combining Atomic Layer Deposition and Selective Etching, <i>Martijn Vos</i> , Eindhoven University of Technology, Netherlands; <i>S. Chopra</i> , University of Texas at Austin; <i>M. Verheijen</i> , Eindhoven University of Technology, Netherlands; <i>J. Ekerdt</i> , University of Texas at Austin; <i>S. Agarwal</i> , Colorado School of Mines; <i>W.M.M. Kessels</i> , <i>A.J.M. Mackus</i> , Eindhoven University of Technology, Netherlands	Area Selective ALD Session AS2-TuA1 Area-Selective ALD: Combinations with Etching Moderators: Silvia Armini, IMEC, Dennis Hausmann, Lam Research Corp.
4:15pm	AS2-TuA112 Single Batch Strategies for the Development of an Area Selective Deposition Process with the Deposition/Etch Approach, <i>Christophe Vallée</i> , <i>M. Bonvalot</i> , LTM-UGA, France; <i>R. Gassilloud</i> , CEA-Leti, France; <i>V. Pesce</i> , <i>A. Chaker</i> , <i>S. Belahcen</i> , LTM-UGA, France; <i>N. Possémé</i> , CEA-Leti, France; <i>B. Pelissier</i> , <i>P. Gonon</i> , <i>A. Bsiesy</i> , LTM-UGA, France	
4:30pm	AS2-TuA113 Surface Halogenation of Amorphous Carbon for Defect-free Area-Selective Deposition of Metal Oxides, <i>Mikhail Krystab</i> , KU Leuven, Belgium; <i>S. Armini</i> , IMEC, Belgium; <i>S. De Gendt</i> , KU Leuven/IMEC, Belgium; <i>R. Ameloot</i> , KU Leuven, Belgium	
4:45pm	AS2-TuA214 Real-time Grazing Incidence Small-angle X-ray Scattering Studies of Indium Aluminum Nitride Growth, <i>Jeffrey M. Woodward</i> , <i>S.G. Rosenberg</i> , ASEE (residing at U.S. Naval Research Laboratory); <i>S.D. Johnson</i> , <i>N. Nepal</i> , U.S. Naval Research Laboratory; <i>Z.R. Robinson</i> , SUNY College at Brockport; <i>K.F. Ludwig</i> , Boston University; <i>C.R. Eddy</i> , U.S. Naval Research Laboratory	Area Selective ALD Session AS2-TuA2 Late Breaking Abstracts Moderators: Silvia Armini, IMEC, Dennis Hausmann, Lam Research Corp.
5:00pm	AS2-TuA215 Expanding the Materials Library of Sequential Infiltration Synthesis: Conductive Indium and Gallium Oxides Grown in Polymers, <i>Ruben Waldman</i> , University of Chicago; <i>N. Jeon</i> , <i>D. Mandia</i> , <i>O. Heinonen</i> , <i>S. Darling</i> , <i>A. Martinson</i> , Argonne National Laboratory	
5:15pm	AS2-TuA216 Highly Efficient and Stable Organic – Inorganic Halide Perovskite Solar Cells with ALD-grown Charge Transport Layers, <i>Hyunjung Shin</i> , Sungkyunkwan University, Republic of Korea	

Tuesday Afternoon, July 23, 2019

Room Regency Ballroom A-C		
1:30pm	INVITED: ALE1-TuA1 Atomic Layer Etching of Nanostructures, <i>Sabbir Khan</i> , Niels Bohr Institute, University of Copenhagen, Denmark; <i>D. Suyatin</i> , Lund University, Sweden; <i>J. Sundqvist</i> , Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Germany	Atomic Layer Etching Session ALE1-TuA Modeling & Instrumentation I Moderators: Ankur Agarwal, KLA-Tencor, Alok Ranjan, Tokyo Electron America Inc.
1:45pm	Invited talk continues.	
2:00pm	ALE1-TuA3 Selectivity during Plasma ALE of Si-Compounds: Reaction Mechanism Studied by in-situ Surface Spectroscopy, <i>René Vervuurt</i> , ASM; <i>K. Nakane</i> , <i>T. Tsutsumi</i> , <i>M. Hori</i> , <i>N. Kobayashi</i> , Nagoya University, Japan	
2:15pm	ALE1-TuA4 Chamber Vacuum Strategies to Enable High Productivity ALE, <i>Declan Scanlan</i> , <i>D. Stephenson</i> , <i>A. Stover</i> , Edwards Vacuum, Ireland	
2:30pm	ALE1-TuA5 Mechanistic Study of the Thermal Atomic Layer Etch of Cobalt Metal Using Propene and CO, <i>Suresh Kondati Natarajan</i> , <i>M. Nolan</i> , Tyndall National Institute, Ireland; <i>P. Theofanis</i> , <i>C. Mokhtarzadeh</i> , <i>S.B. Clendenning</i> , Intel Corp.	
2:45pm	ALE1-TuA6 Selective Quasi-ALE of SiO ₂ over Si ₃ N ₄ via Bottom-up Si ₃ N ₄ Passivation: A Computational Study, <i>Du Zhang</i> , <i>Y. Tsai</i> , <i>Y. Shi</i> , <i>M. Wang</i> , TEL Technology Center, America, LLC	
3:00pm	INVITED: ALE1-TuA7 Insights of Different Etching Properties between CW and ALE Processes using 3D Voxel-Slab Model, <i>Nobuyuki Kuboi</i> , <i>T. Tatsumi</i> , <i>J. Komachi</i> , <i>S. Yamakawa</i> , Sony Semiconductor Solutions Corp., Japan	
3:15pm	Invited talk continues.	
3:30pm	Break & Exhibits	
3:45pm	Break & Exhibits	
4:00pm	ALE2-TuA11 First-principles Understanding of Atomic Layer Etching of Silicon Nitride using Hydrofluorocarbons, <i>Gyeong Hwang</i> , <i>E. Cheng</i> , University of Texas at Austin; <i>S. Sridhar</i> , TEL Technology Center, America; <i>P. Ventzek</i> , <i>A. Ranjan</i> , Tokyo Electron America Inc.	Atomic Layer Etching Session ALE2-TuA Modeling & Instrumentation II Moderators: Dmitry Suyatin, Lund University, Tetsuya Tatsumi, Sony Semiconductor Solutions Corp.
4:15pm	ALE2-TuA12 An Extended Knudsen Diffusion Model for Aspect Ratio Dependent Atomic Layer Etching, <i>Luiz Felipe Aguinis</i> , <i>P. Manstetten</i> , TU Wien, Austria; <i>A. Hössinger</i> , Silvac Europe Ltd., UK; <i>S. Selberherr</i> , <i>J. Weinbub</i> , TU Wien, Austria	
4:30pm	ALE2-TuA13 Thermodynamics-Based Screening Approach for Atomic Layer Etching, <i>Nagraj Kulkarni</i> , Consultant	
4:45pm	ALE2-TuA14 Always in Competition: Self-limiting Versus Continuous Reactions in ALD and ALEt, <i>Simon D. Elliott</i> , Schrödinger, Inc.; <i>S.K. Natarajan</i> , <i>R. Mullins</i> , <i>M. Nolan</i> , Tyndall National Institute, Ireland; <i>A. Cano</i> , <i>J. Clancey</i> , <i>S.M. George</i> , University of Colorado - Boulder	
5:00pm	ALE2-TuA15 Variation of Etched Depth per Cycle and Removal of Reactive Species in Atomic-Layer Etching (ALE) : Molecular Dynamics Study, <i>Satoshi Hamaguchi</i> , <i>E.J. Tinacba</i> , <i>S. Shigeno</i> , <i>Y. Okada</i> , <i>M. Isobe</i> , <i>T. Ito</i> , <i>K. Karahashi</i> , Osaka University, Japan	
5:15pm		

ALD Applications

Room Evergreen Ballroom & Foyer - Session AA1-TuP

Energy Harvesting and Storage Poster Session

5:30pm

AA1-TuP1 Study on Atomic Layer Deposited Al₂O₃, TiO₂ and ZnO for the Application in Silicon Photovoltaics, *Arun Haridas, M.G. Sreenivasan*, Hind High Vacuum Company Pvt. Ltd., India; *A. Antony*, Indian Institute of Technology Bombay, India

AA1-TuP2 Nitrogen-Doped TiO₂ Film Deposited using Plasma-Enhanced Atomic Layer Deposition to Improve the Electrical Conductivity for Surface Passivation of Crystalline Silicon, *E.-J. Song*, Korea Institute of Materials Science, Republic of Korea; *J.-H. Ahn*, Korea Maritime and Ocean University, Republic of Korea; *Jung-Dae Kwon*, Korea Institute of Materials Science, Republic of Korea

AA1-TuP3 Multilayer Encapsulation for Highly Stable Perovskite Solar Cells with Atomic Layer Deposited Al₂O₃ and Chemical Vapor Deposited Flowable Oxide, *Jungwoo Kim, H. Hwangbo, S.J. Kim, J.H. Jang, H.C. Tran Vo, H. Chae*, Sungkyunkwan University (SKKU), Republic of Korea

AA1-TuP5 Oxide Buffer Layers for Perovskite Solar Cells Grown with a 200 mm Commercial ALD System Using Low-Temperature Process, *P. Rajbhandari, Tara Dhakal*, Binghamton University

AA1-TuP6 Ultra-thin Nickel Films for Energy Harvesting Applications, *Ken Bosnick, P. Motamedi*, National Research Council Canada, Canada; *K. Cadien*, University of Alberta, Canada; *K. Harris, J.-Y. Cho*, National Research Council Canada, Canada

AA1-TuP7 MoNx-Deposited on High-surface N-doped Carbon Coated-Carbon Cloth Substrates: The Best Possible Option for ALD in View of Energy Storage Application, *S.Y. Sawant, D.K. Nandi, R. Rahul, S.-H. Kim, Moo Hwan Cho*, Yeungnam University, Republic of Korea

AA1-TuP8 ALD Coatings for Nano Imprint Masks, *Thomas Seidel*, Seitek50

AA1-TuP9 The Investigation of Al₂O₃ Passivation Characteristics in the Condition of Growth Temperature and Ozone Concentration, *Young Joon Cho, H.S. Chang*, Chungnam National University, Republic of Korea

AA1-TuP10 Effect of Al₂O₃ Passivation on n-type Si Solar Cell with Passivated Emitter and Rear Cell (PERC), *Kiryun Kim, H.S. Chang*, Chungnam National University, Republic of Korea

AA1-TuP11 High Quality CaF₂ from a New ALD Process: Enabling New Approaches in Battery Technology and Optical Applications, *Max Gebhard, A. Mane, J.W. Elam*, Argonne National Laboratory

AA1-TuP12 Properties of Molybdenum Oxide Deposited by Plasma Enhanced Atomic Layer Deposition for High Efficiency Solar Cells, *Taewon Lim, H.S. Chang*, Chungnam National University, Republic of Korea

AA1-TuP13 Understanding and Mitigating F Migration in ALD Nanocomposite Coatings, *Anil Mane, M. Gebhard, J.W. Elam*, Argonne National Laboratory; *M. Popecki, T. Cremer, Incom Inc.; M. Minot*, incom

AA1-TuP14 Ultrathin Metal Oxide Passivation by Atomic Layer Deposition Enhances Stability and Performance of Visible Solar Water Splitting on Solution-Processed Organic Semiconductor Thin Films, *L. Wang, D. Yan*, Stony Brook University; *D. Shaffer*, Brookhaven National Laboratory; *X. Ye*, Stony Brook University; *B. Layne, J. Concepcion, M. Liu, Chang-Yong Nam*, Brookhaven National Laboratory

AA1-TuP15 Enhancement of Photovoltaic Efficiency using a Novel Nickel-4 Mercaptophenol Hybrid Interfacial Layer, *Jinseon Park, N.V. Long, H. Thu*, Hanyang University, Republic of Korea

AA1-TuP16 Enhancement of Photovoltaic Properties of Metal/III-V Schottky Solar Cells using Al₂O₃ Anti-Reflection and Passivation Layer, *A. Ghods, V. Saravade, C. Zhou, Ian Ferguson*, Missouri University of Science and Technology

AA1-TuP17 Investigation of ALD-grown i-ZnO Buffer Layer Properties for CIGS Solar Cell Application, *Jeha Kim, V. Arepalli*, Cheongju University, Republic of Korea; *W.-J. Lee, Y.-D. Chung*, Electronics and Telecommunications Research Institute, Republic of Korea

AA1-TuP18 Atomic Layer Deposited Zirconium-doped ZnO Transparent Conductive Oxides for Silicon Solar Cells, *Geedhika Kallidil Poduval, M.A. Hossain, B. Hoex*, University of New South Wales, Australia

AA1-TuP19 Atomic Layer Deposition of Few-Atom Cluster Arrays for Solar Fuel Catalysis, *David Mandia, N. Guisinger, A. Martinson*, Argonne National Laboratory

ALD Applications

Room Evergreen Ballroom & Foyer - Session AA2-TuP

Microelectronics Poster Session

5:30pm

AA2-TuP1 Chemically and Mechanically Activated Carbonaceous Materials for Supercapacitor, *D.V. Lam, J.-H. Kim, Seung-Mo Lee*, Korea Institute of Machinery and Materials, South Korea

AA2-TuP2 Diamond Field Effect Transistors with Different Gate Lengths of HfO₂ Deposited by Atomic Layer Deposition, *Changzhi Gu*, Institute of Physics, Chinese Academy of Sciences, China

AA2-TuP3 Atomic Layer Deposition of IGZO Thin Films for BEOL Applications, *Shóna Doyle*, Tyndall National Institute, Ireland

AA2-TuP4 Preparation and Electrical Properties of Polymer-based High-density MIM Capacitors by Plasma-Enhanced Atomic Layer Deposition, *C. Fang, M. Wang, Chang Liu, D. Wu, A.-D. Li*, Nanjing University, China

AA2-TuP5 High Voltage MIM Capacitor based on ALD Deposited Crystalline HfAlO_x Film, *Valentina Korchnoy*, Technion - Israel Institute of Technology, Israel; *M. Lisiansky*, Tower Semiconductor Ltd., Israel; *I. Popov, V. Uvarov*, The Hebrew University of Jerusalem, Israel; *B. Meyler*, Technion - Israel Institute of Technology, Israel

AA2-TuP6 Improved Performance of GaN Metal-Oxide-Semiconductor Capacitors by Plasma ALD of AlN Interlayer, *Dilini Hemakumara, X. Li, K. Floros, S. Cho*, University of Glasgow, UK; *I. Guinney, C. Humphreys*, University of Cambridge, UK; *I. Thayne*, University of Glasgow, UK; *A. O'Mahony*, Oxford Instruments Plasma Technology; *H. Knoops*, Oxford Instruments Plasma Technology, UK; *D. Moran*, University of Glasgow, UK

AA2-TuP7 2-Dimensional Perovskite Oxide Thin Films Deposited by ALD for High-k Application, *Seung-Won Lee*, Korea Maritime and Ocean University, Republic of Korea; *C.-M. Kim, S.-H. Kwon*, Pusan National University, Republic of Korea

AA2-TuP8 High Performance Atomic Layer Deposition (ALD) of Gate Dielectrics for 4H-SiC Power Device Application, *B. Lee, M. Kang*, North Carolina State University; *Adam Bertuch*, Veeco-CNT; *V. Misra*, North Carolina State University

AA2-TuP9 Atomic Layer Deposited TiO₂-Based Memristors using In-situ Fabricated Al Doped ZnO Thin Film as Electrodes, *Kai Zhang, P. Lin*, Old Dominion University; *A. Pradhan*, Advance Material Solution LLC; *H. Baumgart*, Old Dominion University

AA2-TuP10 Homogeneously Doped Atomic Layer Deposition Zinc Tin Oxide Thin Films for Improving Contact Resistance in Semiconductor Device Applications, *Alex Ma*, University of Alberta, Canada; *T. Muneshwar*, Synthergy Inc., Canada; *D. Barlage, K. Cadien*, University of Alberta, Canada

AA2-TuP11 AlGaIn/GaN Layers Obtained by Atomic Layer Deposition Targeting Thin Film HEMT, *Joaquin Alvarado, M. Chávez*, Benemérita Universidad Autónoma de Puebla, Mexico; *S. Gallardo*, CINVESTAV-IPN, Mexico; *Y. Sheng, D. Muenstermann*, Lancaster University, UK

AA2-TuP12 High-Temperature Thermal Stability of ALD-TiN Metal Gate on In-situ Al₂O₃/Y₂O₃/(In)GaAs(001): Toward the Self-Aligned Gate-First Process, *Lawrence Boyu Young, H.-W. Wan, J.-H. Huang, K.-Y. Lin, J. Liu, Y.-H. Lin*, National Taiwan University, Republic of China; *J. Kwo*, National Tsing Hua University, Republic of China; *M. Hong*, National Taiwan University, Republic of China

AA2-TuP13 Identification of Interfacial Defect in ALD Grown Al₂O₃/GeO₂/Ge Gate Stack, *Jinjuan Xiang, L. Zhou, X. Wang, X. Ma, T. Li, W. Wang*, Institute of Microelectronics of Chinese Academy of Sciences, China

AA2-TuP15 Effect of Metal-insulator Interface on Dielectric Properties of Ultrathin Al₂O₃ and MgO Fabricated using In-situ Sputtering and Atomic Layer Deposition, *Jagaran Acharya, J. Wilt, R. Goul, B. Liu, J. Wu*, The University of Kansas

AA2-TuP16 Thermal and Plasma ALD Al₂O₃ Gate Insulator for GaN Electronic Devices Characterized by CV-Stress Measurements, *Nicole Bickel, E. Bahat Treidel, I. Ostermay, O. Hilt, O. Krüger*, Ferdinand-Braun-Institut, Germany; *F. Naumann, H. Gargouri*, SENTECH Instruments GmbH, Germany; *J. Würfl, G. Tränkle*, Ferdinand-Braun-Institut, Germany

AA2-TuP17 Variable Morphology Highly-Conformal Diffusion Barriers for Advanced Memory and Logic Applications, *Hae Young Kim, S. Rathi, B. Nie, N. Naghibolashrafi, Y. Okuyama, S. Chugh, J. Heo, S.H. Jung, J. Mack, N. Mukherjee*, Eugene, Inc.

Tuesday Evening Poster Sessions, July 23, 2019

AA2-TuP18 Room Temperature Deposition of Hafnium Oxide by Atomic Layer Deposition for Gating Applications, *Pragya Shekhar, S. Shamim, S. Hartinger, J. Kleinlein, R. Schlereth, H. Buhmann, L. Molenkamp*, University of Wuerzburg, Germany

AA2-TuP19 Influence of Surface Cleaning Process on Initial Growth of ALD- Al_2O_3 and Electrical Properties of Pt/ $\text{Al}_2\text{O}_3/\beta\text{-Ga}_2\text{O}_3$ MOS Capacitors, *Masafumi Hirose*, Shibaura Institute of Technology, Japan; *T. Nabatame*, National Institute for Materials Science, Japan; *E. Maeda*, Shibaura Institute of Technology, Japan; *A. Ohi, N. Ikeda, Y. Irokawa, Y. Koide*, National Institute for Materials Science, Japan; *H. Kiyono*, Shibaura Institute of Technology, Japan

AA2-TuP20 Reliable Gate Stack Development Employing Plasma Assisted Atomic Layer Deposited HfO_xN_y on InGaAs Substrate, *Sukeun Eom, M. Kong, K. Seo*, Seoul National University, Republic of Korea

ALD Applications

Room Evergreen Ballroom & Foyer - Session AA3-TuP Catalysis and Sensor Applications Poster Session 5:30pm

AA3-TuP1 Highly Dispersed Uniform Pt Catalysts on Carbon Support by Atomic Layer Deposition with Fluidized Bed Reactor(FBR)., *Jung-Yeon Park, W.P. Hong, S.-J. Oh*, Hyundai Motor Group, Republic of Korea; *W.-J. Lee, S.-H. Kwon*, Pusan National University, Republic of Korea

AA3-TuP3 Stabilizing Ultrasmall Colloidal Platinum Diphosphide (PtP_2) Nanocrystals with Atomic Layer Deposition Oxide for Neutral H_2O_2 Electrosynthesis, *Hui Li, S. Geyer*, Wake Forest University

AA3-TuP5 Synthesis of Core Shell Nanocatalysts using Atomic Layer Deposition with Fluidized Bed Reactor for PEMFC, *Seung-Jeong Oh, W.P. Hong, J.Y. Park*, Hyundai Motor Group, Republic of Korea; *W.-J. Lee, S.-H. Kwon*, Pusan National University, Republic of Korea

AA3-TuP6 Porous Nanomembranes Grown by Atomic Layer Deposition: Self-Rolling in Solvent and their Sensing Applications, *F. Ma, Y.T. Zhao, G. Huang, Yong Feng Mei*, Fudan University, China

AA3-TuP7 Fabrication and Characterization of Atomic Layer Deposited ZnO-based Ultra-thin Films for Hydrogen Sensing, *Yan-Qiang Cao, A.-D. Li*, Nanjing University, China

ALD Applications

Room Evergreen Ballroom & Foyer - Session AA4-TuP Protective Coatings, Barrier Films, Membranes and Flexible Substrates Poster Session 5:30pm

AA4-TuP1 ALD for Membrane Applications, *Matthieu Weber, M. Bechelany*, Institut Européen des Membranes, France

AA4-TuP2 Nano-Hardness of ALD Films, *James Daubert, W. Sweet, J. Kellher*, Northrop Grumman

AA4-TuP3 High Acid Corrosion Resistance of Nb_2O_5 Thin Film Deposited by Room Temperature ALD, *Kazuki Yoshida, K. Saito, M. Miura, K. Kanomata, B. Ahmad, S. Kubota, F. Hirose*, Yamagata University, Japan

AA4-TuP4 Effects of Composition Ratios on Mechanical and Electrical Properties of AZO – Zincone Composite Thin Film Deposited on Transparent Polyimide Film Using Atomic and Molecular Layer Depositions., *Seung Hak Song, B.-H. Choi*, Korea University, Republic of Korea

AA4-TuP5 Room-temperature Atomic Layer Deposition of Aluminosilicate Thin Film on Flexible Films, *Yoshiharu Mori, K. Yoshida, K. Kanomata, M. Miura, B. Ahmad Arima, S. Kubota, F. Hirose*, Yamagata University, Japan

AA4-TuP6 ALD Layers for Reduced Wear on Micro Cutting Tools, *T. Junghans, Hans-Dieter Schnabel*, Westsächsische Hochschule Zwickau, Germany

AA4-TuP7 Fabrication of Atomic Layer Deposited Alumina as Protective Coating of Silver, *Gwon Deok Han, J.S. Park, J. Koo, J.H. Shim*, Korea University, Republic of Korea

AA4-TuP8 Characterization of Laminated Thin Films for Encapsulation using Single Si Precursor by PEALD, *Joong Jin Park, S.D. Lee, H.-D. Lim, S.J. Jang, S.G. Kim, G.J. Park, S.I. Lee, M.W. Kim*, DNF Co. Ltd, Republic of Korea

AA4-TuP9 Low-cost Fabrication of Flexible Transparent Electrodes based on Sprayed Nanocomposites Silver Nanowires and Al Doped ZnO Deposited by Spatial ALD, *V.H. Nguyen, J. Resende, D. Papanastasiou, C. Jimenez, D. Bellet*, LMGP Grenoble INP/CNRS, France; *S. Aghazadehchors*, LMGP, France; *N.D. Nguyen*, Université de Liège; *David Muñoz-Rojas*, LMGP Grenoble INP/CNRS, France

AA4-TuP10 Nanomechanical Properties of Crystalline Anatase Titanium Oxide Films Synthesized using Atomic Layer Deposition, *Yousuf Mohammed, P. Lin, K. Zhang, H. Baumgart, A. Elmustafa*, Old Dominion University

AA4-TuP11 Encapsulation of Magnetic Nanostructures by ALD for Improved Stability and Performance, *Devika Choudhury, Y. Zhang, K. Gao, A. Mane, J.W. Elam*, Argonne National Laboratory

AA4-TuP12 Diffusion Barrier Properties of ALD TiSiN Films, *Jerry Mack, J. Heo, S. Chugh, H.Y. Kim, S. Rathi, N. Mukherjee*, Eugenius, Inc.

ALD Applications

Room Evergreen Ballroom & Foyer - Session AA5-TuP Emerging Applications Poster Session 5:30pm

AA5-TuP1 Bottom up Stabilization of Perovskite Quantum Dots LED via Atomic Layer Deposition, *Rong Chen, K. Cao, Q. Xiang, B. Zhou*, Huazhong University of Science and Technology, China

AA5-TuP2 ALD Bilayers for X-ray Windows with Long Lifetime, *Agnieszka Kurek, Y. Shu*, Oxford Instruments Plasma Technology; *H. Knoops*, Oxford Instruments Plasma Technology, UK; *A. O'Mahony, O. Thomas, R. Gunn*, Oxford Instruments Plasma Technology; *Y. Alivov, C. McKenzie, B. Grigsby, A. Degtyaroy*, Oxford Instruments X-ray Technology

AA5-TuP3 ALD for 3D Nano MEMS Applications, *Dorothee Dietz*, Fraunhofer Institute for Microelectronic Circuits and Systems IMS, Germany

AA5-TuP4 Tribological Properties of Plasma Enhanced Atomic Layer Deposition TiMoN, *Mark Sowa, Veeco-CNT; A. Kozen*, U.S. Naval Research Laboratory; *B. Krick, N. Strandwitz*, Lehigh University

AA5-TuP5 Thickness Optimization of Alumina Thin Film for Microchannel Plate Detector, *Baojun Yan, S. Liu*, Institute of High Energy Physics, Chinese Academy of Sciences, China

AA5-TuP6 Optical Coatings Deposited on Nonlinear Crystals by Atomic Layer Deposition, *Ramutis Drazdys, R. Buzelis, M. Drazdys*, Center for Physical Sciences and Technology, Lithuania

AA5-TuP7 Atomic Layer Deposition of Nickel and Nickel Oxide Thin-Films for Astronomical X-ray Optics Applications, *Hossein Salami, A. Uy, A. Vadapalli*, University of Maryland; *V. Dwivedi*, NASA Goddard Space Flight Center; *R. Adomaitis*, University of Maryland

AA5-TuP8 Atomic Layer Deposition and Chemical Vapor Deposition of Zirconium Boride for Various Applications: New Work Function, Barrier Metal, Hard Mask and Area Selective Deposition, *Jun-Hee Cho, J.J. Park, W.-M. Chae, J.-H. Park, S.I. Lee, M.W. Kim*, DNF Co. Ltd, Republic of Korea

AA5-TuP9 Comparative Study of $\text{Mo}_{1-x}\text{W}_x\text{S}_2$ Alloy Gas Sensor by Atomic Layer Deposition, *Minjoo Lee, Y. Kim, J. Park, H. Kim*, Yonsei University, Republic of Korea

AA5-TuP10 Fabrication of High-Aspect-Ratio Nanometric Gold Gratings, *O. Makarova*, Creatv MicroTech Inc; *Ralu Divan, L. Stan*, Argonne National Laboratory; *C.-M. Tang*, Creatv MicroTech Inc

Area Selective ALD

Room Evergreen Ballroom & Foyer - Session AS-TuP Area Selective ALD Poster Session 5:30pm

AS-TuP1 Laterally-Structured Dielectrics by Area-Selective Atomic-Layer-Deposition on 3D Substrates, *Philip Klement, D. Anders, F. Michel, J. Schörmann, S. Chatterjee*, Justus Liebig University Giessen, Germany

AS-TuP2 Light Assisted Area Selective Atomic Layer Deposition on Plasmonic Nanoantennas, *Chengwu Zhang, T. Gao, B. Willis*, University of Connecticut

AS-TuP3 Area-Specific Atomic Layer Deposition (ALD) of Cobalt As Mediated by Thermally Induced Dehydrocoupled Self-Assembled Monolayers (SAMs), *Barry Arkles, J. Goff, C. Brick*, Gelest, Inc.; *A. Kaloyeros*, SUNY Polytechnic Institute

Tuesday Evening Poster Sessions, July 23, 2019

AS-TuP4 Investigation of *In-situ* Surface Cleaning of Cu Films using O₂/O₂ and N₂H₄, **Su Min Hwang**, A.L.N. Kondusamy, Q. Zhiyang, H.S. Kim, L.F. Peña, K. Tan, J. Veyan, University of Texas at Dallas; D. Alvarez, J. Spiegelman, RASIRC; J. Kim, University of Texas at Dallas

AS-TuP5 Area-Selective Deposition of SiO₂ based on Spatial ALD with Interleaved Etching Steps to Obtain High Selectivity, **Alfredo Mameli**, TNO/Holst Center, Netherlands; F. Roozeboom, Eindhoven University of Technology and TNO, Netherlands; P. Poedt, TNO/Holst Center, Netherlands

AS-TuP6 Defect Mitigation Solution for Area-Selective Atomic Layer Deposition of Ru on TiN/SiO₂ Nanopatterns, J. Soethoudt, KU Leuven – University of Leuven/IMEC, Belgium; F. Grillo, ETH Zurich, Switzerland; E. Marques, R. van Ommen, Delft University of Technology, Netherlands; B. Briggs, H. Hody, V. Spampinato, A. Franquet, B.T. Chan, **Annelies Delabie**, IMEC, Belgium

Nanostructure Synthesis and Fabrication

Room Evergreen Ballroom & Foyer - Session NS-TuP

Nanostructures Synthesis and Fabrication Poster Session

5:30pm

NS-TuP1 Molybdenum Disulfides and Diselenides by Atomic Layer Deposition, **Raul Zazpe**, J. Prikryl, M. Krbal, J. Charvot, F. Dvorak, F. Bures, J. Macak, University of Pardubice, Czech Republic

NS-TuP2 Wafer-scale MoS₂ Thin Film Deposition via H₂S Plasma Sulfurization of ALD-grown MoO₃ at Low Temperature, **Jeong-Hun Choi**, Korea Maritime and Ocean University, Republic of Korea

NS-TuP3 ALD-based Synthesis of Few-layer Transition Metal Disulfides with Wafer-scale Uniformity for Device Integration, **Tao Chen**, Y. Wang, H. Zhu, L. Chen, Q.Q. Sun, D.W. Zhang, Fudan University, China

NS-TuP4 Overcoming Agglomeration and Adhesion in Particle ALD, **Benjamin Greenberg**, J. Wollmershauser, B. Feigelson, U.S. Naval Research Laboratory

NS-TuP5 Density Function Theory for Nucleation of MoF₆ with Oxide Surfaces in Atomic Layer Deposition of MoS₂, **Matthew Lawson**, Boise State University

Wednesday Morning, July 24, 2019

Room Grand Ballroom A-C		
8:00am	EM1-WeM1 Molecular Layer Deposition of Titanicene Films using TiCl and Fumaric or Maleic Acid: Growth Mechanism and Ambient Stability, <i>Yan-Qiang Cao, A.-D. Li</i> , Nanjing University, China	Emerging Materials Session EM1-WeM Molecular Layer Deposition Moderators: Stacey F. Bent, Stanford University, Charles L. Dezelah, ASM
8:15am	EM1-WeM2 Temperature Dependent Surface Chemistry in Molecular Layer Deposition of Polyimide on Cu and Si, <i>Chao Zhang, M. Leskelä, M. Ritala</i> , University of Helsinki, Finland	
8:30am	EM1-WeM3 Integrated MLD Supercycle for the Direct Deposition of Zeolitic Imidazolate Framework Films, <i>Alexander John Cruz, I. Stassen, R. Ameloot</i> , KU Leuven, Belgium	
8:45am	EM1-WeM4 Understanding Molecular Layer Deposition Nucleation Mechanisms in Polyurea via Time Domain Thermoreflectance, <i>Rachel Nye, M. Fusco</i> , North Carolina State University; <i>E. Radue, A. Kelliher, P. Hopkins</i> , University of Virginia; <i>G.N. Parsons</i> , North Carolina State University	
9:00am	EM1-WeM5 Molecular Layer Deposition of Indicene Thin film using Indium Precursor and Hydroquinone, <i>Seung-Hwan Lee, G.H. Baek, J.-H. Lee</i> , Hanyang University, Republic of Korea; <i>T.T. Ngoc Van, B. Shong</i> , Hongik University, Republic of Korea; <i>J.-S. Park</i> , Hanyang University, Republic of Korea	
9:15am	EM1-WeM6 Air Stable Alucone Thin Film Deposited by Molecular Layer Deposition using Hetero Bifunctional Organic Reactant, <i>GeonHo Baek, S.-H. Lee, J.-H. Lee, J.-S. Park</i> , Hanyang University, Republic of Korea	
9:30am	EM1-WeM7 Molecular Layer Deposition of "Magnesicone", a Magnesium-based Hybrid Material, as a Matrix Material for Solid Composite Electrolytes, <i>Jeroen Kint, F. Mattelaer, M. Minjaaw</i> , Ghent University, Belgium; <i>P. Vereecken</i> , IMEC, Belgium; <i>J. Dendooven, C. Detavernier</i> , Ghent University, Belgium	
9:45am	EM1-WeM8 Molecular Layer Deposition of Polyamide Films on Particles Using a Rotating Cylinder Reactor, <i>Tyler Myers, S.M. George</i> , University of Colorado - Boulder	
10:00am	Break & Exhibits	
10:15am	Break & Exhibits	
10:30am	Break & Exhibits	
10:45am	EM2-WeM12 Vapor Phase Infiltration: A Route for Making Insulating Polymer Fibers Conductive, <i>Mato Knez</i> , CIC nanoGUNE, Spain; <i>I. Azpitarte</i> , CTECHnano, Spain	Emerging Materials Session EM2-WeM Organic-Inorganic Hybrid Materials Moderators: Gregory N. Parsons, North Carolina State University, Jonas Sundqvist, Fraunhofer Institute for Ceramic Technologies and Systems IKTS
11:00am	EM2-WeM13 Vapor Phase Infiltration of Metal Oxides into Microporous Polymers for Organic Solvent Separation Membranes, <i>Emily McGuinness, F. Zhang, Y. Ma, R. Lively, M. Losego</i> , Georgia Institute of Technology	
11:15am	EM2-WeM14 ZnO-Infiltrated Hybrid Polymer Thin Films with Enhanced Gravimetric Water and Oxygen Vapor Sensing Properties, <i>E. Muckley, L. Collins, A. Jevlev</i> , Oak Ridge National Laboratory; <i>X. Ye, K. Kisslinger</i> , Brookhaven National Laboratory; <i>B. Sumpter, N. Lavrik</i> , Oak Ridge National Laboratory; <i>Chang-Yong Nam</i> , Brookhaven National Laboratory; <i>I. Ivanov</i> , Oak Ridge National Laboratory	
11:30am	EM2-WeM15 Physically Interpenetrated Organic-Inorganic Sub-Surface Layers Created via Vapor Phase Infiltration for Improved Film Adhesion, <i>Mark Losego, S. Dwarakanath, R. Tummala</i> , Georgia Institute of Technology	
11:45am	EM2-WeM16 Inorganic-Organic Thin Film Layer-Structures and Thermal Conductivity, <i>Fabian Krahl</i> , Aalto University, Finland; <i>A. Giri, P. Hopkins</i> , University of Virginia; <i>M. Karppinen</i> , Aalto University, Finland	

Wednesday Morning, July 24, 2019

Room Grand Ballroom E-G		
8:00am	AM1-WeM1 Impact of Operating Parameters on Precursor Separation in “Air Hockey” Spatial Atomic Layer Deposition Reactor, <i>John Grasso</i> , B. Willis, University of Connecticut	ALD for Manufacturing Session AM1-WeM Spatial ALD, Fast ALD, and Large-Area ALD Moderators: John F. Conley, Jr., Oregon State University, Paul Poodt, TNO/Holst Center
8:15am	AM1-WeM2 Plasma Enhanced Spatial ALD of Silver Thin Films at Atmospheric Pressure, <i>Tim Hasselmann</i> , University of Wuppertal, Germany; <i>N. Boysen</i> , Ruhr University Bochum, Germany; <i>D. Theirich</i> , University of Wuppertal, Germany; <i>A. Devi</i> , Ruhr University Bochum, Germany; <i>T. Riedl</i> , University of Wuppertal, Germany	
8:30am	INVITED: AM1-WeM3 Low Temperature Spatial PEALD of Silicon Nitride Films from Aminosilane Precursors and DC Direct Plasma, <i>Eric Dickey</i> , Lotus Applied Technology	
8:45am	Invited talk continues.	
9:00am	AM1-WeM5 Development and Characterization of an Atmospheric Pressure Plasma Reactor Compatible with Open-Air Spatial ALD, <i>H. Rabat</i> , <i>F. Zoubian</i> , <i>O. Aubry</i> , <i>N. Dumuis</i> , <i>S. Dozias</i> , GREMI Université d'Orléans/CNRS, France; <i>C. Masse de la Huerta</i> , <i>A. Sekkat</i> , <i>V.H. Nguyen</i> , LMGP Grenoble INP/CNRS, France; <i>M. Bonvalot</i> , <i>C. Vallée</i> , LTM-UGA, France; <i>D. Hong</i> , GREMI Université d'Orléans/CNRS, France; <i>David Muñoz-Rojas</i> , LMGP Grenoble INP/CNRS, France	
9:15am	AM1-WeM6 Fast Plasma ALD Employing de Laval Nozzles for High Velocity Precursor Injection, <i>Abhishekkumar Thakur</i> , <i>J. Sundqvist</i> , Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Germany; <i>S. Wege</i> , Plasway Technologies GmbH, Germany	
9:30am	AM1-WeM7 Development of a Meter Scale ALD Optical Coating Tool for Astronomical Mirror (and other) Applications, <i>D. Fryauf</i> , University of California Santa Cruz; <i>A. Phillips</i> , University of California Observatories; <i>A. Feldman</i> , Structured Material Industries, Inc.; <i>N. Kobayashi</i> , University of California Santa Cruz; <i>Gary Tompa</i> , Structured Material Industries, Inc.	
9:45am	AM1-WeM8 From Wet-lab to Cleanroom: An Integrated ALD-CVD Process for the Large-area Deposition of Ultrathin Zeolitic Imidazolate Framework Films, <i>Ivo Stassen</i> , <i>A.J. Cruz</i> , <i>R. Ameloot</i> , KU Leuven, Belgium	
10:00am	Break & Exhibits	
10:15am	Break & Exhibits	
10:30am	Break & Exhibits	
10:45am	EM3-WeM12 Atomic Layer Epitaxy of Zinc Oxide on C-plane Sapphire from Diethylzinc and Water using Pulsed-Heating Atomic Layer Deposition, <i>Brandon Piercy</i> , <i>M. Losego</i> , Georgia Institute of Technology	
11:00am	EM3-WeM13 Growth of AlN Barriers in Al/AlN/Al SIS Josephson Junctions by Low Temperature Atomic Layer Epitaxy, <i>Charles Eddy, Jr.</i> , U.S. Naval Research Laboratory; <i>D.J. Pennachio</i> , <i>J. Lee</i> , <i>A. McFadden</i> , University of California, Santa Barbara; <i>S.G. Rosenberg</i> , U.S. Naval Research Laboratory; <i>Y.H. Chang</i> , <i>C.J. Palmstrom</i> , University of California, Santa Barbara	
11:15am	EM3-WeM14 Investigating Plasma Parameters and Influence of Argon to the Crystallinity of GaN Films Grown by Plasma-Assisted ALD, <i>Deepa Shukla</i> , <i>I. Saidjafarzoda</i> , <i>A. Mohammad</i> , <i>B. Brian Willis</i> , <i>N. Biyikli</i> , University of Connecticut	
11:30am	EM3-WeM15 Ultrathin GaN Epilayer by Low-temperature Atomic Layer Annealing and Epitaxy, <i>Wei-Chung Kao</i> , <i>W.-H. Lee</i> , <i>Y.-T. Yin</i> , National Taiwan University, Republic of China; <i>J.-J. Shyue</i> , Academia Sinica; <i>H.-C. Lin</i> , <i>M.J. Chen</i> , National Taiwan University, Republic of China	
11:45am	EM3-WeM16 High Quality ALD Formation of Group-III Nitrides and their Applications in FTO-based Thin Film Solar Cells, <i>Xinhe Zheng</i> , <i>H. Wei</i> , <i>P. Qiu</i> , <i>M. Peng</i> , <i>S. Liu</i> , <i>Y. He</i> , <i>Y. Song</i> , <i>Y. An</i> , University of Science and Technology Beijing, China	

Wednesday Morning, July 24, 2019

Room Grand Ballroom H-K		
8:00am	INVITED: AA1-WeM1 ALD/ALE Process in Commercially Available Leading-Edge Logic and Memory Devices, <i>Rajesh Krishnamurthy</i> , TechInsights	ALD Applications Session AA1-WeM ALD for Memory Applications II Moderators: Seung Wook Ryu, SK Hynix, Myung Mo Sung, Hanyang University
8:15am	Invited talk continues.	
8:30am	AA1-WeM3 Atomic Layer Deposited Crystalline Zinc Oxide for Silver-based Ultra-Steep Threshold Switching Selector, <i>Harrison Sejoon Kim, A. Sahota, J. Mohan, H. Hernandez-Arriaga, J. Kim</i> , The University of Texas at Dallas	
8:45am	AA1-WeM4 ALD Ge-Se-Te OTS Selectors with Controlled Composition for PCM Applications, <i>Valerio Adinolfi, L. Cheng, R. Clarke, S. Balatti, K. Littau</i> , Intermolecular, Inc.	
9:00am	AA1-WeM5 Pulsed CVD of Amorphous GeSe for Application as OTS Selector, <i>A. Haider</i> , IMEC, Belgium; <i>Shaoren Deng</i> , ASM, Belgium; <i>E. Schapmans</i> , IMEC, Belgium; <i>J.W. Maes</i> , ASM, Belgium; <i>J.-M. Girard</i> , Air Liquide Advanced Materials, France; <i>G. Khalil</i> , imec; <i>G.S. Kar, L. Goux, R. Delhougne</i> , IMEC; <i>M. Caymax</i> , IMEC, Belgium	
9:15am	INVITED: AA1-WeM6 Thin Film Challenges in 3D NAND Scaling, <i>Jessica Kachian, D. Pavlopoulos, D. Kioussis</i> , Intel Corporation	
9:30am	Invited talk continues.	
9:45am		
10:00am	Break & Exhibits	
10:15am	Break & Exhibits	
10:30am	Break & Exhibits	
10:45am	INVITED: AA2-WeM12 The Journey of ALD High-k Metal Gate from Research to High Volume Manufacturing, <i>Dina Triyoso, R. Clark, S. Consiglio, K. Tapily, C. Wajda, G. Leusink</i> , TEL Technology Center, America, LLC	ALD Applications Session AA2-WeM ALD for ULSI Applications I Moderators: Ravindra Kanjolia, EMD Performance Materials, Han-Jin Lim, Samsung Electronics
11:00am	Invited talk continues.	
11:15am	AA2-WeM14 Effects of Er Doping on Structural and Electrical Properties of HfO ₂ Grown by Atomic Layer Deposition., <i>Soo Hwan Min, B.-E. Park, C.W. Lee</i> , Yonsei University, Republic of Korea; <i>W. Noh</i> , Air Liquide Laboratories Korea, South Korea; <i>I.-K. Oh</i> , Yonsei University, Republic of Korea; <i>W.-H. Kim</i> , Hanyang University, Republic of Korea; <i>H. Kim</i> , Yonsei University, Republic of Korea	
11:30am	AA2-WeM15 Improvement of Electrical Performances of Atomic Layer Deposited ZrO ₂ MIM Capacitors with Ru Bottom Electrode, <i>Jaehwan Lee, B.-E. Park</i> , Yonsei University, Republic of Korea; <i>W. Noh</i> , Air Liquide Laboratories Korea, South Korea; <i>I.-K. Oh</i> , Yonsei University, Republic of Korea; <i>W.-H. Kim</i> , Hanyang University, Republic of Korea; <i>H. Kim</i> , Yonsei University, Republic of Korea	
11:45am	AA2-WeM16 Perfecting ALD-Y ₂ O ₃ /GaAs(001) Interface with Ultra-High Vacuum Annealing, <i>Keng-Yung Lin, Y.-H. Lin, W.-S. Chen, H.-W. Wan, L.B. Young</i> , National Taiwan University, Republic of China; <i>C.-P. Cheng</i> , National Chia-Yi University, Republic of China; <i>T.-W. Pi</i> , National Synchrotron Radiation Research Center, Republic of China; <i>J. Kwo</i> , National Tsing Hua University, Republic of China; <i>M. Hong</i> , National Taiwan University, Republic of China	

Wednesday Morning, July 24, 2019

Room Regency Ballroom A-C		
8:00am	INVITED: ALE1-WeM1 ALD and Etch Synergy to Enable the Next Scaling Innovations, <i>Angelique Raley, K.L. Lee, X. Sun, Q. Lou, Y.T. Lu, M. Edley, S. Oyola-Reynoso, P. Ventzek, R. Clark, P. Biolsi, H. Masanobu, A. Ranjan</i> , TEL Technology Center, America, LLC	Atomic Layer Etching Session ALE1-WeM Integration & Application of ALE Moderators: Bert Ellingboe, Dublin City University, Wei Tian, Applied Materials
8:15am	Invited talk continues.	
8:30am	INVITED: ALE1-WeM3 On the Role of Individual Etching Components in Selective Atomic Layer Processing: Etch and Deposit to Obtain High Selectivity, <i>Alfredo Mameli</i> , TNO/Holst Center, Netherlands; <i>F. Roozeboom</i> , Eindhoven University of Technology and TNO, Netherlands; <i>P. Poodt</i> , TNO/Holst Center, Netherlands	
8:45am	Invited talk continues.	
9:00am	ALE1-WeM5 Area-Selective Deposition of TiO ₂ on Various Surfaces by Isothermal Integration of Thermal TiO ₂ ALD and ALE, <i>Seung Keun Song, G.N. Parsons</i> , North Carolina State University	
9:15am	ALE1-WeM6 Limited Dose ALE and ALD Processes for Local Film Coatings on 3D Structures, <i>Thomas Seidel</i> , Seitek50; <i>M. Current</i> , Current Scientific	
9:30am	ALE1-WeM7 Formation of Ohmic Contacts to Si using In-situ Chemical Cleaning of the Substrate, <i>Sara Iacopetti</i> , Technion - Israel Institute of Technology, Israel; <i>R. Tarafdar, S. Lai, M. Danek</i> , Lam Research Corp.; <i>M. Eizenberg</i> , Technion - Israel Institute of Technology, Israel	
9:45am	ALE1-WeM8 SADP Spacer Profile Engineering by Quasi-Atomic Layer Etching, <i>Tsai Wen (Maggie) Sung, C. Yan, H. Chung, J. Lo, D. Desai, P. Lembesis, R. Pakulski, M. Yang</i> , Mattson Technology, Inc.	
10:00am	Break & Exhibits	
10:15am	Break & Exhibits	
10:30am	Break & Exhibits	
10:45am	ALE2-WeM12 Dynamic Temperature Control Enabled Atomic Layer Etching of Titanium Nitride, <i>He Zhang, Y.S. Kim, D. Paeng</i> , Lam Research Corp.	Atomic Layer Etching Session ALE2-WeM Materials Selective ALE Moderators: Fred Roozeboom, Eindhoven University of Technology and TNO, Geun Young Yeom, Sungkyunkwan University
11:00am	INVITED: ALE2-WeM13 Rapid Thermal-Cyclic Atomic Layer Etching of Thin Films with Highly Selective, Self-Limiting, and Conformal Characteristics, <i>Kazunori Shinoda</i> , Hitachi, Japan; <i>H. Kobayashi</i> , Hitachi; <i>N. Miyoshi, M. Izawa</i> , Hitachi High-Technologies; <i>K. Ishikawa, M. Hori</i> , Nagoya University, Japan	
11:15am	Invited talk continues.	
11:30am	ALE2-WeM15 Atomic Layer Etching of HfO ₂ with Selectivity to Si by Utilizing Material-Selective Deposition Phenomena, <i>Kang-Yi Lin, C. Li</i> , University of Maryland; <i>S. Engelmann, R.L. Bruce, E.A. Joseph</i> , IBM T.J. Watson Research Center; <i>D. Metzler</i> , IBM Research - Albany; <i>G.S. Oehrlein</i> , University of Maryland	
11:45am	ALE2-WeM16 Enhancing Etch Selectivity in Plasma-Assisted ALE of Silicon-Based Dielectrics using Surface Functionalization, <i>Ryan Gasvoda</i> , Colorado School of Mines; <i>S. Wang, E. Hudson</i> , Lam Research Corp.; <i>S. Agarwal</i> , Colorado School of Mines	

Wednesday Afternoon, July 24, 2019

	ALD Applications Room Grand Ballroom A-C - Session AA1-WeA Emerging Applications II Moderators: Arrelaine Dameron, Forge Nano, Se-Hun Kwon, Pusan National University	ALD Applications Room Grand Ballroom H-K - Session AA2-WeA ALD for ULSI Applications II Moderators: Haripin Chandra, Versum Materials, Inc., Robert Clark, TEL Technology Center, America, LLC
1:30pm	AA1-WeA1 Atomic Layer Deposited Nano-Coatings to Protect SrAl ₂ O ₄ Based Long-Life Phosphors from Environmental Degradation, <i>Erkul Karacaoglu</i> , Georgia Institute of Technology; <i>E. Ozturk</i> , Karamanoglu Mehmetbey University, Turkey; <i>M. Uyener</i> , Necmettin Erbakan University, Turkey; <i>M. Losego</i> , Georgia Institute of Technology	INVITED: AA2-WeA1 Silicon-Based Low k Dielectric Materials with Remote Plasma ALD, <i>Hyeongtag Jeon</i> , Hanyang University, Republic of Korea
1:45pm	AA1-WeA2 Enhanced Interfacial Fracture Toughness of Polymer-Epoxy Interfaces using ALD Surface Treatments, <i>Yuxin Chen</i> , <i>N. Ginga</i> , <i>W. LePage</i> , <i>E. Kazyak</i> , <i>A. Gayle</i> , <i>J. Wang</i> , <i>M.D. Thouless</i> , <i>N.P. Dasgupta</i> , University of Michigan	Invited talk continues.
2:00pm	AA1-WeA3 Atomic Layer Deposition of Pd on ZnO Nanorods for High Performance Photocatalysts, <i>Jong Seon Park</i> , <i>B.J. Kim</i> , <i>G.D. Han</i> , <i>K.-H. Park</i> , <i>E.H. Kang</i> , <i>H.-D. Park</i> , <i>J.H. Shim</i> , Korea University, Republic of Korea	AA2-WeA3 SiOC Films by PEALD with Excellent Conformality and Wet Etch Resistance, <i>Young Chol Byun</i> , <i>E. Shero</i> , ASM
2:15pm	AA1-WeA4 Accelerating Light Beam (ALB) Generation through Dielectric Optical Device Fabricated by Low Temperature Atomic Layer Deposition (ALD), <i>W. Zhu</i> , <i>C. Zhang</i> , <i>A. Agrawal</i> , <i>H. Lezec</i> , National Institute of Standards and Technology; <i>Huazhi Li</i> , Arradance LLC	AA2-WeA4 ALD TiN for Superconducting Through-Silicon Vias, <i>Kestutis Grigoras</i> , <i>S. Simbierowicz</i> , <i>L. Grönberg</i> , <i>J. Govenius</i> , <i>V. Vesterinen</i> , <i>M. Prunnila</i> , <i>J. Hassel</i> , VTT Technical Research Centre of Finland Ltd, Finland
2:30pm	AA1-WeA5 Tunable Plasmonic Colours Preserved and Modified by Atomic Layer Deposition of Alumina, <i>J.-M. Guay</i> , <i>A. Lesina</i> , <i>G. Killaire</i> , University of Ottawa, Canada; <i>Peter Gordon</i> , Carleton University, Canada; <i>C. Hahn</i> , University of Ottawa, Canada; <i>S. Barry</i> , Carleton University, Canada; <i>L. Ramunno</i> , <i>P. Berini</i> , <i>A. Weck</i> , University of Ottawa, Canada	AA2-WeA5 Physical and Electronic Properties of Annealed ALD-deposited Ru from Ru(DMBD)(CO) ₃ and Oxygen, <i>Michael H. Hayes</i> , Oregon State University; <i>C.L. Dezelah</i> , <i>J.H. Woodruff</i> , EMD Performance Materials; <i>J.F. Conley, Jr.</i> , Oregon State University
2:45pm	AA1-WeA6 TFE of OLED Displays by Time-Space-Divided (TSD) PE-ALD and PE-CVD Hybrid System, <i>Bongsik Kim</i> , JUSUNG Engineering, Republic of Korea	AA2-WeA6 Fluorine Free Boron-Containing Composite Layers for Shallow Dopant Source Applications, <i>Anil Mane</i> , <i>D. Choudhury</i> , <i>K. Pupek</i> , <i>R. Langeslay</i> , <i>M. Delferro</i> , <i>J.W. Elam</i> , Argonne National Laboratory
3:00pm	AA1-WeA7 Tailoring the Ferroelectricity of ZrO ₂ Thin Films using Ultrathin Interfacial Layers Prepared by Plasma-Enhanced Atomic Layer Deposition, <i>Sheng-Han Yi</i> , <i>B.-T. Lin</i> , <i>T.-Y. Hsu</i> , <i>J. Shieh</i> , <i>M.J. Chen</i> , National Taiwan University, Republic of China	AA2-WeA7 Impact of Medium Energy Ions on the Microstructure and Physical Properties of TiN Thin Layers Grown by Plasma Enhanced Atomic Layer Deposition (PE-ALD), <i>S. Belahcen</i> , <i>C. Vallée</i> , <i>A. Bsiesy</i> , <i>Marceline Bonvalot</i> , LTM-UGA, France
3:15pm	AA1-WeA8 Spin-Hall-Active Platinum Thin Films Grown Via Atomic Layer Deposition, <i>Michaela Lammel</i> , IFW Dresden, Germany; <i>R. Schlitz</i> , Technische Universität Dresden, Germany; <i>A.A. Amusan</i> , IFW Dresden, Germany; <i>S. Schlicht</i> , FAU Erlangen, Germany; <i>T. Tynell</i> , IFW Dresden, Germany; <i>J. Bachmann</i> , FAU Erlangen, Germany; <i>G. Woltersdorf</i> , Martin-Luther-Universität Halle-Wittenberg, Germany; <i>K. Nielsch</i> , IFW Dresden, Germany; <i>S.T.B. Goennenwein</i> , Technische Universität Dresden, Germany; <i>A. Thomas</i> , IFW Dresden, Germany	AA2-WeA8 ALD Process Monitoring for 3D Device Structures, <i>Jiangtao Hu</i> , Lam Research Corp.
3:30pm	Break	Break
3:45pm	Break	Break
4:00pm		
4:15pm		
4:30pm		
4:45pm		
5:00pm		

Wednesday Afternoon, July 24, 2019

Emerging Materials Room Regency Ballroom A-C - Session EM1-WeA Ternary and Quaternary Oxide Materials Moderator: Bart Macco, Eindhoven University of Technology		Nanostructure Synthesis and Fabrication Room Grand Ballroom E-G - Session NS-WeA 2D Nanomaterials by ALD (including Transition Metal Dichalcogenides) Moderators: Annelies Delabie, IMEC, Harm Knoops, Oxford Instruments Plasma Technology	
1:30pm	EM1-WeA1 Rhenium(III)-based Ternary Oxides: Novel Materials from Straightforward Synthesis <i>via</i> ALD Comprising Uncommon Reaction Pathways, Max Gebhard , <i>S. Letourneau, D. Mandia, D. Choudhury, A. Yanguas-Gil, A. Mane, A. Sattelberger, J.W. Elam</i> , Argonne National Laboratory	NS-WeA1 Modified ALD Process to Achieve Crystalline MoS ₂ Thin Films, Li Zeng , <i>C. MacIsaac, J. Shi, N. Ricky, I.-K. Oh, S.F. Bent</i> , Stanford University	
1:45pm	EM1-WeA2 Growth Behavior and Electronic Characterization of PbZr _{0.5} Ti _{0.5} O ₃ and PbZr _x Ti _{1-x} O ₃ Grown by Atomic Layer Deposition with Several Zr Precursors, Nicholas Strnad , University of Maryland; <i>D. Potrepka</i> , U.S. Army Research Laboratory; <i>A. Leff</i> , General Technical Services, LLC; <i>J. Pulskamp</i> , U.S. Army Research Laboratory; <i>R. Phaneuf</i> , University of Maryland; <i>R. Polcawich</i> , U.S. Army Research Laboratory	NS-WeA2 Nucleation and Growth of ALD MoS ₂ Films on Dielectric Surfaces, Steven Letourneau , <i>A. Mane, J.W. Elam</i> , Argonne National Laboratory	
2:00pm	EM1-WeA3 Understanding Growth Characteristics of ALD NiAl ₂ O ₄ : The Role of Ozone, Jonathan Baker , <i>J. Schneider, S.F. Bent</i> , Stanford University	INVITED: NS-WeA3 Plasma-Enhanced Atomic Layer Deposition of Transition Metal Dichalcogenides: From 2D Monolayers to 3D Vertical Nanofins, Ageeth Bol , Eindhoven University of Technology, Netherlands	
2:15pm	EM1-WeA4 Atomic Layer Deposition of B _x Mg _{1-x} O Films: Progress Towards Shallow Boron Doping, David Mandia , <i>D. Choudhury, M. Gebhard</i> , Argonne National Laboratory; <i>J. Liu</i> , Northwestern University; <i>A. Yanguas-Gil, A.U. Mane, A. Nassiri, J.W. Elam</i> , Argonne National Laboratory	Invited talk continues.	
2:30pm	EM1-WeA5 Enhanced Doping Control of Metal Oxide Thin Films Using a Modified ALD Process, <i>E. Levrau</i> , IBM TJ Watson Research Center; Yohei Ogawa , ULVAC, Japan; <i>M. Frank, M. Hopstaken, E. Cartier</i> , IBM T.J. Watson Research Center; <i>K. Schmidt</i> , IBM Research - Almaden; <i>M. Hatanaka</i> , ULVAC, Japan; <i>J. Rozen</i> , IBM T.J. Watson Research Center	NS-WeA5 Atomic Layer Deposition of Emerging 2D Semiconductors HfS ₂ and ZrS ₂ , Miika Mattinen , <i>G. Popov, M. Vehkamäki, P. King, K. Mizohata, P. Jalkanen, J. Räisänen, M. Leskelä, M. Ritala</i> , University of Helsinki, Finland	
2:45pm	EM1-WeA6 As Deposited Epitaxial LaNiO ₃ and La(Ni,Cu)O ₃ with Controllable Electric Properties, Henrik Hovde Sønsteby , University of Oslo / Argonne Natl. Labs, Norway; <i>O. Nilsen, H. Fjellvåg</i> , University of Oslo, Norway	NS-WeA6 Low Temperature ALD for Phase-controlled Synthesis of 2D Transition Metal (M=Ti, Nb) <i>di-</i> (MX ₂) and <i>Tri-</i> (MX ₃) Sulfides, Saravana Balaji Basuvalingam , <i>M. Verheijen, W.M.M. Kessels, A. Bol</i> , Eindhoven University of Technology, Netherlands	
3:00pm	EM1-WeA7 Time Dependence of Pyroelectric Response in Ferroelectric Hf _{0.58} Zr _{0.42} O ₂ Films, Sean Smith , <i>M.D. Henry, M. Rodriguez</i> , Sandia National Laboratories; <i>J. Ihlefeld</i> , University of Virginia	NS-WeA7 ALD Boron Nitride Coated and Infiltrated Carbon Materials for Environmental Applications, <i>W. Hao, C. Journet, A. Brioude</i> , Université Lyon, France; <i>H. Okuno</i> , Université Grenoble-Alpes, France; Catherine Marichy , Université Lyon, France	
3:15pm	EM1-WeA8 Tailoring Nickel Oxide Conductivity by Introducing Transition Metals: From First-principles to Experimental Demonstration, Md. Anower Hossain , <i>T. Zhang, D. Lambert</i> , University of New South Wales, Australia; <i>Y. Zakaria</i> , Hamad Bin Khalifa University, Qatar; <i>P. Burr</i> , University of New South Wales, Australia; <i>S. Rashkeev, A. Abdallah</i> , Hamad Bin Khalifa University, Qatar; <i>B. Hoex</i> , University of New South Wales, Australia		
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