ALD 2015 Tutorial Schedule

Sunday, June 28, 2015

Time	Session	Location
11:30-12:30 p.m.	Registration	Ballroom Foyer
12:30 p.m.-1:15 p.m.	*Early Stage ALD and CVD Precursor Development at Intel,* Patricio E Romero, Intel	Grand Ballroom I
1:15 p.m.-2:00 p.m.	*ALD Process Development: Solutions to Industrial Challenges,* Markku Leskelä, Univ. of Helsinki, Finland	Grand Ballroom I
2:00 p.m.-2:15 p.m.	Break	Ballroom Foyer
2:15 p.m.-3:00 p.m.	*Lab to Fab: Precursor Development for Semiconductor Applications,* Ravi Kanjolia, SAFC Hitech	Grand Ballroom I
3:00 p.m.-3:45 p.m.	*ALD Technologies and Applications in Semiconductor Device Fabrication,* Han Jin Lim, Samsung Electronics	Grand Ballroom I
3:45 p.m.- 4:00 p.m.	Break	Ballroom Foyer
4:00 p.m.- 4:45 p.m.	*Challenges in BEOL Technology and Opportunities for ALD Processing,* Theodorus Standaert, IBM	Grand Ballroom I
4:45 p.m.- 5:30 p.m.	*ALD for Novel Device Technologies,* Peide D. Ye, Purdue Univ.	Grand Ballroom I

ALD 2015 Technical Program Overview

Sunday, June 28, 2015

4:00 p.m.-8:00 p.m.	Registration	Ballroom Foyer
6:00 p.m.-8:00 p.m.	Welcome Reception	Pavilion

Monday, June 29, 2015

7:00 a.m.-7:00 p.m.	Registration	Ballroom Foyer
8:15 a.m.-8:30 a.m.	Opening Remarks	Grand Ballroom I
8:30 a.m.-9:15 a.m.	Plenary Speaker: *ALD: Essential but not Sufficient,* Mike Mayberry, Intel	Grand Ballroom I
9:15 a.m.-10:00 a.m.	Plenary Speaker: *Toward 5 nm CMOS Node: Value Proposition and Challenges,* Ghavam G. Shahidi, IBM T.J. Watson Research Center	Grand Ballroom I
10:00 a.m.-10:45 a.m.	Break & Exhibits	Pavilion
10:45 a.m.-11:30 a.m.	Plenary Speaker: ALD for Technologies Beyond Electronics: Chances and Challenges, Mato Knez, CIC nanoGUNE	Grand Ballroom I
11:30 a.m.-11:45 a.m.	ALD 2015 Innovation Award	Grand Ballroom I
11:45 a.m.-12:00 p.m.	ALD 2015 Sponsor Preview	Grand Ballroom I
12:00 p.m.-1:30 p.m.	Lunch & Exhibits	Pavilion

	Session A		Session B		Session C	
1:30 p.m.	Growth and Characterization	Grand Ballroom I	Memory	Grand Ballroom II	Manufacturing	Parlors ABC
3:30 p.m.	Break & Exhibits	Pavilion	Break & Exhibits	Pavilion	Break & Exhibits	Pavilion
4:00 p.m.	Growth and Characterization	Grand Ballroom I	Precursors	Grand Ballroom II	Energy	Parlors ABC
5:30 p.m.-7:00 p.m.	Poster Session I & Exhibits			Pavilion		

Tuesday, June 30, 2015

7:00 a.m.-7:00 p.m.	Registration				Ballroom Foyer	
	Session A		Session B		Session C	
8:00 a.m.	Growth and Characterization	Grand Ballroom I	Precursors	Grand Ballroom II	Energy	Parlors ABC
10:00 a.m.	Break & Exhibits	Pavilion	Break & Exhibits	Pavilion	Break & Exhibits	Pavilion
10:45 a.m.	Growth and Characterization	Grand Ballroom I	ULSI FEOL/BEOL	Grand Ballroom II	Novel Materials	Parlors ABC
12:00 p.m.	Lunch & Exhibits	Pavilion	Lunch & Exhibits	Pavilion	Lunch & Exhibits	Pavilion
1:30 p.m.	Growth and Characterization	Grand Ballroom I	Nanostructures	Grand Ballroom II	Energy	Parlors ABC
3:30 p.m.	Break & Exhibits	Pavilion	Break & Exhibits	Pavilion	Break & Exhibits	Pavilion
400 p.m.	Growth and Characterization	Grand Ballroom I	Nanostructures	Grand Ballroom II	Novel Materials	Parlors ABC
5:30 p.m.-7:00 p.m.	Poster Session II & Exhibits			Pavilion		

Wednesday, July 1, 2015

7:00 a.m.-2:00 p.m.	Registration				Ballroom Foyer	
	Session A		Session B		Session C	
8:00 a.m.	Growth and Characterization	Grand Ballroom I	Precursors	Grand Ballroom II	Manufacturing	Parlors ABC
10:00 a.m.	Break & Exhibits	Pavilion	Break & Exhibits	Pavilion	Break & Exhibits	Pavilion
10:45 a.m.	Growth and Characterization	Grand Ballroom I	Novel Materials	Grand Ballroom II	Energy	Parlors ABC
12:00 p.m.	Lunch & Exhibits	Pavilion	Lunch & Exhibits	Pavilion	Lunch & Exhibits	Pavilion
1:30 p.m.	Growth and Characterization	Grand Ballroom I	Nanostructures	Grand Ballroom II	ULSI FEOL/BEOL	Parlors ABC
3:30 p.m.	Break & Exhibits	Ballroom Foyer	Break & Exhibits	Ballroom Foyer	Break & Exhibits	Ballroom Foyer
4:00 p.m.	Growth and Characterization	Grand Ballroom I	Nanostructures	Grand Ballroom II	ULSI FEOL/BEOL	Parlors ABC
4:45-5:00 p.m.	Closing Remarks/Awards/ALD 2016 Announcement			Grand Ballroom I		

ALE Workshop 2015 Overview

Wednesday, July 1, 2015

4:00 p.m.9:00 p.m.	Registration	Ballroom Foyer
6:00 p.m.-9:00 p.m.	Poster Session & Welcome Reception	Skyline

Thursday, July 2, 2015

7:00 a.m.-12:00 p.m.	Registration	Ballroom Foyer
8:00 a.m.	Morning Session I	Grand Ballroom II
10:00 a.m.	Break	Ballroom Foyer
10:40 a.m.	Morning Session II	Grand Ballroom II
12:00 p.m.	Lunch	Skyline
1:40 p.m.	Afternoon Session I	Grand Ballroom II
3:40 p.m.	Break	Ballroom Foyer
4:20 p.m.	Afternoon Session II	Grand Ballroom II

ALD 2015 Schedule

AVS 15th International Conference on Atomic Layer Deposition
June 28-July 1, 2015, Portland, Oregon

Monday, June 29, 2015 – Plenary Session

Breaks & Exhibits: 10:00–10:45/3:30–4:00; Lunch & Exhibits: 12:00–1:30; Posters, Exhibits, & Networking: 5:30–7:00

Monday Plenary Session (Session Chairs: C. Winter and D.-G. Park)

8:00 – 8:15
Opening Remarks

8:30 – 9:15
ALD: Essential but Not Sufficient
M. Mayberry, Intel Corp. 51

9:15 – 10:00
Toward 5 nm CMOS Node: Value Proposition and Challenges
G.G. Shahidi, IBM T.J. Watson Research Center

10:00 – 10:45
Break & Exhibits

10:45 – 11:30
ALD for Technologies beyond Electronics: Chances and Challenges
M. Knez, Ikerbasque and CIC nanoGUNE 52

11:30 – 11:45
ALD 2015 Innovation Award Presentation

11:45 – 12:00
ALD 2015 Sponsor Preview

12:00-1:30
Lunch & Exhibits

Monday, June 29, 2015 – Session A

Breaks & Exhibits: 10:00–10:45/3:30–4:00; Lunch & Exhibits: 12:00–1:30; Posters, Exhibits, & Networking: 5:30–7:00

Monday Session A: Growth and Characterization (Session Chair: S. Clendenning)

1:30 – 1:45
Wettability of ALD Rare Earth Oxides for Superhydrophobic Coating
C.M. Yoon, I-K. Oh, Yonsei Univ.; K. Kim, Z. Lee, Ulsan National Institute of Science and Technology; C. Lansalot-Matras, W. Noh, Air Liquide; H. Kim, Yonsei Univ.; H-B-R. Lee, Incheon National Univ. 55

1:45 – 2:00
~~*Forming Very Reactive Metals by High Vacuum Plasma Enhanced Atomic Layer Deposition*~~
~~F. Niu, P. Chow, SVT Associates, Inc. .... 56~~

2:00 – 2:15
Plasma Enhanced Atomic Layer Deposition of Ruthenium Below 100 °C Using RuO_4 and H_2-Plasma
M. Minjauw, J. Dendooven, B. Capon, Univ. of Ghent; M. Schaekers, IMEC; C. Detavernier, Univ. of Ghent 57

2:15 – 2:30
Electronic State Configuration of Plasma-enhanced Atomic Layer Deposited SiO_2 on GaN
B.S. Eller, J. Yang, M. Hao, R.J. Nemanich, Arizona State Univ. 58

2:30 – 2:45
High-reliability Passivation of Diamond Surface Conduction Layer Using High-temperature H_2O-oxidant ALD Growth of Al_2O_3
A. Hiraiwa, T. Saito, D. Matsumuara, H. Kawarada, Waseda Univ. 59

2:45 – 3:00
In Situ QCM Monitoring of ALD in Porous Materials
M. Knaut, Technische Universitaet Dresden; I. Dirnstorfer, Nanoelectronic Materials Lab gGmbH (NaMLab); M. Albert, J.W. Bartha, Technische Universitaet Dresden 60

3:00 – 3:15
Low Temperature SiO_2 Passivation by Plasma-Enhanced Atomic Layer Deposition and High-Density Plasma Chemical Vapor Deposition
T.S. English, M.T. Barako, S. Roy-Panzer, T. Kodama, J. Provine, K.E. Goodson, T.W. Kenny, Stanford Univ. 61

3:15 – 3:30
Atomic Layer Deposition of ZnO Nanoparticles on Multi-Walled Carbon Nanotubes (MWCNTs) As a Functionalization Compound for Methane Sensing Application
Md. Humayun, Univ. of Illinois at Chicago; L. Stan, R. Divan, Y. Liu, Argonne National Lab; Igor Paprotny, Univ. of Illinois at Chicago 62

3:30 – 4:00
Break & Exhibits

Monday Session A: Growth and Characterization (Session Chair: M. Leskelä)

4:00 – 4:30 (Invited)
Mechanistic Studies of Oxide and Nitride Deposition by in Situ Infrared Spectroscopy
A. Vega, L.F. Pena-Orduna, Y. Gao, C. Nanayakkara, W. Cabrera, D. Dick, Y. Chabal, Univ. of Texas at Dallas; M. Halls, Schrodinger Inc. 63

4:30 – 4:45
Molecular Layer Deposition of "Titanicone," a Titanium-based Hybrid Material, As an Electrode for Lithium-ion Batteries
K. Van de Kerckhove, F. Mattelaer, D. Deduytsche, Ghent Univ.; P.M. Vereecken, IMEC/KU-Leuven; J. Dendooven, C. Detavernier, Ghent Univ. 64

4:45 – 5:00
Atomic Layer Deposited TiAlC Film as Metal Gate for 22nm Node CMOS Technology and Beyond
J. Xiang, Y. Zhang, J. Gao, T. Li, H. Yin, J. Li, C. Zhao, Institute of Microelectronics of Chinese Academy of Science 65

5:00 – 5:15
PEALD as the Method of Choice to Deposit TiO_2-Barrier Layers on PET Substrates: A Comparison of New and Established Ti-Precursors
M. Gebhard, F. Mitschker, P. Awakowicz, A. Devi, Ruhr-Univ. Bochum 66

5:15 – 5:30
Plasma Effects on Conformality for Atomic Layer Deposition of Silicon Nitride
K. Kelchner, S. Tang, G. Yuan, D. Hausmann, J. Henri, J. Sims, Lam Research 67

5:30 – 7:00
Poster Session I, Exhibits, & Networking

Monday, June 29, 2015 – Session B

Breaks & Exhibits: 10:00–10:45/3:30–4:00; Lunch & Exhibits: 12:00–1:30; Posters, Exhibits, & Networking: 5:30–7:00

Monday Session B: Memory (Session Chair: J. Conley)

1:30 – 2:00 (Invited)
Capacitor Dielectric and Electrodes for DRAM with Sub-20 Nm Design Rule
W. Lee, W. Jeon, C.H. An, M.J. Chung, C.S. Hwang, Seoul National Univ. 71

2:00 – 2:15
Study of Hydrogen Plasma Reduction of Nickel Substrate during PEALD Ta_2O_5 Deposition for Reram Application
R. Gassilloud, Cea Leti; A. Marty, R. Vallat, CNRS-LTM; A. Abbadie, Ph. Rodriguez, Cea Leti; S. Favier, ST micro; E. Nolot, D. Jourde, Cea Leti 72

2:15 – 2:30
Atomic Layer Deposition of High Refractive Index Nb_2O_5 for Application as Optical Waveguide Material
P. Raisanen, M. Verghese, M. Givens, ASM America Inc; S. Chen, X. Huang, M. Kautzky, Seagate Technology 73

2:30 – 2:45
Integration of Sub-10 Nm Functional Metal Oxide Films with Tailored Compositions for Application in Nonvolatile ReRAM Devices
S. Hoffmann-Eifert, Forschungszentrum Juelich 74

2:45 – 3:00
Atomic Layer Deposition of $Ge_2Sb_2Te_5$ Thin Films for Phase Change Memories
T. Eom, T. Gwon, S. Yoo, Seoul National Univ.; M.-S. Kim, Air Products Korea; I. Buchanan, M. Xiao,
Air Products and Chemicals, Inc.; C.S. Hwang, Seoul National Univ. 75

3:00 – 3:15
HfO_2 for Non-volatile Memories: from Resistors (RRAM) to Memory-impedance (MEM-Z) Devices
C. Vallee, P. Gonon, C. Mannequin, T. Wakrim, M. Saadi, A. Delamoreanu, Univ. Grenoble Alpes;
H. Grampeix, CEA; A. Sylvestre, Univ. Grenoble Alpes 76

3:15 – 3:30
ALD Memristor and Selector Devices for RRAM Application
K.M. Kim, B.J. Choi, J.J. Yang, Z. Li, R.S. Williams, HP Labs 77

3:30 – 4:00
Break & Exhibits

Monday Session B: Precursors (Session Chair: R.G. Gordon)

4:00 – 4:15
Reducing Agents for the Atomic Layer Deposition of WS_2 from the WF_6 and H_2S Precursors
A. Delabie, M. Heyne, B. Groven, K. Haesevoets, J. Meersschaut, T. Nuytten, P. Verdonck, S. Van Elshocht,
M. Heyns, I. Radu, M. Caymax, IMEC 81

4:15 – 4:30
Study of the Surface Chemistry and Formation of Ternary Materials Deposited by ALD
A. Mackus, C. MacIsaac, K. Pickrahn, W-H. Kim, S. Bent, Stanford Univ. 82

4:30 – 4:45
Atomic Layer Deposition of Tin(II) Monoxide Thin Films from $Sn(dmamp)_2$ and H_2O
J.H. Han, Y.J. Chung, B.K. Park, Korea Research Institute of Chemical Technology (KRICT); S.K. Kim, Korea Institute of
Science and Technology; D.J. Jeon, C.G. Kim, T-M. Chung, Korea Research Institute of Chemical Technology (KRICT) 83

4:45 – 5:00
Development of High Volume Manufacturing Methods for Molybdenum Disulfide Deposition
J.E. Maslar, W.A. Kimes, B. Kalanyan, B.A. Sperling, NIST; R. Tieckelmann, T. Orzali, SEMATECH 84

5:00 – 5:30 (Invited)
ALD Precursor Development for Cu and Other Metal Films
A. Sakurai, N. Yamada, A. Saito, T. Shiratori, M. Hatase, A. Nishida, T. Yoshino, M. Okabe, ADEKA Corporation.......................... 85

5:30 – 7:00
Poster Session I, Exhibits, & Networking

Monday, June 29, 2015 – Session C

Breaks & Exhibits: 10:00–10:45/3:30–4:00; Lunch & Exhibits: 12:00–1:30; Posters, Exhibits, & Networking: 5:30–7:00

Monday Session C: Manufacturing (Session Chair: P. Poodt)

~~1:30 – 1:45~~
~~*Optimizing Plasma Environment in PEALD to Suppress Parasitics and Enable Production-worthy Processing*~~
~~F.L. Pasquale, C. Baldasseroni, E. Augustyniak, S. Swaminathan, P. Ni, K. Leesar, D.C. Smith, S. Varadarajan, A. LaVoie, Lam Research .... 89~~

1:45 – 2:00
Nano-scale Coatings on Macro-scale Objects: Atomic Layer Deposition on a Volkswagen
M. Mousa, C. Oldham, G.N. Parsons, North Carolina State Univ 90

2:00 – 2:15
Atmospheric Pressure Plasma Enhanced Spatial ALD
Y. Creyghton, F. van den Bruele, A. Illiberi, Holst Centre / TNO; F. Roozeboom, Holst Centre / TNO and Eindhoven Univ. of Technology; P. Poodt, Holst Centre / TNO 91

2:15 – 2:30
Overcome of Throughput Limitation Using Space Divided Plasma ALD Hybrid Reactor
B-H. Cho, H-D. Kim, C-J. Hwang, JUSUNG Engineering, Korea 92

2:30 – 2:45
Reaction-path Analysis of ALD Kinetics: Understanding the Algebraic and Geometrical Structure of Surface Reaction Models
R.A. Adomaitis, Univ. of Maryland 93

2:45 – 3:00
ZnO ALD Coverage in the Pores of Anodic Aluminum Oxide Membranes Deposited Using Spatial ALD
K. Sharma, Univ. of Colorado at Boulder; D. Routkevitich, N. Varaksa, InRedox; S.M. George, Univ. of Colorado at Boulder 94

3:00 – 3:30 (Invited)
ALD for High Volume Manufacturing: Latest Trends, Developments, and Market Applications
A. Lavoie, LAM Research 95

3:30 – 4:00
Break & Exhibits

Monday Session C: Energy (Session Chair: P. Ye)

4:00 – 4:15
Spatial Atmospheric ALD of Zinc Oxysulfide Buffer Layers for CIGS Solar Cells
C. Frijters, P.J. Bolt, P. Poodt, A. Illiberi, Solliance/TNO 99

4:15 – 4:30
Multiply Confined Nano-catalysts based on Atomic Layer Deposition
Z. Gao, Y. Qin, Institute of Coal Chemistry, Chinese Academy of Sciences 100

4:30 – 4:45
Extremely Stable Platinum Electrocatalysts for Fuel Cells by Area-selective Atomic Layer Deposition and Atomic Scale Enhancement of Metal-support Interactions
A.X. Sun, N. Cheng, M. Banis, J. Liu, A. Riese, X. Li, R. Li, Univ. of Western Ontario; S. Ye, Ballard Power Systems Inc. 101

4:45 – 5:00
Growth of Crystalline Al_2O_3 via Low Temperature Thermal ALD: Nanomaterial Substrate Phase Stabilization
S.M. Prokes, Naval Research Lab; M.B. Katz, NRC at NRL; M.E. Twigg, Naval Research Lab 102

5:00 – 5:15
Atomic Layer Deposition of Yttria-Stabilized Zirconia on Porous Silver Cathode for High-Performance Low-Temperature Solid Oxide Fuel Cells
K.C. Neoh, Y.K. Lee, H.K. Kim, M. Kim, J. Koo, H.J. Jeong, D.Y. Jang, J.H. Shim, Korea Univ. 103

5:15 – 5:30
Ultra-High Power Capabilities in Amorphous $LiFePO_4$ Thin Films
K.B. Gandrud, O. Nilsen, H. Fjellvåg, Univ. of Oslo 104

5:30 – 7:00
Poster Session I, Exhibits, & Networking

Tuesday, June 30, 2015 – Session A

Breaks & Exhibits: 10:00–10:45/3:30–4:00; Lunch & Exhibits: 12:00–1:30; Posters, Exhibits, & Networking: 5:30–7:00

Tuesday Session A: Growth and Characterization (Session Chair: M. McSwiney)

8:00 – 8:15
Stabilization Layer for High-κ Dielectrics Deposition Using Precursor Chemistry on III-V Semiconductors
W. Cabrera, A. Dangerfield, The Univ. of Texas at Dallas; M.D. Halls, Schrödinger Inc.; Y.J. Chabal, The Univ. of Texas at Dallas 107

8:15 – 8:30
Fabrication Technique for Atomic Growth of Thin SiO_2 on Ni Films
G. Karbasian, M.S. McConnell, A.O. Orlov, G.L. Snider, Univ. of Notre Dame 108

8:30 – 8:45
Direct Comparison of the Properties of VO_2 Films Prepared by PLD and ALD
V. Wheeler, Z. Robinson, H. Kim, M. Currie, M. Tadjer, B. Downey, D. Meyer, C. Eddy Jr., Naval Research Lab 109

8:45 – 9:00
Improved GaAs MOS Capacitor Performance by Sulfur Passivation
Y. Contreras, A. Luna, P. Mancheno, A.J. Muscat, The Univ. of Arizona 110

9:00 – 9:15
Regrown InN Ohmic Contacts by Atomic Layer Epitaxy
C.R. Eddy, Jr., U.S. Naval Research Lab; N. Nepal, Sotera Defense Solutions; M. Tadjer, T. Anderson, A. Koehler, J. Hite, K. Hobart, U.S. Naval Research Lab 111

9:15 – 9:30
Atomic Layer Deposition of Amorphous In-Zn-O Films: A New Route to Ultra-Smooth and High Electron Mobility Transparent Conductors
D-J. Lee, Brown Univ.; J-Y. Kwon, Yonsei Univ.; J. Kim, K-J. Kim, Y-H. Cho, S-Y. Cho, Seoul National Univ.; S-H. Kim, Yeungnam Univ.; J. Xu, Brown Univ.; K-B. Kim, Seoul National Univ. 112

9:30 – 9:45
Preparation of High Quality High-κ/GaSb Interfaces Using In-situ Spectroscopic Ellipsometry and Reflection High Energy Electron Diffraction
M. Barth, The Pennsylvania State Univ.; G.B. Rayner, Jr., Kurt J. Lesker Company; Y. Zheng, R. Engel-Herbert, S. Datta, The Pennsylvania State Univ. 113

9:45 – 10:00
A Comparison of Tungsten Films Grown by CVD and Hot-wire Assisted ALD
M. Yang, A.A.I. Aarnink, A.Y. Kovalgin, R. Wolters, J. Schmitz, Univ. of Twente 114

10:00 – 10:45
Break & Exhibits

Tuesday Session A: Growth and Characterization (Session Chair: A. Delabie)

10:45 – 11:15 (Invited)
Atomic Layer Deposition of 2 Dimensional Transition Metal Dichalcogenides (TMDCs) and Their Applications
H. Kim, Yonsei Univ. 115

11:15 – 11:30
Effect of Oxygen Concentration on the Structure of Titanium Oxynitride Films Synthesized Via Atomic Layer Deposition
S. Iwashita, S. Aoyama, M. Nasu, K. Shimomura, Tokyo Electron Yamanashi Ltd.; K. Miyashita, Tokyo Electron Ltd.; Y. Akasaka, Tokyo Electron Yamanashi Ltd. 116

11:30 – 11:45
Aluminum Nitride Grown by Atomic Layer Epitaxy Characterized with Real-time Grazing Incidence Small Angle X-ray Scattering
V.R Anderson, N. Nepal, S.D. Johnson, U.S. Naval Research Lab; A. DeMasi, Boston Univ.; J.K. Hite, U.S. Naval Research Lab; K.F. Ludwig, Boston Univ.; C.R. Eddy, Jr., U.S. Naval Research Lab 117

11:45 – 12:00
Precursor Selection for Low Temperature Plasma Enhanced Atomic Layer Deposition of Silicon Nitride118
S. Weeks, G. Nowling, M. Bowes, N. Fuchigami, Intermolecular, Inc. 118

12:00 – 1:30
Lunch & Exhibits

Tuesday Session A: Growth and Characterization (Session Chair: M. Ritala)

1:30 – 2:00 (Invited)
Selective-Area Atomic Layer Deposition of Metals and Metal Oxides by Modified Nucleation and "Inverse" Polymer Patterning
G. Parsons, B. Kalanyan, S. E. Atanasov, E. Dandley, C. Needham, P. Lemaire, M. Ritz, E. Stevens, C. Oldham, E. Santiso, NC State Univ. 119

2:00 – 2:15
Comparison of Trimethylgallium and Triethylgallium as "Ga" Source Materials for the Growth of Ultra-thin GaN Films via Hollow-cathode Plasma-assisted ALD
M. Alevli, Marmara Univ.; N. Gungor, Marmara Univ.; C. Ozgıt-Akgun, A. Haider, S. Kizir, S. Leghari, S. Alkis, A.K. Okyay, N. Bıyıklı, Bilkent Univ. 120

2:15 – 2:30
Atomic Layer Deposition of Ultrathin Metal Oxide Films on Mono-layered Graphene in a Wafer Scale
S-J. Jeong, H. Kim, Samsung Advanced Institute of Technology; Y. Gu, Sungkyunkwan Univ.; M-H. Lee, H.J. Song, C-S. Lee, J. Ku, Y. Lee, Y. Cho, Samsung Advanced Institute of Technology; J. Yang, Sungkyunkwan Univ.; H. Suh, Samsung Advanced Institute of Technology; H. Kim, Sungkyunkwan Univ.; S. Hwang, S. Park, Samsung Advanced Institute of Technology........ 121

2:30 – 2:45
Real-time Studies of Atomic Layer Deposition Using Ambient Pressure X-ray Photoelectron Spectroscopy
A.R. Head, R. Timm, S. Ygnman, Lund Univ.; J-J. Gallet, Université Pierre et Marie Curie; G. Olivieri, Synchrotron-SOLEIL; S. Chaudhary, J. Knutsson, M. Hjort, Lund Univ.; F. Bournel, H. Tissot, Université Pierre et Marie Curie; J. Knudsen, A. Mikkelsen, J. Schnadt, Lund Univ. 122

2:45 – 3:00
In Situ X-ray Absorption Spectroscopy of ALD Half-cycles on Flat Substrates
M.S. Weimer, Illinois Institute of Technology; J.A. Klug, A. Yanguas-Gil, J.W. Elam, Argonne National Lab; A.S. Hock, Illinois Institute of Technology; T. Proslier, Argonne National Lab........ 123

3:00 – 3:15
SiO_2 ALD Layers Activation Evidenced Through III-V on Si Hybrid Bonded Interfaces
A. Talneau, K. Pantzas, A. Durnez, G. Patriarche, CNRS; E.L. Bourhis, Univ de Poitiers........ 124

3:15 – 3:30
Towards Atomic Layer Deposition of Carbon-Containing Silicon-Based Dielectrics
R.A. Ovanesyan, R.J. Gasvoda, Colorado School of Mines; D.M. Hausmann, Lam Research Corporation; S. Agarwal, Colorado School of Mines........ 125

3:30 – 4:00
Break & Exhibits

Tuesday Session A: Growth and Characterization (Session Chair: R. Kanjolia)

4:00 – 4:15
Plasma-surface Interaction in Plasma ALD: On the Effect of Redeposition
H.C.M. Knoops, Oxford Instruments Plasma Technology; W.M.M. Kessels, Eindhoven Univ. of Technology 126

4:15 – 4:30
The Effect of ALD-grown Al_2O_3 Coatings on the Refractive Index Sensitivity of an Optical Fiber Sensor During Metal Deposition
D. J. Mandia, W. Zhou, Carleton Univ.; J. J. Sims, J. B. Giorgi, Univ. of Ottawa; M. J. Ward, H. Joress, Cornell Univ.; J. Albert, S.T. Barry, Carleton Univ. 127

4:30 – 4:45
Thin ALD Fluoride Films to Protect and Enhance Al Mirrors in the Far UV
J. Hennessy, B.K. Balasubramania, A. Jewell, S. Nikzad, Jet Propulsion Lab, California Institute of Technology; C.S. Moore, K. France, Univ. of Colorado at Boulder 128

4:45 – 5:00
Atomic Layer Deposition of $BiFeO_3$ Thin Films: Analysis of Secondary Phase Evolution from in Situ Studies
A.R. Akbashev, A. Plokhikh, J.E. Spanier, Drexel Univ. 129

5:00 – 5:15
The Evolution of the Coordination Environment of ALD ZnO Thin Films from Isolated Atoms to a Wurzite Structure
A. Yanguas-Gil, J.A. Libera, T. Wu, Argonne National Lab; R.T. Haasch, Univ. of Illinois at Urbana-Champaign; J.W. Elam, Argonne National Lab 130

5:15 – 5:30 (Student Finalist)
What's Limiting Low-temperature ALD of Al_2O_3? A Vibrational Broadband Sum-frequency Generation Study
V. Vandalon, W.M.M. Kessels, Eindhoven Univ. of Technology 131

5:30 – 7:00
Poster Session II, Exhibits, & Networking

Tuesday, June 30, 2015 – Session B

Breaks & Exhibits: 10:00–10:45/3:30–4:00; Lunch & Exhibits: 12:00–1:30; Posters, Exhibits, & Networking: 5:30–7:00

Tuesday Session B: Precursors (Session Chair: S. Barry)

8:00 – 8:15
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V. Miikkulainen, K. Väyrynen, Univ. of Helsinki; V. Kilpi, Picosun Oy; M. Ritala, Univ. of Helsinki 135

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Interaction of N_2 Plasma with SiN_X Surfaces: First-Principles Molecular Dynamics Simulations
C.K. Ande, H.C.M. Knoops, Eindhoven Univ. of Technology; S.D. Elliott, Tyndall National Institute; W.M.M. Kessels, Eindhoven Univ. of Technology 136

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Low-temperature Atomic Layer Deposition of MoS_2 Using a Novel Organometallic Precursor
S. Cadot, F. Martin, O. Renault, M. Fregnaux, D. Rouchon, E. Nolot, CEA, LETI; L. Veyre, C. Thievleux, E.A. Quadrelli, C2P2 - UMR 5265, CPE Lyon 137

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Influence of Nitrogen Plasma Dose on the PEALD of Silicon Nitride Using a Trisilylamine Derivative Precursor
S.J. Jang, DNF Co., Ltd.; Luchana L. Yusup, W-J. Lee, Sejong Univ.; S.D. Lee, J.H. Kim, D. Y. Kim, J.H. Seok, S-I. Lee, M.W. Kim, DNF Co., Ltd. 138

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Organometallic Precursor Design for Manganese Metal ALD
D.J.H. Emslie, J.S. Price, P. Chadha, McMaster Univ. 139

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Towards Atomic Layer Deposition of Gold Metal from Volatile, Ambient-stable, Gold Phosphine Compounds
M.B.E. Griffiths, S.T. Barry, Carleton Univ. 140

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Halides, Alkyls, Amides, Cyclopentadienyls, and What Follows Next? In Pursuit of New and Improved ALD Precursors
A. Devi, Ruhr Univ. Bochum, Germany 141

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ALD of Manganese Silicate
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The Impact of ALD TaN Barrier Processes on Different BEOL Ultra Low-k Dielectrics
X. Zhang, C. Gillot, L. Zhao, T. Ryan, GLOBALFOUNDRIES, Inc.; C. Wu, IMEC 146

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Inherently Selective ALD of Metal Oxides
S.K. Selvaraj, C.G. Takoudis, Univ. of Illinois at Chicago 147

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Comparison of Alkyl and Alkylamide Precursor ALD on Native Oxide InAs(100) and GaAs(100) Surfaces
A.J. Henegar, T. Gougousi, UMBC 148

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Plasma-based In-situ ALD Surface Treatment for High-k/InGaAs Gate Stacks with Low Leakage and Trap State Densities
V. Chobpattana, T.E. Mates, J.Y. Zhang, E. Mikheev, S. Stemmer, Univ. of California, Santa Barbara 149

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A.U. Mane, J.W. Elam, J. A. Libera, Argonne National Lab 153

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Directed Patterning of Arbitrary Metal Oxide Nanostructures Using Polymer Template Nanoreactors
C-Y. Nam, A. Stein, Brookhaven National Lab 154

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Patterning of Thin Films Deposited by ALD via a Combination of Silylation and UV/Ozonolysis
L. Guo, I. Lee, F. Zaera, Univ. of California, Riverside 155

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J. Ballard, A. Zaman, S. Pryadkin, J. Owen, U. Fuchs, J. Randall, Zyvex Labs; D. Dick, Y. Chabal, Univ. of Texas at Dallas 156

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Formation of V_2O_5 Wires from Thin ALD VO_2 Films
V. Wheeler, M. Tadjer, N. Bassim, J. Caldwell, M. Mastro, C. Eddy Jr., Naval Research Lab 157

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A. Yoshikawa, K. Kusakabe, K. Wang, D. Imai, Chiba Univ. 158

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J.P. Chang, Univ. of California, Los Angeles 159

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C. Militzer, S. Knohl, W. A. Goedel, Chemnitz Univ. of Technology 161

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Plasma Enhanced Atomic Layer Deposition of Two-dimensional WS_2 from WF_6, H_2S and H_2 Plasma
B. Groven, M. Heyne, K. Haesevoets, J. Meersschaut, T. Nuytten, P. Verdonck, S. Van Elshocht, M. Heyns, I. Radu, A. Delabie, M. Caymax, IMEC 162

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Coaxial Capacitors with ALD Deposited Alumina on Silver Nanowires
R. Yuksel, S. Coskun, Middle East Technical Univ.; S. Sağkal, H. Eren, N. Biyikli, Bilkent Univ.; H.E. Unalan, Middle East Technical Univ. 163

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Sequential Infiltration Synthesized ZnO Nanostructures
L.E. Ocola, D. Gosztola, A. Yanguas-Gil, Argonne National Lab 164

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Growth, Characterization, and Application of Two-Dimensional Molybdenum Disulfide
B. Keller, Massachusetts Institute of Technology; A. Bertuch, Ultratech - Cambridge NanoTech Inc.; N. Ferralis, Massachusetts Institute of Technology; J. Provine, Stanford Univ.; J.C. Grossman, Massachusetts Institute of Technology 165

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X. Wang, Univ. of Wisconsin-Madison 169

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J. Liu, M.N. Banis, B. Xiao, Q. Sun, R. Li, X. Sun, Univ. of Western Ontario 170

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Origin and Tunability of Acid Sites in Amorphous Silica-alumina Probed by Atomic Layer Deposition
C. Canlas, L. Cheng, Argonne National Lab; B. O'Neill, Univ. of Wisconsin; F. Dogan, J. Libera, Argonne National Lab; J. Dumesic, Univ. of Wisconsin; L. Curtiss, J.W. Elam, Argonne National Lab 171

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X. Meng, Y. Cao, J.W. Elam, Argonne National Lab 172
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Atomic Layer Deposited ZnO as a Thermoelectric Material
M. Ruoho, I. Tittonen, Aalto Univ. 173

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Differences in Pseudocapacitive V_2O_5 ALD on Meso- and Micro-Porous Carbon for High Performance Supercapacitors
J. Daubert, NC State Univ.; N.P. Lewis, Penn State Univ.; H.N. Gotsch, J.Z. Mundy, D.N. Monroe, E.C. Dickey, NC State Univ.; M.D. Losego, Georgia Tech Univ.; G.N Parsons, NC State Univ. 174

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J. Bunquin, J. Miller, C. Marshall, Argonne National Lab; P. Stair, Northwestern Univ.; A.S. Hock, Illinois Institute of Technology 175

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J-P. Niemelä, M. Karppinen, Aalto Univ. 179

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Atomic Layer Deposition of Cu-doped ZnS Films As a Novel p-type Transparent Conductor
S. Sinha, S.K Maurya, K.R. Balasubramanium, S.K. Sarkar, Indian Institute of Technology Bombay 180

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Rapid Visible Color Change and Physical Swelling during Water Exposure in Triethanolamine-metalcone Films Formed by Molecular Layer Deposition
P.C. Lemaire, C.J. Oldham, G.N. Parsons, North Carolina State Univ. 181

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Designing and Tailoring Inorganic-Organic films for Application in Lithium Storage Materials
A. Lushington, J. Liu, Y. Liu, M. Bannis, C. Langford B. Xiao, S. Lawes, X. Sun, Western Univ.; K. Nie, Y. Ye, J.Guo, Lawrence Berkeley National Lab. 182

11:45 – 12:00
Atomic Layer Epitaxy of Fe_2O_3: Phase Control, Directed Crystal Growth, and Nanostructure Epitaxy
J.D. Emery, C.M. Schleputz, Argonne National Lab; P. Guo, Northwestern Univ.; S.C. Riha, Argonne National Lab; R.P.H. Chang, Northwestern Univ.; A.B.F. Martinson, Argonne National Lab 183

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M. Creatore, V. Zardetto, Eindhoven Univ. of Technology; F. Di Giacomo, CHOSE-Univ. of Rome- Tor Vergata; A. D'Epifanio, Univ. of Rome- Tor Vergata; S. Licoccia, Univ. of Rome-Tor Vergata; W.M.M. Kessels, Eindhoven Univ. of Technology; A. Di Carlo, T.M. Brown, CHOSE-Univ. of Rome- Tor Vergata 187

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Supported Metal Catalyst Smart Design Using Atomic Layer Deposition
J. Lu, Univ. of Science and Technology of China 188

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Transition Metal Oxide-Titania Alloys for Water Oxidation by Atomic Layer Deposition
O.L. Hendricks, C.E.D. Chidsey, P.C. McIntyre, Stanford Univ. 189

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Atomic Layer Deposition of Lanthanum Strontium Cobaltite for Solid Oxide Fuel Cell Cathodes
H.J. Choi, S.W. Park, G.D. Han, J. Koo, J.H. Shim, Korea Univ. 190

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Rational Design and Synthesis of Nanostructured Cathode for Lithium-oxygen Batteries Using Atomic Layer Deposition
M.P. Hermida, Univ. of Alabama in Huntsville; X. Luo, J. Lu, Argonne National Lab; Y. Lei, Univ. of Alabama in Huntsville 191

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Low Temperature Atomic Layer Deposition of Ruthenium Oxide and Its Application for Polyaniline-RuO_2 Core-Shell Nanostructured Arrays to Achieve Very Stable and High Performance Pseudocapacitors
X. Wang, C. Xia, KAUST; Z. Wang, KASUT; H. Alshareef, KAUST 192

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Multicomponent ALD Process Development and Optimization for Solid Lithium Electrolytes
A.C. Kozen, A.J. Pearse, G.W. Rubloff, Univ. of Maryland 193

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Transparent ALD-grown Ta_2O_5 Protective Layers for Corrosion Vulnerable Photoanodes in Solar Water Splitting
T. Wang, C. Li, J. Gong, Tianjin Univ. 194

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A. Valdivia, J.F. Conley, Jr., Oregon State Univ. 196

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H.V. Bui, R. Helmer, A. Goulas, F. Grillo, J. Ruud van Ommen, Delft Univ. of Technology 197

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Exploration of the Nucleation Behavior and Film Morphology of Polyurea Films Grown by Molecular Layer Deposition
D.S. Bergsman, R.G. Closser, Stanford Univ.; D. Nordlund, C.J. Tassone, SLAC National Accelerator Lab; B.M. Clemens, S.F. Bent, Stanford Univ. 198

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Adjustable Photocatalysis Using Molecular Layer Deposition of Organic-inorganic Hybrid Films
R. Yerushalmi, Institute of Chemistry and the Center for Nanoscience and Nanotechnology 199

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Plasma-enhanced ALD: a Route to Hydrophilic, Glueable PTFE
A.K. Roy, J. Dendooven, D. Deduytsche, K. Devloo-Casier, K. Ragaert, L. Cardon, C. Detavernier, Ghent Univ. 200

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Metal Organic Framework (MOF) Modification by ALD: Computation, Experiment, and Catalysis
I.S. Kim, A. Platero-Prats, Argonne National Lab; J. Borycz, S. Tussupbayev, Univ. of Minnesota; T. Wang, O. Farha, J. Hupp, Northwestern Univ.; L. Gagliardi, C. Cramer, Univ. of Minnesota; K. Chapman, A. Martinson, Argonne National Lab 201

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M. Ritala, Univ. of Helsinki 205

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Plasma-enhanced ALD of Aluminium Phosphate Based on the Plasma Polymerization of Trimethyl Phosphate
T. Dobbelaere, A. K. Roy, Ghent Univ.; P. Vereecken, IMEC; C. Detavernier, Ghent Univ. 206

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Atomic Layer Deposition of $SrTiO_3$ Films with $\{Sr(demamp)(tmhd)\}_2$ for DRAM Capacitor Application
W. Lee, W. Jeon, C.H. An, M.J. Chung, C.S. Hwang, Seoul National Univ. 207

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Real-time Study of Plasma Enhanced Atomic Layer Epitaxy of InN Films by Synchrotron X-ray Methods
N. Nepal, V.R. Anderson, S.D. Johnson, B.P. Downey, D.J. Meyer, U.S. Naval Research Lab; A. DeMasi, K.F. Ludwig, C.R. Eddy, Jr., Boston Univ. 208

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GaN Growth at Room Temperature Using Electron Enhanced ALD
J.K. Sprenger, A.S. Cavanagh, H. Sun, Univ. of Colorado at Boulder; K.J. Wahl, Naval Research Lab; A. Roshko, National Institute of Standards and Technology; S.M. George, Univ. of Colorado at Boulder 209

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ALD of Nb-doped TiO_2 as a Transparent Conductive Oxide
S. Lin, N. Murari, Oregon State Univ.; W.F. Stickle, Hewlett Packard Corporation; J.F. Conley, Jr., Oregon State Univ. 210

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In-situ Infrared Study of Atomic Layer Deposition of Silicon Oxide Using Di-sec-butylaminosilane and Ozone
L.F. Peña-Orduña, C.E. Nanayakkara, Y.J. Chabal, The Univ. of Texas at Dallas; A. Mallikarjunan, H. Chandra, M. Xiao, X. Lei, R.M. Pearlstein, A. Derecskei-Kovacs, Air Products and Chemicals 211

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B. Kannan, B. Sun, S. Krishnan, M. Medikonda, E. Mclellan, IBM; W.T. Lee, M. Klare, M. Kwan, T. Larson, ReVera Corporation........212

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In-vacuo Study of Functionalization Approaches for the ALD of High-k Dielectrics on Graphene
M. Junige, T. Oddoy, Technische Universität Dresden; R. Yakimova, V. Darakchieva, Linköping Univ.; C. Wenger, G. Lupina, IHP GmbH, Leibniz-Institut für Innovative Mikroelektronik; M. Albert, J.W. Bartha, Technische Universität Dresden 213

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Atomic Layer Deposition of the Important Lead Free Ferroelectric $K_xNa_{(1-x)}NbO_3$
H. H. Sønsteby, H. Fjellvåg, O. Nilsen, Univ. of Oslo 214

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Growth of Multilayer Thin Films of Boron Nitride by Atomic Layer Epitaxy
M. Sky Driver, J.D. Beatty, J.A. Kelber, Univ. of North Texas 215

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Electrical Characterization of ALD TiO_2/Al_2O_3 Bilayers on GaN
C.M. Jackson, The Ohio State Univ.; M.A. Negara, Stanford Univ.; A.R. Arehart, The Ohio State Univ.; P.C. McIntyre, Stanford Univ.; S.A. Ringel, The Ohio State Univ. 216

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W.M.M. Kessels, Eindhoven Univ. of Technology 217

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J. Stickney, The Univ. of Georgia 218

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S.M. Geyer, Wake Forest Univ.; R. Methaapanon, S.F. Bent, Stanford Univ. 220

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SALD Growth Surfaces and Material Interfaces - Understanding the Critical Parameters for Patterned-by-Printing Electronics
C.R. Ellinger, S.F. Nelson, Eastman Kodak Company 221

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Comparison of Oxygen Sources in ALD of Lanthanum Oxide
S. Seppala, J. Niinisto, K. Mizohata, Univ. of Helsinki; C. Lansalot-Matras, W. Noh, Air Liquide; M. Ritala, M. Leskela, Univ. of Helsinki 222

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Gas Permeation Barriers Deposited by Atmospheric Pressure Plasma Enhanced ALD
L. Hoffmann, D. Theirich, T. Hasselmann, D. Schlamm, A. Räupke, T. Riedl, Univ. of Wuppertal 223

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J.E. Bratvold, H. Fjellvåg, O. Nilsen, Centre for Materials Science and Nanotechnology (SMN) 225

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Crystallinity and H-doping of In_2O_3 Thin Films Prepared by ALD
Y. Wu, D. Vanhemel, B. Macco, M.A. Verheijen, F. Roozeboom, W.M.M. Kessels, Eindhoven Univ. of Technology 226

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E. Dandley, North Carolina State Univ.; A. Yoon, Z. Zhu, L. Sheet, Lam Research; G. Parsons, North Carolina State Univ. 230

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Oxidation of Ligands Leading to Reduction of Metals in Thermal ALD
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Molecular Oxygen Reactions with Tetrakisdimethylamido-metal Precursors for Atomic Layer Deposition
J. Provine, P. Schindler, F.B. Prinz, Stanford Univ. 232

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J. Schuster, Fraunhofer Institute for Electronic Nano Systems; S.E. Schulz, T. Gessner, X. Hu, Chemnitz Univ. of Technology 233

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Low Temperature Water Assisted ALD of Iron Oxide
D. Peeters, K. Lowjaga, Inorganic Material Chemistry, Ruhr-Univ. Bochum, Germany; D. Rogalla, H-W. Becker, RUBION, Ruhr-Univ. Bochum, Germany; A. Devi, Inorganic Material Chemistry, Ruhr-Univ. Bochum, Germany 234

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ALD of BaO and $BaTiO_3$ Films using Novel Ba Precursor for Semiconductor Applications
S. Acharya, J. Torgersen, Y. Kim, Stanford Univ.; C. Schildknecht, BASF Corp.; F.B. Prinz, Stanford Univ. 235

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M. Reinke, Y. Kuzminkyh, P. Hoffmann, Empa - Materials Science and Technology 236

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J. DuMont, D.R. Zywotko, J.J. Travis, S.M. George, Univ. of Colorado at Boulder 240

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D.V. Lam, Korea Univ. of Science and Technology (UST); J-H. Kim, Korea Institute of Machinery and Materials (KIMM) 241

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Stabilization of Catalysts via Atomic Layer Deposition
A. Goulas, A. Dokania, F. Grillo, J.R. van Ommen, Delft Univ. of Technology 242

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A. Haider, C. Ozgit-Akgun, Bilkent Univ.; K. Elmabruk, Turgut Özal Univ.; N. Biyikli, Bilkent Univ.,; I. Yilmaz, Turgut Özal Univ. 245

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Atomic Layer Deposition of SiO_2/Al_2O_3 on Pt for Single Electron Transistors Utilizing Pt Oxidation and Reduction
M.S. McConnell, L.C. Schneider, G. Karbasian, S. Rouvimov, A.O. Orlov, G.L. Snider, Univ. of Notre Dame 247

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Area Selective Deposition of Ultrathin Magnetic Cobalt Films via ALD
T. Ngo, H. Nallan, S. Chopra, A. Posadas, A. Demkov, The Univ. of Texas at Austin 248

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E. Shkondin, Technical Univ. of Denmark; J.M. Lindhard, M.D. Mar, F. Jensen, Danish National Center for Micro- and Nanofabrication; A. Lavrinenko, Technical Univ. of Denmark 249

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M. Fang, Beijing Institute of Graphic Communication; L. Zhang, Beijing Institute of Fashion Technology; C. Zhang, L. Yang, L. Sang, Beijing Institute of Graphic Communication 250

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A.R. Bielinski, E. Kazyak, Univ. of Michigan, Ann Arbor; C.M. Schlepütz, Argonne National Lab; H.J. Jung, Pacific Northwest National Lab; K.N. Wood, N.P. Dasgupta, Univ. of Michigan, Ann Arbor 252

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S. Chopra, Z. Zhang, C. Kaihlanen, J.G. Ekerdt, The Univ. of Texas at Austin 253

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Nanotubes, Nanocones and Nanotube Networks Fabricated by Ion-Track Technology and ALD of TiO_2, SiO_2, and Al_2O_3
A. Spende, GSI Helmholtz Centre for Heavy Ion Research; L. Movsesyan, N. Sobel, C. Hess, M. Lukas, B. Stühn, Technical Univ. Darmstadt; J.M. Montero Moreno, R. Zierold, K. Nielsch, Universität Hamburg; C. Trautmann, M.E. Toimil-Molares, GSI Helmholtz Centre for Heavy Ion Research 254

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ALE Workshop 2015 Schedule

AVS Atomic Layer Etching Workshop 2015
July 1-2, 2015, Portland, Oregon

ALE Workshop 2015 Poster Session and Welcome Reception

Wednesday, July 1, 2015

Posters and Welcome Reception: 6:00-9:00

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ALE Workshop 2015 Technical Program

Thursday, July 2, 2015

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All-spatial Concept of ALD-passivated Plasma Etching towards Room Temperature High-rate Atomic Layer Etching
F. Roozeboom, TNO and Eindhoven Univ. of Technology; F. van den Bruele, Y. Creyghton, P. Poodt, TNO;
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10:40 – 11:20 (Invited)
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P. Ventzek, Tokyo Electron America; M. Wang, Tokyo Electron Technology Center America 565

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Molecular Dynamics Simulations of Low Damage Atomic Layer Etching
J-C. Wang, S. Rauf, J. Kenney, L. Dorf, K. Collins, Applied Materials, Inc. 566

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Y. Sonoda, M. Tanaka, N. Yasui, Hitachi High-Technologies Corp. 567

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Fluorocarbon Assisted Atomic Layer Etching of SiO_2 and Si Using Cyclic Ar/C_4F_8 Plasma
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Fluorocarbon-based Atomic Layer Etching of Silicon Dioxide for Self-aligned Contact
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Self-limited Light Implantation for Precise Low-k Spacer Etching
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F. Leverd, STMicroelectronics; C. Fenouillet-Beranger, CEA-LETI; C. Richard, STMicroelectronics 571

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H. Kobayashi, N. Miyoshi, M. Matsui, Hitachi; K. Ishikawa, M. Hori, Nagoya Univ. 572

3:40 – 4:20
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4:20 – 4:40
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Tz. B. Petrova, G.M. Petrov, Naval Research Lab 573

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J.W. Park, G.Y. Yeom, SungKyunKwan Univ. 575

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