Workshop Schedule

Sunday, July 28, 2013

Time	Session	Location
11:30-12:30 p.m.	Registration	Marina Ballroom Foyer
12:30 p.m.-1:15 p.m.	*Modeling ALD - Molecules, Layers, Films,* Simon Elliott, Tyndall Univ.	Marina F
1:15 p.m.-2:00 p.m.	*Rational Design of Chemical Process and Precursors for Atomic Layer Deposition*, David Thompson, Applied Materials	Marina F
2:00 p.m.-2:15 p.m.	Break	Marina F
2:15 p.m.-3:00 p.m.	*Characterization of Ultra-thin ALD Films* Jim Engstrom, Cornell Univ.	Marina F
3:15 p.m.-3:45 p.m.	*Design and Manufacture of Successful Precursors for Semiconductor Fabrication,* Mike McSwiney, Intel Corp.	Marina F
3:45 p.m.- 4:00 p.m.	Break	Marina F
4:00 p.m.- 4:45 p.m.	*Enabling ALD for the Next Generation* David Chu, Applied Materials	Marina F
4:45 p.m.- 5:30 p.m.	*Atomic Layer Deposition for FEOL Logic Device Applications,* Dae-Gyu Park, IBM	Marina F

Technical Program Overview

Sunday, July 28, 2013

4:00 p.m.-8:00 p.m.	Registration	Marina Ballroom Foyer
6:00 p.m.-8:00 p.m.	Welcome Reception	Marriott Poolside

Monday, July 29, 2013

7:30 a.m.-5:00 p.m.	Registration	Marina Ballroom Foyer
8:20 a.m.-8:30 a.m.	**Opening Remarks**	Marina G
8:30 a.m.-9:10 a.m.	**Plenary Speaker:** *Atomic Layer Deposition from Development to Commercialization,* S. George, Univ. of Colorado	Marina G
9:10 a.m.-9:50 a.m.	**Plenary Speaker:** *Circuits at the Atomic Scale: Putting Layer by Layer Fabrication Methods into Our Toolbox,* J. Clarke, Intel Corp.	Marina G
9:50 a.m.-10:30 a.m.	**Plenary Speaker:** *Mobile Wireless Devices Driving the Semiconductor Industry:* Roadmap and Future Trends, G. Yeap, Qualcomm	Marina G
10:30 a.m.-11:00 a.m.	Break & Exhibits	Marina ED
11:00 a.m.-12:00 p.m.	Special Session	Marina G
12:00 p.m.-12:10 p.m.	ALD Innovation Award	Marina G
12:10 p.m.-1:30 p.m.	Lunch & Exhibits	Coronado Terrace

	Session A		Session B	
1:30 p.m.	Memory I	Marina G	Energy Applications-Fuel Cells	Marina F
3:00 p.m.	Break & Exhibits	Marina ED	Break & Exhibits	Marina ED
3:30 p.m.	Semiconductors-High-k Metal Gate	Marina G	Energy Applications-Storage	Marina F
5:00 p.m.-8:00 p.m.	Poster Session I & Exhibits			Marina ED

Tuesday, July 30, 2013

7:30 a.m.-5:00 p.m.	Registration				Marina Ballroom Foyer	
	Session A		**Session B**		**Session C**	
8:30 a.m.	Semiconductors-FEOL Applications	Marina G	Characterization of ALD Processes	Marina F	Plasma Enhanced ALD	Pt. Loma
10:00 a.m.	Break & Exhibits	Marina ED	Break & Exhibits	Marina ED	Break & Exhibits	Marina ED
10:30 a.m.	Mechanism & Characterization	Marina G	Selective ALD	Marina F	Memory II	Pt. Loma
12:00 p.m.	Lunch & Exhibits	Coronado Terrace	Lunch & Exhibits	Coronado Terrace	Lunch & Exhibits	Coronado Terrace
1:30 p.m.	Spatial ALD	Marina G	Novel Precursors	Marina F	Dopant & Film Property Tuning	Pt. Loma
3:00 p.m.	Break & Exhibits	Marina ED	Break & Exhibits	Marina ED	Break & Exhibits	Marina ED
3:30 p.m.	Organic-Inorganic Interfaces	Marina G	ALD Reactor Design & New Concepts	Marina F	Simulations & Modeling	Pt. Loma
5:00 p.m.-8:00 p.m.	Poster Session II & Exhibits				Marina ED	

Wednesday, July 31, 2013

7:30 a.m.-5:00 p.m.	Registration			
	Session A		**Session B**	
8:30 a.m.	Energy Applications	Marina G	Semiconductors-Interconnects	Marina F
10:00 a.m.	Break & Exhibits	Marina ED	Break & Exhibits	Marina ED
10:30 a.m.	Nucleation & Growth	Marina G	Emerging Technologies	Marina F
12:00 p.m.	Lunch & Exhibits	Coronado Terrace	Lunch & Exhibits	Coronado Terrace
1:30 p.m.	Novel Applications	Marina G	Dielectrics	Marina F
3:00 p.m.	Break & Exhibits	Marina ED	Break & Exhibits	Marina ED
4:00 p.m.	Nitrides & Oxides	Marina G	Novel Precursors Development/Nanolayers	Marina F
5:05 p.m.	Closing Remarks & Best Student Paper Award Announcement			Marina G

Technical Program Schedule & Table of Contents

AVS 13th International Conference on Atomic Layer Deposition
July 28-31, 2013, San Diego, California

Monday, July 29, 2013

Breaks & Exhibits: 10:30-11:00/3:00-3:30; Lunch & Exhibits: 12:00-1:30; Posters, Exhibits, & Networking: 5:00-8:00

Plenary Session (Session Chairs: J. Kim and P. Ma)

8:30–9:10
Atomic Layer Deposition from Development to Commercialization
S. George, Univ. of Colorado at Boulder

9:10 – 9:50
Circuits at the Atomic Scale: Putting Layer by Layer Fabrication Methods into Our Toolbox
J. Clarke, Intel Corp.

9:50 – 10:30
Mobile Wireless Devices Driving the Semiconductor Industry: Roadmap and Future Trends
Geoff Yeap, Qualcomm

10:30 – 11:00
Break & Exhibits

Special Session (Session Chair: G. Parsons)

11:00 – 11:20
Conductive Metal Oxide/Carbon Composite Films by Pyrolysis of Hybrid Organic-inorganic MLD Films
J.J. Travis, A.I. Abdulagatov, K.E. Terauds, A.S. Cavanagh, R. Raj, S.M. George, Univ. of Colorado at Boulder

11:20 – 11:40
Low Temperature Atomic Layer Deposition of Counter-electrode and Compact Layers for Flexible Dye-sensitized Solar Cells
D. Garcia-Alonso, Eindhoven Univ. of Technology; V. Zardetto, Univ. of Rome-Tor Vergata;
A.J.M. Mackus, Eindhoven Univ. of Technology; T.M. Brown, Univ. of Rome-Tor Vergata; W.M.M. Kessels,
M. Creatore, Eindhoven Univ. of Technology

11:40 – 12:00
Low Temperature Plasma-enhanced ALD of Vanadium Nitride as Copper Diffusion Barrier
G. Rampelberg, K. Devloo-casier, D. Deduytsche, Ghent Univ.; M. Schaekers, IMEC; N. Blasco,
Air Liquide Electronics; C. Detavernier, Ghent Univ.

12:00 – 12:10
ALD Innovation Award Presentation

12:00-1:30
Lunch & Exhibits

Session A: Memory I (Session Chair: P.D. Ye)

1:30 – 2:00 (Invited)
Unusual ALD Behaviors in Oxides and Chalcogenides
C.S. Hwang, Seoul National Univ.

2:00 – 2:15
Atomic Layer Deposition Enabled Synthesis of Nanostructured Composite $BiFeO_3$/$CoFe_2O_4$ Thin Films for Multiferroic Applications
C. Pham, J. Chang, Univ. of California, Los Angeles

2:15 – 2:30
Resistive Switching of AlN Films Grown by Plasma Enhanced Atomic Layer Deposition
B.J. Choi, A.C. Torrezan, M. Zhang, J.J. Yang, R.S. Williams, Hewlett Packard

2:30 – 2:45
High Performance Floating Gate Flash Memories Using Reduced Graphene Oxide As Charge Storage Medium and Atomic Layer Deposited High-k Dielectric Layers as Tunnel Barrier
D. Kocaay, C.O. Akgun, I. Donmez, O.O. Ekiz, M. Urel, Bilkent Univ.; N. Biyikli, A. Dana,
UNAM-National Nanotechnology Research Center

2:45 – 3:00
Resistive Switching Characteristics of Sr-rich ALD $SrTiO_3$ Films
H.J. Choi, S.W. Park, K. Bae, J.H. Shim, Korea Univ.

3:00 – 3:30
Break & Exhibits

Session A: Semiconductors – High-k Metal Gate (Session Chair: D-G. Park)

3:30 – 4:00 (Invited)
High-k and Metal Gate Technology for 3D and Emerging Devices
A. Noori, Applied Materials

4:00 – 4:15
ALE of Lanthanide Oxides on Gallium Arsenide and Germanium
R.G. Gordon, X. Wang, Y. Liu, H. Liu, Harvard Univ.; L. Dong, P. Ye, Purdue Univ.

4:15 – 4:30
Atomic Layer Deposition of Hafnium Aluminum Carbide As a Metal Gate Workfunction Material in MOS Devices
A. Lee, N. Fuchigami, D. Pisharoty, Z. Hong, E. Haywood, A. Joshi, S. Mujamdar, A. Bodke, O. Karlsson, Intermolecular; H. Kim, K. Choi, P. Besser, Global Founderies

4:30 – 4:45
Developments of ALD-(Nb/Ta)ON Films As Gate Insulator for Gate-last High-k CMOS Process
T. Nabatame, National Institute for Materials Science; H. Yamada, M. Kimura, Shibaura Institute of Technology; A. Ohi, National Institute for Materials Science; T. Ohishi, Shibaura Institute of Technology

4:45 – 5:00
High-k Atomic Layer Deposition on 2-D Materials
S. McDonnell, A. Azcatl, J. Kim, R.M. Wallace, Univ. of Texas at Dallas

5:00 – 8:00
Poster Session I, Exhibits, & Networking

Monday, July 29, 2013

Breaks & Exhibits: 9:45-10:15/3:30-4:00; Lunch & Exhibits: 12:00-1:30; Posters, Exhibits, & Networking: 5:00-8:00

Session B: Energy Applications – Fuel Cell (Session Chair: S. George)

1:30 – 2:00 (Invited)
Nanostructured Interfaces for Energy Conversion Reactions
J. Bachmann, Friedrich Alexander Univ. of Erlangen-Nürnberg

2:00 – 2:15
TBD

2:15 – 2:30
ALD of Platinum Catalysts on Nanowire Surfaces for Photoelectrochemical Water Reduction
N.P. Dasgupta, C. Liu, S. Andrews, P. Yang, Univ. of California at Berkeley

2:30 – 2:45 (Student Finalist)
Stabilization of Dye-TiO_2 Attachment in Dye-sensitized Solar Cells Achieved Using Atomic Layer Deposition after Dye Adsorption
D.H. Kim, M.D. Losego, North Carolina State Univ.; K. Hanson, Univ. of North Carolina; K. Lee,
North Carolina State Univ.; L. Alibabaei, T.J. Meyer, Univ. of North Carolina; G.N. Parsons,
North Carolina State Univ.

2:45 – 3:00
Investigation of ALD Dielectrics and Nanolaminates for Rectenna Based Energy Harvesting Applications
N. Alimardani, J.F. Conley, Oregon State Univ.

3:00 – 3:30
Break & Exhibits

Session B: Energy Applications – Storage (Session Chair: A. Londergan)

3:30 – 3:45
Atomic Layer Deposited Gallium Sulfide and Its Electrochemical Application as a Battery Anode
X. Meng, J.A. Libera, J. Lu, S.J. Jokela, T.T. Fister, L. Trahey, P. Fenter, J.W. Elam, Argonne National Lab

3:45 – 4:00
V_2O_5 and SnO_2 ALD on Graphene for the Fabrication of High-performance Anodes for Lithium Ion Batteries
M. Xie, Univ. of Colorado; X. Sun, H. Sun, J. Lian, Rensselaer Polytechnic Institute; S.M. George, Univ. of Colorado

4:00 – 4:15
Atomic Layer Deposition of Lithium Manganate for Thin Film Lithium Ion Batteries
V. Miikkulainen, A. Ruud, E. Østreng, O. Nilsen, Univ. of Oslo; M. Laitinen, T. Sajavaara, Univ. of Jyväskylä;
H. Fjellvåg, Univ. of Oslo

4:15 – 4:30
Atomic Layer Deposition of $LiCoO_2$ Thin-film Electrodes for All-solid-state Li-ion Micro-batteries
W.M.M. Kessels, H.C.M. Knoops, M.E. Donders, W.M. Arnoldbik, P.H.L. Notten, Eindhoven Univ. of Technology.

4:30 – 4:45
Role of Mesoporosity in Cellulose Fiber for Li-ion Migration in High-rate Li-storage Paper Electrodes
X. Chen, H. Zhu, Y. Chen, L. Hu, G. Rubloff, Univ. of Maryland, Collage Park

4:45 – 5:00
ALD of SnO_2 and Sb-doped SnO_2 As Transparent Conducting Oxides
A. Lancu, F. Prinz, Stanford Univ.

5:00 – 8:00
Poster Session I, Exhibits, & Networking

Tuesday, July 30, 2013

Breaks & Exhibits: 10:00-10:30/3:00-3:30; Lunch & Exhibits: 12:00-1:30; Posters, Exhibits, & Networking: 5:00-8:00

Session A: Semiconductors – FEOL Applications (Session Chair: R. Gordon)

8:30 – 9:00 (Invited)
III-V 3D Transistors Enabled by ALD
P. Ye, Purdue Univ.

9:00 – 9:15
ALD Vertical Transistor Architectures and Circuits
L.W. Tutt, S. Nelson, Eastman Kodak Company

9:15 – 9:45 (Invited)
Dual Passivation for ALD Gate Oxide Nucleation on III-V Surfaces
A.C. Kummel, Univ. of California, San Diego

9:45 – 10:00
Defect Passivation of In0.53Ga0.47As(100) by Trimethylaluminum and Water Vapor Dosing Prior to ALD-Al_2O_3 Gate Dielectric
J. Ahn, K. Tang, P.C. McIntyre, Stanford Univ.

10:00 – 10:30
Break & Exhibits

Session A: Mechanism & Characterization (Session Chair: Y. Chabal)

10:30 – 10:45
Mechanism of Atomic Layer Deposition of Silicon Oxide and Silicon Nitride Dielectric Films
C. Murray, S. Elliott, Tyndall National Institute; D. Hausmann, J. Henri, A. Lavoie, Lam Research Corp.

10:45 – 11:00
Reliable Electrical Calcium Test for the Evaluation of the WVTR of Al_2O_3 Barrier Layer Films Deposited by Low Temperature Atomic Layer Deposition
J. Simon, T. Maindron, B. Aventurier, E. Viasnoff, T. Jullien, A. Ghazouani, CEA-LETI.

11:00 – 11:15
X-ray Absorption Studies of Surface Species in SnO_2 and FeOx ALD
M.S. Weimer, B. Hu, S.J. Kraft, C.U. Segre, A.S. Hock, Illinois Institute of Technology

11:15 – 11:30
Dynamic Ellipsometry Study during Initial Stages of ALD Growth
T.P. Muneshwar, K.C. Cadien, Univ. of Alberta

11:30 – 11:45
Parameter Estimation of ALD Kinetics Applied to QCM Diagnostics
A. Holmqvist, Lund Univ.; T. Törndahl, U. Zimmermann, Uppsala Univ.; S. Stenström, Lund Univ.

11:45 – 12:00
In Situ Reaction Mechanism Studies on the Atomic Layer Deposition Processes of $Ti(O^iPr)_2(NMe_2)_2$ and $Ti(O^iPr)_3(N^iPr\text{-}Me\text{-}amd)$ with D_2O and Ozone
Y. Tomczak, K. Knapas, M. Leskelä, M. Ritala, Univ. of Helsinki

12:00 – 1:30
Lunch & Exhibits

Session A: Spatial ALD (Session Chair: Y. Shimogaki)

1:30 – 1:45
Spatial ALD of Transparent Conductive Oxides
A. Illiberi, Holst Centre/TNO; F. Roozeboom, Holst Centre/TNO & TU Eindhoven; R. Scherpenborg, P. Poodt, Holst Centre/TNO

1:45 – 2:00
Nucleation and Growth of GaInZnO Thin Films by Spatial-ALD
A. Illiberi, Holst Centre/TNO; T. Grehl, ION-TOF; A. Sharma, B. Cobb, G. Gelinck, P. Poodt, Holst Centre/TNO; H. Brongersma, Imperial College & TU Eindhoven; F. Roozeboom, Holst Centre/TNO & TU Eindhoven

2:00 – 2:15
Patterned by Printing--Taking Advantage of the Speed of Spatial ALD
C.R. Ellinger, S.F. Nelson, Eastman Kodak Company

2:15 – 2:30
Atmospheric Pressure Plasma Enhanced Spatial ALD of Silver and Alumina
P. Poodt, Holst Centre/TNO; Y. Creyghton, M. Simor, TNO; A. Illiberi, F. Roozeboom, Holst Centre/TNO

2:30 – 2:45
Atmospheric Pressure R2R ALD with In-situ Process Monitoring
M. Groner, J. Spencer, ALD NanoSolutions; A. Yersak, Y.C. Lee, Univ. of Colorado

2:45 – 3:00
An Industrial Scale Roll-to-roll Atomic Layer Deposition Process for Coating Flexible Web Substrates
P. Maydannik, T. Kaariainen, K. Lahtinen, D. Cameron, Lappenranta Univ. of Technology

3:00 – 3:30
Break & Exhibits

Session A: Organic-Inorganic Interfaces (Session Chair: C. Winter)

3:30 – 4:00 (Invited)
Layer-by-layer Designed and Deposited Multifunctional Inorganic-organic Hybrid Materials
M. Karppinen, Aalto Univ.

4:00 – 4:15
Metalization by Atomic Layer Deposition in a Metal-organic Framework
J.E. Mondloch, W. Bury, O.K. Farha, J.T. Hupp, Northwestern Univ.

4:15 – 4:30
Atomic Layer Deposition of Inorganic Coatings onto Carbon Fibres
W. Goedel, S. Knohl, A.K. Roy, Chemnitz Univ. of Technology

4:30 – 4:45
Atomic Layer Deposition of Pt Using Ozone Reactant on Carbon Surfaces
H. Lee, Incheon National Univ.; S.F. Bent, Stanford Univ.

4:45 – 5:00
Announcements: ALD 2013 Sponsors & ALD 2014

5:00 – 8:00
Poster Session II, Exhibits, & Networking

Tuesday, July 30, 2013

Breaks & Exhibits: 10:00-10:30/3:00-3:30; Lunch & Exhibits: 12:00-1:30; Posters, Exhibits, & Networking: 5:00-8:00

Session B: Characterization of ALD Processes (Session Chair: J. Engstrom)

8:30 – 8:45
In Situ Optical Characterization of Solid Precursor Delivery for ALD Processes
J.E. Maslar, W.A. Kimes, B.A. Sperling, NIST; P.F. Ma, J. Anthis, J.R. Bakke, Applied Materials; R. Kanjolia, SAFC Hitech.

8:45 – 9:00
In Situ Synchrotron Radiation X-ray Diffraction Studies of Metal ALD
R. Methaapanon, S.M. Geyer, R.W. Johnson, S.F. Bent, Stanford Univ.

9:00 – 9:15
In-situ Infrared Study of Aluminum Silicate on Chemically-treated InP(100) Using Atomic Layer Deposition
W. Cabrera, K.B. Ramos, Univ. of Texas at Dallas; I.M. Povey, Univ. College Cork; H. Dong,
B. Brennan, R.M. Wallace, Y.J. Chabal, A. Vega, Univ. of Texas at Dallas

9:15 – 9:30
In Situ FT-IR, XAS and PDF Characterization of Pd ALD for Synthesis of Sintering-resistant Pd Catalysts
Y. Lei, J. Lu, H. Zhao, B. Liu, J.A. Libera, J. Greeley, P. Chupas, J. Miller, J.W. Elam, Argonne National Lab.

9:30– 9:45
Characterization of Bubbler Performance as a Proof of Principle for Using Optical Diagnostics to Monitor Precursor Concentrations in ALD and CVD Delivery Lines
W. Kimes, J. Maslar, NIST; W. Kimmerle, W. Quinn, Nuance Systems, Inc.

9:45 – 10:00
High Energy X-ray Analysis of High Dielectric Constant Oxides
J. Church, J.J. Krajewski, R.L. Opila, Univ. of Delaware; C. Weiland, National Institute of Standards and Technology

10:00 – 10:30
Break & Exhibits

Session B: Selective ALD (Session Chair: G. Sundaram)

10:30 – 10:45
Advanced Ultrathin Nano Layers Selective Cobalt and Conformal SiN Caps for Sub-20 nm Copper/Low k Interconnects
S.V. Nguyen, IBM Research at Albany Nanotech; H. Shobha, D. Priyadarshini, C. Yang, T. Haigh, IBM at Albany Nanotech; C. Hu, S. Cohen, E. Liniger, T. Shaw, IBM Research; E. Adams, J. Burnham, IBM Essex Junction; T. Ko, IBM Hopewell Junction; Y. Lin, Global Foundries; A. Madan, N. Klymko, C. Parks, D. Yang, IBM Hopewell Junction; S. Knupp, IBM at Albany Nanotech; S. Molis, A. Simon, IBM Hopewell Junction; G. Bonilla, A. Grill, D. Edelstein, IBM Research; D. Canaperi, T. Spooner, IBM at Albany Nanotech; D. Collins, L.Q. Xia, S. Reiter, M. Balseanu, Applied Materials

10:45 – 11:00
Selective Metal Deposition on Cu
J. Roberts, J. Clarke, S.B. Clendenning, J. Plombon, P.E. Romero, Intel Corp.

11:00 – 11:15 (Student Finalist)
The Effect of Substrate Composition on Selective Area Atomic Layer Deposition Using Self-assembled Monolayers as Blocking Layers
W. Zhang, C.T. Long, J.R. Engstrom, Cornell Univ.

11:15 – 11:30
Area-selective ALD by Area-activation for Contacting of Carbon Nanomaterials
A.J.M. Mackus, N.F.W. Thissen, Eindhoven Univ. of Technology; J.L.L. Mulders, FEI Electron Optics; A.A. Bol, W.M.M. Kessels, Eindhoven Univ. of Technology

11:30 – 11:45
Selective Synthesis of Infiltrated Metal Oxide into Block Copolymers via ALD for Sub-10 nm Patterned Media
Y.A. Chapuis, R. Ruiz, L. Wan, H. Gao, J. Lille, K. Panel, T.R. Albrecht, HGST, a Western Digital Company

11:45 – 12:00
Selective Surface Reactions during Atomic Layer Deposition on Bi-component Polymer Fibers
G. Parsons, B. Gong, S. Arvidson, S. Khan, P. Williams, North Carolina State Univ.

12:00 – 1:30
Lunch & Exhibits

Session B: Novel Precursors (Session Chair: M. Leskelä)

1:30 – 2:00 (Invited)
Precursors and Processes for the Growth of Metallic First Row Transition Metal Films by Atomic Layer Deposition
C.H. Winter, L.C. Kalutarage, Wayne State Univ.

2:00 – 2:15
Low Temperature Formation of Ru and RuO_2 Thin Films by Thermal Atomic Layer Deposition Using a Novel Zero-valence Ru Metallorganic Precursor and O_2
S.J. Lee, S. Yeo, J.Y. Park, S.H. Kim, Yeungnam Univ.; T.M. Jung, C.G. Kim, E.A. Jung,
Korea Research Institute of Chemical Technology; T.E. Hong, Korea Basic Science Institute

2:15 – 2:30
Characterization of Bismuth Oxide Deposited by Atomic Layer Deposition Using $Bi(OCMe_2{}^iPr)_3$ and H_2O
D.Z. Austin, S.W. Smith, Oregon State Univ.; D. Allman, D. Price, S. Hose, ON Semiconductor;
M. Saly, SAFC Hitech; J.F. Conley, Jr., Oregon State Univ.

2:30 – 2:45
Atomic Layer Deposition of Molybdenum Oxide Using Bis(Tert-butylimido)bis(Dimethylamido) Molybdenum
A. Bertuch, G. Sundaram, Ultratech / Cambridge Nanotech; M. Saly, Formerly at SAFC Hitech; D. Moser,
R. Kanjolia, SAFC Hitech

2:45 – 3:00
Atomic Layer Deposition of Cerium Oxide Using Tris(Isopropyl-cyclopentadienyl)cerium and Water Vapor
J.I. Rossero, C.G. Takoudis, R.F. Klie, A. Gulec, Univ. of Illinois at Chicago

3:00 – 3:30
Break & Exhibits

Session B: ALD Reactor Design & New Concepts (Session Chair: S. Haukka)

3:30 – 4:00 (Invited)
Analytic Solution to the Problem of ALD Growth in Cross-flow Reactors: Surface Coverage, Saturation Curves, and Scale-up
A. Yanguas-Gil, Argonne National Lab

4:00 – 4:15
ALD Process Selection for Scalable Nanomanufacturing
A.U. Mane, J.A. Libera, J.W. Elam, Argonne National Lab

4:15 – 4:30
Thermal and Plasma-enhanced ALD of Titanium Nitride on Powders Using a Rotary Reactor
D. Longrie, D. Deduytsche, J. Haemers, Ghent Univ.; K. Driesen, Umicore; C. Detavernier, Ghent Univ.

4:30 – 4:45
Design and Implementation of a Novel Portable ALD/CVD Hybrid Reactor
S.K. Selvaraj, G. Jursich, C.G. Takoudis, Univ. of Illinois at Chicago

4:45 – 5:00
Announcements: ALD 2013 Sponsors & ALD 2014

5:00 – 8:00
Poster Session II, Exhibits, & Networking

Tuesday, July 30, 2013

Breaks & Exhibits: 10:00-10:30/3:00-3:30; Lunch & Exhibits: 12:00-1:30; Posters, Exhibits, & Networking: 5:00-8:00

Session C: Plasma Enhanced ALD (Session Chair: E. Kessels)

8:30 – 8:45
The Growth Characteristic and Film Properties of Dy_2O_3 and Dy Doped HfO_2 Dielectrics by Plasma Enhanced Atomic Layer Deposition on Si Using Newly Synthesized Dy Precursor
J. Lee, I. Oh, J. Park, Yonsei Univ.; K.H. Lee, Korea Inst Sci and Tech; C. Lansalot-matras, W. Noh, H. Chevrel, Air-Liquide; Hyungjun, Kim

8:45 – 9:00
Metal Al Film Deposited by Plasma Assisted Atomic Layer
Q. Chen, Z. Wang, L. Sang, Beijing Institute of Graphic Communication

9:00 – 9:15 (Student Finalist)
High-quality Metal Films by Hot-wire Assisted ALD Using Metallocenes and NH_2 Radical
G. Yuan, H. Shimizu, T. Momose, Y. Shimogaki, The Univ. of Tokyo

9:15 – 9:30
Surface Modification of the PEALD Al_2O_3 GaSb Interface for Enhanced Electrical Performance
E.R. Cleveland, L.B. Ruppalt, B.R. Bennett, S.M. Prokes, Naval Research Lab

9:30 – 9:45
Low-temperature Deposition of Crystalline AlN Thin Films Using Nitrogen Plasma-enhanced Atomic Layer Deposition
P. Motamedi, K. Voon, K. Bothe, D. Barlage, K.C. Cadien, Univ. of Alberta.

9:45 – 10:00
Interface Electronic State Characterization of Remote PEALD Al_2O_3 Grown by DMAI on Free Standing GaN
J. Yang, Arizona State Univeristy; B.S. Eller, R.J. Nemanich, Arizona State Univ.

10:00 – 10:30
Break & Exhibits

Session C: Memory II (Session Chair: H. Kim)

10:30 – 11:00 (Invited)
Advanced ALD Materials and Equipment Design for High-volume Production of Next Generation Memory Devices
B. Lu, AIXTRON Inc.

11:00 – 11:15
Application of ALD in Thin Film Magnetic Head Processing, Current and Future
X. Du, A. Zhao, R. Umeda, S. Maat, HGST, a Western Digital Company

11:15 – 11:30
Improved Polarity Symmetry of TiN-ZrO_2/Al_2O_3/ZrO_2-TiN MIM Capacitors by In-situ TaCN Barrier Layers
W. Weinreich, J. Koch, K. Seidel, S. Riedel, Fraunhofer IPMS-CNT; J.-. Chiang, National Taiwan Univ.; M. Drescher, J. Sundqvist, Fraunhofer IPMS-CNT

11:30 – 11:45
Evaluating the Mechanism for Leakage Current Reduction of ALD TiO_2 Film by Al-doping
W. Jeon, W. Lee, Y.W. Yoo, C.H. An, C.S. Hwang, Seoul National Univ.

11:45 – 12:00
Alumina Interface Control Layers by ALD Enabling Minority Carrier Responses in Fully-functional Metal/HfO_2/In0.53Ga0.47As Capacitors
J. Mullins, É. O'connor, S. Monaghan, Tyndall National Institute; J. Connolly, Applied Materials; P.K. Hurley, M.E. Pemble, I.M. Povey, Tyndall National Institute

12:00 – 1:30
Lunch & Exhibits

Session C: Dopant & Film Property Tuning (Session Chair: S. Elliott)

1:30 – 2:00 (Invited)
Impact of Different Dopant Materials on the Ferroelectric Properties of ALD HfO_2
U. Schroeder, Namlab gGmbH

2:00 – 2:15
Molecular Oxide Embedded in Atomic Layer Deposition Oxide As Atomic-level Precise Artificial Atom
N. Satoh, Harvard Univ./National Institute for Materials Science; R.G. Gordon, Harvard Univ.

2:15 – 2:30
Controllable Nitrogen Doping in As Deposited TiO_2 Film and Its Effect on Post Deposition Annealing
S. Deng, K. Devloo-casier, D. Deduytsche, G. Rampelberg, B.D. Schutter, J. Dendooven, C. Detavernier, Ghent Univ…

2:30 – 2:45
Tuning the Electronic Properties by Interrupted Atomic Layer Growth of Magnesium-doped Zinc Oxide
M. Ballarotto, J. Hackley, K. Gaskell, C.J.K. Richardson, W.N. Herman, D.B. Romero, Univ. of Maryland

2:45 – 3:00
Atomic Layer Deposition of Thin Film Laminates and Solid Solutions-the Case of Zinc Tin Oxide
C. Hagglund, Stanford Univ.; T. Grehl, ION-TOF GmbH; J.T. Tanskanen, Y. Yee, M.N. Mullings, B. Clemens, Stanford Univ.; H.H. Brongersma, ION-TOF GmbH; S.F. Bent, Stanford Univ.

3:00 – 3:30
Break & Exhibits

Session C: Simulations & Modeling (Session Chair: C. Detavernier)

3:30 – 4:00 (Invited)
Cycle-by-cycle Growth Simulations and the Cooperation between Adsorbate Molecules in ALD
M. Shrazi, S. Elliott, Tyndall National Institute

4:00 – 4:15
Atomic Layer Deposition of Ruthenium Complexes on Titanium Nitride Surface: A Density Functional Theory Study
Q. Phung, S. Vancoillie, KU Leuven; G. Pourtois, J. Swerts, IMEC; K. Pierloot, KU Leuven; A. Delabie, IMEC

4:15 – 4:30
Dehydrogenation Reactions During O_2 Based Ru ALD Processes: First-principles Calculations and Experiments
C.K. Ande, N. Leick, Eindhoven Univ. of Technology; S.D. Elliott, Tyndall National Institute; W.M.M. Kessels, Eindhoven Univ. of Technology

4:30 – 4:45
Finite Element Modeling of ALD Process: Conformality and Surface Reactions
L. Zhong, Seagate Technology

4:45 – 5:00
Announcements: ALD 2013 Sponsors & ALD 2014

5:00 – 8:00
Poster Session II, Exhibits, & Networking

Wednesday, July 31, 2013

Breaks & Exhibits: 10:00-10:30/3:00-3:30; Lunch & Exhibits: 12:00-1:30

Session A: Energy Applications (Session Chair: D. Thompson)

8:30 – 8:45
Atomic Layer Epitaxy of Semiconductor Grade III-N Materials: Discovery of a Novel InN Phase
N. Nepal, J.K. Hite, L.O. Nyakiti, N.A. Mahadik, S.B. Qadri, M.J. Mehl, V.D. Wheeler, M.A. Mastro, C.R.E. Jr, U.S. Naval Research Lab

8:45 – 9:00
Preparation of Gallium Nitride Surfaces for ALD Deposition of Aluminum Oxide
A. Kerr, S. Gu, P. Asbeck, T. Kaufman-Osborn, E. Chagarov, A.C. Kummel, Univ. of California, San Diego; S. Oktyabrsky, S. Madisetti, State Univ. of New York, Albany

9:00 – 9:15 (Student Finalist)
Characterization and Electronic Device Applications of III-nitride Thin Films Deposited by Plasma-enhanced ALD
C. Ozgit-Akgun, I. Donmez, D. Kocaay, F. Bozkurt-oruc, A. Dana, A.K. Okyay, N. Biyikli, Bilkent Univ.

9:15 – 9:30
Precise Control of NiO Nanomaterial Growth through ALD and the Substrate Chemistry
X. Tong, Z. Gao, X. Guo, Institute of Coal Chemistry, Chinese Academy of Sciences; E. Pippel, Max Planck Institute of Microstructure Physics; Y. Qin, Institute of Coal Chemistry, Chinese Academy of Sciences, China; M. Knez, CIC nanoGUNE, Donostia-San Sebastian

9:30 – 9:45
Atomic Layer Deposition of the Photovoltaic Absorber Cu_2ZnSnS_4 (CZTS)
E. Thimsen, Univ. of Minnesota/Argonne National Lab; S.V. Baryshev, Euclid Techlabs/Argonne National Lab; S.C. Riha, A.B.F. Martinson, J.W. Elam, I.V. Veryovkin, M.J. Pellin, Argonne National Lab

9:45 – 10:00
Stabilizing Cu_2S Photovoltaics via Ultrathin ALD Barrier Layers
S.C. Riha, A. Martinson, Argonne National Lab

10:00 – 10:30
Break & Exhibits

Session A: Nucleation & Growth (Session Chair: D. Shenai)

10:30 – 11:00 (Invited)
Initial Growth of Ru Thin Films by Atomic Layer Deposition
S.K. Kim, Korea Institute of Science and Technology; J.H. Han, C.S. Hwang, Seoul National Univ.

11:00 – 11:15
Atomic Layer Deposition of AlF_3 Using Trimethylaluminum and Hydrogen Fluoride-Pyridine
Y. Lee, A.S. Cavanagh, S.M. George, Univ. of Colorado, Boulder

11:15 – 11:30
Atomic Layer Deposition of Epitaxial Delta-MoN
J.A. Klug, N. Groll, N.G. Becker, J.W. Elam, M.J. Pellin, T. Proslier, Argonne National Lab.

11:30 – 11:45
Initial Growth Behavior of TiO_2 Atomic Layer Deposition on Different Surface Modified Nanoporous Films.
E. Levrau, K. Devloo-casier, J. Dendooven, Univ. of Ghent; K.F. Ludwig, Boston Univ.; P. Verdonck, J. Meersschaut, M.R. Baklanov, IMEC; C. Detavernier, Univ. of Ghent

11:45 – 12:00
Low Temperature Atomic Layer Deposition of MgO Thin Films on Si
S. Vangelista, R. Mantovan, A. Lamperti, G. Tallarida, B. Kutrzeba-kotowska, S. Spiga, Laboratorio MDM, IMM-CNR; M. Fanciulli, Università di Milano Bicocca

12:00 – 1:30
Lunch & Exhibits

Session A: Novel Applications (Session Chair: J. Elam)

1:30 – 1:45
Atomic Layer Deposition of Pb(Zr_xTi_{1-x})O_3 Thin Films for PiezoMEMS Applications
D. Chien, T. Kim, J.H. Choi, F. Zhang, J.P. Chang, UCLA

1:45 – 2:00
ALD Coating on Cotton Fabric: a Novel Method for Improving Fire Retardant Properties
X. Chen, X. Liu, S. Stoliarov, G. Rubloff, Univ. of Maryland, Collage Park.

2:00 – 2:15
Synthesis of a Bio-inspired Multilayer Polarizer Using ALD and Its Application to Anti-counterfeiting
O. Poncelet, L. Francis, Université catholique de Louvain

2:15 – 2:30
Improved Cut and Stab Resistance of Kevlar after Coating by Atomic Layer Deposition
S.E. Atanasov, C.J. Oldham, North Carolina State Univ.; K. Slusarski, Army Research Lab; K.J. Senecal,
S. Filocamo, U.S. Army Natick Research, Development and Engineering Center; E.D. Wetzel, Army Research Lab;
G.N. Parsons, North Carolina State Univ.

2:30 – 2:45
Safety Aspects of Polymer Films with Atomic Layer Deposited Thin Al_2O_3 Barrier Layers
M. Vähä-nissi, M. Pitkänen, E. Salo, J. Sievänen, VTT Technical Research Centre of Finland; M. Putkonen,
VTT Technical Research Centre of Finland and Aalto Univ., School of Chemical Technology; A. Harlin,
VTT Technical Research Centre of Finland

2:45 – 3:00
Fracture Bulge Testing of Suspended ALD Thin Films and Nanolaminates
M. Berdova, P.T. Törmä, P. Kostamo, S. Franssila, Aalto Univ.

3:00 – 3:30
Break & Exhibits

Session A: Nitrides & Oxides (Session Chair: S. Ramanathan)

3:30 – 3:45
Characteristics of ALD SiO_2 Film at Low Temperature Using SDPCVD System
M. Cheon, B. Cho, H. Kim, JUSUNG Engineering

3:45 – 4:00
Plasma-assisted ALD of Silicon Nitride from BTBAS: Influence of Plasma Exposure and Substrate Temperature
H.C.M. Knoops, E.M.J. Braeken, S.E. Potts, Eindhoven Univ. of Technology; S. Haukka, V. Pore, ASM; W.M.M. Kessels,
Eindhoven Univ. of Technology

4:00 – 4:15
Properties of Low Temperature PEALD SiO_2
M. Putkonen, R.L. Puurunen, O.M.E. Ylivaara, VTT Technical Research Centre of Finland; M. Bosund, Beneq Oy; T. Sajavaara,
Univ. of Jyväskylä; M. Vähä-nissi, VTT Technical Research Centre of Finland

4:15 – 4:30
Room-temperature ALD of Aluminium Oxide, Titanium Dioxide, Silicon Dioxide and Silicon Nitride Enabled by Energy-enhanced ALD Techniques
S.E. Potts, H.B. Profijt, R. Roelofs, E.M.J. Braeken, H.C.M. Knoops, Eindhoven Univ. of Technology; S. Haukka, V. Pore, ASM;
W.M.M. Kessels, Eindhoven Univ. of Technology

4:30 – 4:45
Designing High Performance Precursors for Atomic Layer Deposition of Silicon Oxide
A. Mallikarjunan, A. Derecskei-kovacs, H. Chandra, B. Han, M. Xiao, X. Lei, M.L.O. Neill, Air Products and Chemicals, Inc.;
H. Liang, H. Bo, Z. Qingfan, H. Cheng, China University of Geosciences

4:45 – 5:00
Mechanism of Atomic Layer Deposition of Silicon Oxide and Silicon Nitride Dielectric Films
C. Murray, S. Elliott, Tyndall National Institute; D. Hausmann, J. Henri, A. Lavoie, Lam Research Corp.

Wednesday, July 31, 2013

Breaks & Exhibits: 10:00-10:30/3:30-4:00; Lunch & Exhibits: 12:00-1:30

Session B: Semiconductors – Interconnects (Session Chair: U. Schroeder)

8:30 – 9:00 (Invited)
ALD Metal Processes and the Challenges in their Introduction into BEOL Interconnect Metallization
O. Van der straten, IBM

9:00 – 9:15
Low Temperature ALD Cu Nucleation and Full-fill for BEOL Interconnects
C.J. Jezewski, J.J. Plombon, C.T. Carver, S.B. Clendenning, F. Gstrein, T.K. Indukuri, J.S. Clarke, Intel Corp.

9:15 – 9:30
Comparison of Step Coverage in ALD and CVD
K. Li, R.G. Gordon, Harvard Univ.

9:30 – 9:45
Plasma-enhanced ALD Metal Compound for Cu Diffusion Barrier
B. Sheu, A. Lakshmanan, P. Ma, Applied Materials

9:45 – 10:00
ALD of Nickel Oxide and Its Reduction to Nickel for Potential Applications in Interconnects and Spintronics
T. Waechtler, Fraunhofer Institute for Electronic Nano Systems and Chemnitz Univ. of Technology; A. Sharma, Chemnitz Univ. of Technology; N. Ahner, Fraunhofer Institute for Electronic Nanosystems and Chemnitz Univ. of Technology; M. Melzer, Fraunhofer Institute for Electronic Nanosystems; S. Müller, D. Lehmann, P. Schäfer, S. Schulze, Chemnitz Univ. of Technology; S.E. Schulz, Fraunhofer Institute for Electronic Nano Systems and Chemnitz Univ. of Technology; D.R.T. Zahn, M. Hietschold, Chemnitz Univ. of Technology; T. Gessner, Fraunhofer Institute for Electronic Nano Systems and Chemnitz Univ. of Technology

10:00 – 10:30
Break & Exhibits

Session B: Emerging Technologies (Session Chair: M. Knez)

10:30 – 11:00 (Invited)
Robust Electrically-programmable and UV-erasable IGZO-based TFT Memory Device with Pt Nanocrystals Charge Trapping Layer
X. Cui, S. Chen, S. Ding, W. Zhang, Fudan Univ., Shanghai, China

11:00 – 11:15
Atomic Layer Deposition-A Growth Method for Novel Spintronics Materials
M.I. Lukasiewicz, M. Godlewski, E. Guziewicz, A. Wojcik-Glodowska, K. Kopalko, A. Wolska, M. Klepka, B.S. Witkowski, R. Jakiela, I.A. Kowalik, Institute of Physics, Polish Academy of Sciences

11:15 – 11:30
Plasmon Enhanced Conductivity in ALD-enabled Au Nanorod-ZnO Nanocomposites
F. Wu, L. Tian, Washington Univ. in St. Louis; R. Kanjolia, SAFC Hitech; S. Singamaneni, P. Banerjee, Washington Univ. in St. Louis

11:30 – 11:45
Atomic Layer Deposition of Nanocomposite Charge Drain Coating for MEMS Devices
A.U. Mane, J.W. Elam, Argonne National Laboratory; A.D. Brodie, W.M. Tong, KLA-Tencor; M.A. Mccord, KLA-Tencor

11:45 – 12:00
Atomic Layer Deposition of Rare Earth Oxides
J. Niinistö, T. Blanquart, M. Kaipio, S. Seppälä, K. Mizohata, Univ. of Helsinki; C. Lansalot, W. Noh, Air Liquide Labs. Korea; M. Ritala, M. Leskelä, Univ. of Helsinki

12:00 – 1:30
Lunch & Exhibits

Session B: Dielectrics (Session Chair: C.S. Hwang)

1:30 – 2:00 (Invited)
Recent Advancements in ALD Dielectric Integration with Graphene
V. Wheeler, U.S. Naval Research Lab

2:00 – 2:15
In-situ Growth Control for $Al_xTi_yO_z$ Films and Laminates
M. Knaut, TU Dresden; F. Benner, Nanoelectronic Materials Lab gGmbH (NaMLab); C. Hossbach, M. Geidel, TU Dresden; I. Dirnstorfer, Nanoelectronic Materials Lab gGmbH (NaMLab); M. Albert, J.W. Bartha, TU Dresden

2:15 – 2:30
Pd/ALD Al_2O_3/GaN Metal Oxide Semiconductor Structures: GaN Surface Preparation, Annealing and MOS Device Characterization
R.D. Long, Stanford Univ.; C.M. Jackson, The Ohio State Univ.; A. Hazeghi, Stanford Univ.; A.R. Arehart, The Ohio State Univ.; Y. Nishi, Stanford Univ.; S.A. Ringel, The Ohio State Univ.; P.C. Mcintyre, Stanford Univ.

2:30 – 2:45 (Student Finalist)
Integration of Functional Perovskite (ABO_3) Layers on Si (001) by ALD Using a Thin $SrTiO_3$ Buffer Layer
T.Q.Ngo, M.D.McDaniel, A.Posadas, D. Utess, A.A.Demkov, J.G. Ekerdt, The Univ. of Texas at Austin

2:45 – 3:00
Crested Barrier Tunnel Junctions Using PEALD Al_2O_3/HfO_2 Stackings
K.E. Hajjam, Université de Sherbrooke; N. Baboux, INSA Lyon; S. Ecoffey, Université de Sherbrooke; L. Francis, ICTEAM, ELEN, UCL; A. Souifi, Université de Sherbrooke; F. Calmon, INSA Lyon; D. Drouin, Université de Sherbrooke

3:00 – 3:30
Break & Exhibits

Session B: Novel Precursor Development/Nanolaminates (Session Chair: R. Kanjolia)

3:30 – 3:45
Low Temperature PEALD Deposition of Copper
J. Connolly, Applied Materials; D. Hagen, R. Nagle, S. Rushworth, I. Povey, Tyndall National Institute; P. Ma, Applied Materials; M. Pemble, Tyndall National Institute

3:45 – 4:00
The Surface Chemistry of Ligands in ALD Precursors
F. Zaera, Univ. of California, Riverside

4:00 – 4:15
Novel Heteroleptic Precursors for Atomic Layer Deposition of TiO_2
T. Blanquart, J. Niinistö, Univ. of Helsinki; V. Longo, Technische Universiteit Eindhoven; M. Gavagnin, Vienna Univ. of Technology; V.R. Pallem, C. Dussarrat, Air Liquide; M. Ritala, M. Leskela, Univ. of Helsinki

4:15 – 4:30
Evaluation of a Metal-organic Precursor with Regard to a Gold ALD Process by Utilizing In-situ Spectroscopic Ellipsometry
M. Junige, Technische Universität Dresden; D. Schmidt, Univ. of Nebraska-Lincoln; S.T. Barry, Carleton Univ.; J.W. Bartha, Technische Universität Dresden; M. Schubert, Univ. of Nebraska-Lincoln

4:30 – 4:45
Electrical Characterization of Platinum and Aluminum Oxide Nano-laminates
F. Purkl, Univ. of Freiburg and Robert Bosch LLC; T.S. English, Stanford Univ.; J. Provine, Stanford Univ.; A. Feyh, Robert Bosch LLC; O. Ambacher, Univ. of Freiburg; G. O'brien, Robert Bosch LLC; T.W. Kenny, Stanford Univ.

4:45 – 5:00
Enabling Manganese Alkyl Amidinate Precursor for 3-dimensional Integration with Through-silicon Vias
D.V. Shenai, Q.M. Wang, S.J. Manzik, H. Li, J-S. Lehn, Dow Electronic Materials; R.G. Gordon, Harvard Univ.

Poster Session I

Monday, July 29, 2013

Posters, Exhibits, & Networking: 5:00-8:00

Investigating the Impact of an ALD Layer of Alumina on the Strength of Glass Capillaries for Use in Gas Storage
A. O'mahony, D.C. Bennis, Incom, Inc.; M. Bosund, Beneq Oy; C.A. Craven, Incom, Inc.; K. Dame, BAM; M.A. Detarando, Incom, Inc.; D. Eliezer, C.En Ltd.; C. Gröschl, K. Holtappels, A. Krause, R. Meyer, BAM; M.J. Minot, J.M. Renaud, Incom, Inc.

Studies on SOI-MOS Capacitors with HfLaO Dielectrics Deposited by Plasma-enhanced-atomic-layer-deposition
D. Cao, X.H. Cheng, T.T. Jia, L. Zheng, D.W. Xu, Z.J. Wang, C. Xia, Y.H. Yu, Shanghai Institute of Micro-System & Information Technology

The Role of Nucleation Density on the Long Scale Statistical Roughness of HfB_2 Films Grown by CVD
S. Babar, T.T. Li, Univ. of Illinois at Urbana Champaign; T. Karabacak, Univ. of Arkansas at Little Rock; J.R. Abelson, Univ. of Illinois at Urbana Champaign

Controlling Copper Thin Film Morphology Using a Growth Inhibitor in Chemical Vapor Deposition
S. Babar, P. Zhang, L.M. Davis, G.S. Girolami, J.R. Abelson, Univ. of Illinois at Urbana Champaign

Coupling of Reactor and Feature-scale Models during the Simulation of ALD on Nanostructured Substrates
A. Yanguas-gil, J.W. Elam, Argonne National Lab

Characterization of ALD Ultathin Films Using Surface Enhanced Raman Spectroscopy
C. Ko, L. Nien, M. Lin, M. Chen, National Taiwan Univ.

Application of Atomic Layer Deposited Al2O3 on Encapsulation of Implantable Medical Devices
X. Xie, L. Rieth, P. Tathireddy, F. Solzbacher, Univ. of Utah

Improving the Microwave Absorption Performance of Light Conductive Materials with Magnetic Coatings by Atomic Layer Deposition
G. Wang, Z. Gao, C. Chen, Y. Qin, Institute of Coal Chemistry, Chinese Academy of Sciences

Coupling a Sub-monolayer Water Oxidation Catalyst with Hematite Photoanodes by ALD
S. Riha, Argonne National Lab; B. Klahr, Michigan State Univ.; E. Tyo, Yale Univ.; S. Seifert, S. Vajda, M. Pellin, Argonne National Lab; T. Hamann, Michigan State Univ.; A. Martinson, Argonne National Lab

Implementation of ALD Thin Films as Stress Compensation Layers in NEMS
M. Berdova, M. Brandt, Aalto Univ.; L. Grönberg, VTT Technical Research Center of Finland; M. Sillanpää, S. Franssila, Aalto Univ.

Atomic Layer Deposited Tunnel Oxides Stabilize Silicon Photoanodes for Catalytic Water Oxidation
A. Scheuermann, C.E.D. Chidsey, P.C. Mcintyre, Stanford Univ.

ALD/MLD Deposited Hybrid of DL-lactic Acid and Trimethylaluminium
M. Vähä-nissi, J. Sievänen, E. Salo, VTT Technical Research Centre of Finland; L. Johansson, Aalto Univ.; E. Kenttä, VTT Technical Research Centre of Finland; M. Putkonen, VTT Technical Research Centre of Finland and Aalto Univ.; A. Harlin, VTT Technical Research Centre of Finland

Comparison Between Cyclopentadienyl-based SrO and MgO ALD: an In-situ Spectroscopic Ellipsometry Investigation
H. Wang, B. Willis, Univ. of Connecticut

Atmospheric-Pressure Atomic Layer Deposition of Platinum Nanoclusters on Titania Nanoparticles
A. Goulas, J.R. Van Ommen, Delft Univ. of Technology

Low Energy Ion Scattering Analysis of TiN Deposited on Al_2O_3 for MEMS Applications
T. Grehl, ION-TOF GmbH; R. ter Veen, Tascon GmbH; T. Blomberg, ASM Microchemistry, Ltd.

Microbalance for the Masses: A Lid-Integrated QCM for In-situ Mapping of ALD in Low-profile Tools
S. Riha, J. Libera, J. Elam, A. Martinson, Argonne National Lab

Atomic Layer Deposition of Lithium Fluoride
M. Mäntymäki, J. Hämäläinen, M. Ritala, M. Leskelä, Univ. of Helsinki

Using Quartz Crystal Microbalance with Dissipation Monitoring for Real-time Characterization of Al_2O_3 and TiO_2 ALD
M. Dixon, M. Poggi, Biolin Scientific; J.B. Li, X. Lin, C.Y. Yuan, Univ. of Wisconsin-Milwaukee

Properties of Permeation Barrier Layers Deposited by Atomic Layer Deposition
S. Lee, H. Choi, S. Shin, G. Ham, H. Jung, H. Yang, H. Jeon, J. Park, Hanyang Univ.

Cuprous Oxide Based p-n Junction Using Atomic Layer Deposited ZnO Layers
S.K. Baek, Y.H. Kwon, K.R. Lee, H.K. Cho, Sungkyunkwan Univ.

Exploring the Application of Atomic Layer Deposition in Conventional and All-solid-state Lithium-ion Batteries
J. Liu, X. Li, R. Li, X. Sun, Western Univ.

Growth Behavior and Properties of Atomic Layer Deposited Tin Oxide on Silicon from Novel Tin(II)acetylacetonate Precursor and Ozone
S.K. Selvaraj, C.G. Takoudis, Univ. of Illinois at Chicago

Atomic Layer Deposition of Zinc Oxide: Detailed Quantum Chemical and Spectroscopic Ellipsometry Studies of the Growth Mechanism
A. Afshar, K.C. Cadien, Univ. of Alberta

Effects of Passivation Layer on Ga-doped ZnO Films Grown by ALD
Y.C. Chang, C.L. Liao, S.F. Chen, C.C. Huang, C.Y. Lee, C.L. Ho, M.C. Wu, National Tsing Hua Univ.;
A.S. Liu, Epistar Corp.

Characterization of Atomic Layer Deposited Metal Films and Nanolaminates by Multi-parametric Surface Plasmon Resonance
N. Granqvist, BioNavis Ltd.; S. Ek, M. Toivola, W. Li, J. Kostamo, Picosun Ltd.; J. Sadowski, J. Kuncova-Kallio,
S. Törmälä, BioNavis Ltd.

ALD/MLD Growth of Hybrid Inorganic-organic Superlattice Structures
T. Tynell, M. Karppinen, Aalto Univ.

Photocatalysis and Hydrogen Generation of Zn- and Al-doped TiO_2 Nanotubes Fabricated by Atomic Layer Deposition
C.Y. Su, National Tsing Hua; Y.C. Hsueh, S.H. Huang, National Tsing Hua Univ.; C.C. Wang, The Univ. of Texas at Austin;
T.P. Perng, National Tsing Hua Univ.

ALD-based 3D Imaging of Pore Networks in Metal-assisted Chemically Etched Silicon
F. Güder, Y. Yang, U.M. Küçükbayrak, M. Zacharias, Univ. of Freiburg

A Study on the Real Time Decomposition Monitoring of TEMAZ for ZrO_2 ALD Processes
J. Yun, J. An, Korea Research Institute of Standards & Science; I. Park, Hanyang Univ.; D. Cha, Gunsan National Univ.; J. Kim,
Korea Research Institute of Standards & Science

The Role of Atomic Layer Deposited Oxide Films in Infrared Power Generation
G. Scarel, H.S. Mann, Y. Schwab, B.N. Lang, James Madison Univ.; J.L. Lancaster, Univ. of North Carolina - Greensboro

ALD Ceramic Coatings for Erosion and Corrosion Protection of Copper Microchannel Coolers
M. Flannery, T. Desai, A. Fan, Advanced Cooling Technologies, Inc.

XPS Analysis of Strontium Containing Films under ALD Conditions Using Strontium Imidazolate Precursors
X. Qin, Q. Ma, Univ. of California, Riverside; J.A.T. Norman, Air Products and Chemicals; M.S. Kim, Air Products Korea;
F. Zaera, Univ. of California, Riverside

Adhesion Strength of Tungsten ALD Films
M. Eschner, C. Lorenz, A. Neidhardt, C. Reinhold, U. Reinhold, H. Schnabel, Univ. of Applied Sciences

In Situ ATR-FTIR Study of the Surface Reactions during Atomic Layer Deposition of TiO_2
L. Ye, T. Gougousi, Univ. of Maryland, Baltimore County

Single Atoms of Pt on Graphene by ALD As Highly Active and Co-tolerant Electrocatalyst for Methanol Oxidation Used in Fuel Cells
S. Sun, G. Zhang, Y. Chen, J. Liu, X. Meng, R. Li, X. Sun, Western Univ. of London; N. Gauquelin, S. Stambula, G.A. Botton, McMaster Univ.; T-K. Sham, Western Univ. of London; N. Chen, J. Zhou, S. Yang, W. Chen, Canadian Light Source

Effects of Film Thickness and Oxidation State on Electrocatalysts Deposited by ALD
K.L. Pickrahn, Y. Gorlin, A. Garg, T.F. Jaramillo, S.F. Bent, Stanford Univ.

Graphene Oxide Based Charge Trapping Memory Fabricated by Low Temperature Atomic Layer Deposition
L. Wang, Fudan Unversity; W. Yan, Q. Sun, H. Lu, S. Ding, D.W. Zhang, Fudan Univ.

A New Route for Atomic Layer Deposition of GeTe Film for Phase Change Memory
T. Gwon, T. Eom, 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.

Atomic Layer Deposition and Characterization of Al_2O_3 Film on Few Layer MoS_2 Flakes
W. Yang, Y. Geng, L. Wang, Q. Sun, P. Zhou, D.W. Zhang, Fudan Univ.

Fabrication of ZrO_2 Nanotubes by ALD: Conformal Coating of 1D Nanochannel
H. Kim, H. Yoo, M. Kim, S. Lee, Y. Yang, J. Lee, S. Lee, H. Shin, Sungkyunkwan Univ.

Surface Plasmon Resonance (SPR)-assisted Photodetector Using Heterostructures of Au Nanoparticles(NPS) and ALD-grown TiO_2 Nanotubes(NTS)
M. Kim, H. Kim, S. Lee, Y. Yang, S. Lee, J. Lee, S. An, S. Lim, H. Shin, Sungkyunkwan Univ.

Al_2O_3 from Me_3Al and H_2O by ALD on Si: Residual Stress, Elastic Modulus, Hardness and Adhesion
O.M.E. Ylivaara, VTT; X. Liu, Aalto Univ.; L. Kilpi, VTT; J. Lyytinen, Aalto Univ.; D. Schneider, Fraunhofer IWS; M. Laitinen, J. Julin, Univ. of Jyväskylä; S. Ali, S. Sintonen, M. Berdova, E. Haimi, Aalto Univ.; T. Sajavaara, Univ. of Jyväskylä; H. Ronkainen, VTT; H. Lipsanen, J. Koskinen, Aalto Univ.; R.L. Puurunen, VTT

Enhanced Proton Conduction in ALD YSZ
D.Y. Jang, K. Bae, H. Kim, S.W. Park, J.H. Shim, Korea Univ.

Atomic Layer Deposition of P-type Copper(I) Oxide (Cu_2O) Thin Films by Using a Bis(1-dimethylamino-2-methyl-2-butoxy)copper and H_2O
H. Kim, S. Yeo, J. Park, T. Cheon, S. Kim, Yeungnam Univ.

Characterizations of P-type $CuAlO_2$ Thin Films Prepared by Atomic Layer Deposition
H. Kim, S. Yeo, J. Park, T. Cheon, S. Kim, Yeungnam Univ.; T.E. Hong, Korea Basic Science Institute

Atomic Layer Deposition of Metal Phosphate Thin Films
B. Han, J. Park, S. Woo, W. Lee, Sejong Univ.

Fabrication and Characterization of P-type ZnO Films Grown on GaAs Substrate by Atomic Layer Deposition
Y. Zhang, Z.Y. Xie, Y. Geng, Q.Q. Sun, S.J. Ding, H.L. Lu, D.W. Zhang, Fudan Univ.

Photoluminescence of Anodic Aluminum Oxide Modulated by Atomic Layer Deposited ZnO Films
Z.Y. Xie, Y. Zhang, Y. Geng, Q.Q. Sun, S.J. Ding, H.L. Lu, D.W. Zhang, Fudan Univ.

Effect of DC Bias on Inductively Coupled Plasma Enhanced Atomic Layer Deposition of Ruthenium Thin Films
B.H. Liu, National Applied Research Labs; S.H. Huang, National Tsing Hua Univ.; C.C. Kei, C.N. Hsiao, National Applied Research Labs

Fabrication of $PtTiO_2CNT$ Hierarchical Structure Catalyst by Atomic Layer Deposition and Characterization of Photocatalytic Properties
S.H. Huang, Y.C. Hsueh, National Tsing Hua Univ.; B.H. Liu, National Applied Research Labs; C.Y. Su, T.P. Perng, National Tsing Hua Univ.

Al_2O_3 Protection Layer of Nitinol Prepared by Using Atomic Layer Deposition
C.C. Kei, Y.S. Yu, M.J. Huang, National Applied Research Labs; J. Racek, D. Vokoun, Institute of Physics of the ASCR

Mechanical Properties of ALD SiO_2, HfO_2, SrO and ZnO Films
M. Berdova, Aalto Univ.; N.Y. Garces, U.S. Naval Research Lab; X. Liu, Aalto Univ.; A. Nath, M. Rao, George Mason Univ.; D.K. Gaskill, C.R.E. Jr, U.S. Naval Research Lab; S. Franssila, Aalto Univ.

Electrical Characteristics of Ga_2O_3 Thin Films Deposited by Plasma-enhanced Atomic Layer Deposition
H. Altuntas, Cankiri Karatekin Univ.; I. Donmez, C. Ozgit-Akgun, N. Biyikli, Bilkent Univ.

Photocatalytic Activities of ZnO and TiO_2 Nanostructures Fabricated by Atomic Layer Deposition Using Organic Templates
C. Ozgit-Akgun, I. Donmez, H. Ceylan, F. Kayaci, M.O. Guler, T. Uyar, N. Biyikli, Bilkent Univ.

Iron-based Inorganic-organic Hybrid Thin Films by ALD/MLD
A. Tanskanen, M. Karppinen, Aalto Univ.

Controlled Molecular Layer Deposition Enables Extremely Low Friction of Liquid Water Flow on Structured Surfaces
J. Knauf, Advanced Molecular Films GmbH, DWI at RWTH Aachen Univ.; L. Reddemann, Advanced Molecular Films GmbH, Universität zu Köln; A. Böker, DWI at RWTH Aachen Univ.; K. Reihs, Advanced Molecular Films GmbH

Improvement of Mechanical and Barrier Properties of Polyethylene Blown Films Using ALD Process
S.H. Song, S.W. Moon, J.H. Shim, B.H. Choi, G.B. Lee, Korea Univ.

Atomic Layer Deposition of Aluminum Phosphate
S. Knohl, Technical Univ. Chemnitz; A.K. Roy, Univ. Gent; S. Schulze, M. Hietschold, W.A. Goedel, Technical Univ. Chemnitz

Atomic-layer Deposition of Transparent Top Electrode for Inverted Organic Photovoltaic Devices
M. Ballarotto, W.N. Herman, D.B. Romero, Univ. of Maryland

XRR Characterization of ALD Al_2O_3/TiO_2 Nanolaminates with Ultra-thin Bilayers
S. Sintonen, S. Ali, Aalto Univ. School of Electrical Engineering; O.M.E. Ylivaara, R.L. Puurunen, VTT Technical Research Centre of Finland; H. Lipsanen, Aalto Univ. School of Electrical Engineering

Growth and Properties of Highly Oriented ZnO Nanorod Arrays Synthesized by the Two Step Method: ALD and Microwave Assisted-hidrothermal
R. Ortiz Castro, E. Martínez-Guerra, Centro de Investigación en Materiales Avanzados S. C. (CIMAV); E. Pérez-Tijerina, Centro de Innovación, Investigación y Desarrollo en Ingeniería y Tecnología de la UANL (CIIDIT).

Corrosion Resistance of ALD Zirconium Dioxide Films on Cu and Nickel-plated Cu
P.S. Williams, C.J. Oldham, North Carolina State Univ.; T. Desai, M. Flannery, Advanced Cooling Technologies, Inc.; G.N. Parsons, North Carolina State Univ.

Atomic Layer Deposition of Aluminum Phosphate and Titanium Phosphate on Silicon Wafers and Nylon Fibers
C.J. Oldham, N.L. Sigmon, P.S. Williams, G.N. Parsons, North Carolina State Univ.

Wide Range Tunable Electrical Properties in Zinc Oxide Thin Films by Organic Dopant
K.H. Yoon, K.S. Han, S.J. Kim, M.M. Sung, Hanyang Univ.

Synthesis of PbTe Thin Films by Atomic Layer Depositon
K. Zhang, A.D.R. Pillai, M. Tangirala, D. Nminibapiel, W. Cao, H. Baumgart, Old Dominion Univ.; V. Kochergin, MicroXact Inc.

Titanium-aryloxide Thin Film Prepared by Molecular Layer Deposition: an Application to ZnO-based Visible-light Phototransistors
K.S. Han, K.S. Lee, K.H. Kim, S.J. Kim, M.M. Sung, Hanyang Univ.

Organic-inorganic Hybrid Materials Formation into Polyesters during Sequential Vapor Infiltration
H.I. Akyildiz, J.S. Jur, North Carolina State Univ.

Using ALD to Create Tungsten Inverse Opals Capable of Structured Thermal Emission at 1000C for Thermophotovoltaic Applications
M.D. Losego, North Carolina State Univ.; K.A. Arpin, H. Ning, Univ. of Illinois; B. Kalanyan, North Carolina State Univ.; P.V. Braun, Univ. of Illinois; G.N. Parsons, North Carolina State Univ.

Role of PEALD Reactor Wall Conditions on Radical and Ion Substrate Fluxes
M.J. Sowa, Cambridge NanoTech/Ultratech, Inc.

Controlling Phase and Stoichiometry in the Quaternary Cu_2zNsNs_4 System Using the Atomic Layer Deposition of Four Precursors
A. Short, L. Jewell, A. Bielecki, A. Myers, T. Keiber, UCSC; J. Norman, Air Products; F. Bridges, S. Carter, G. Alers, UCSC

Structural and Optical Properties Study of ALD ZnO Films Deposited Using Dimethylzinc and H_2O or Ozone Oxidants
N.Y. Garces, J.A. Freitas, Naval Research Lab; A. Nath, George Mason Univ.; V.D. Wheeler, C.R. Eddy, Naval Research Lab

ALD TiO_2 Layers Improve Photovoltage of Silicon Photocathodes for Solar Water Spitting
B. Kalanyan, M.D. Losego, M.D. Dickey, G.N. Parsons, North Carolina State Univ.

Conductivity and Mechanical Properties of ALD Coated Nonwoven Fibers
W.J. Sweet, C.J. Oldham, J.S. Jur, G.N. Parsons, North Carolina State Univ.

Photoremediation of Toxic Heavy Metals by Nonwoven Fabrics Coated with Thin Films Deposited by Atomic Layer Deposition
J. Halbur, A. Madan, J. Jur, North Carolina State Univ.

Controlled Nano-scaled Modification of the Total Surface Area of Single Particles and Powders by ALD
S. Ek, W. Li, M. Pudas, M. Toivola, T. Pilvi, V. Kilpi, N. Holm, R. Laine, J. Kostamo, Picosun

New Hydrogen Peroxide Vapor Delivery Systems for Surface Preparation and ALD
L. Shon-Roy, D. Alvarez, R. Holmes, E. Heinlein, Z. Shamsi, B. Arya, J. Spiegelman, RASIRC;
A. Kummel, T. Kaufman-Osborn, K. Kiantaj, Univ. of California San Diego

Analysis of Bi_2Te_3/Sb_2Te_3 Nanolaminate Structures Synthesized by Atomic Layer Deposition
K. Zhang, D. Nminibapiel, M. Tangirala, Old Dominion Univ.; V.S.K. Chakravadhanula, Karlsruhe Institute of Technology;
H. Baumgart, Old Dominion Univ.; V. Kochergin, MicroXact Inc.

Fast Surface FT-IR Spectroscopy during ALD
B.A. Sperling, J. Hoang, W.A. Kimes, J.E. Maslar, NIST

Diffusion of In0.53Ga0.47As Elements through Hafnium Oxide during Post Deposition Annealing
W. Cabrera, B. Brennan, H. Dong, Univ. of Texas at Dallas; T.P. O'regan, Army Research Lab; I.M. Povey,
S. Monaghan, E. O'connor, P.K. Hurley, Univ. College Cork; R.M. Wallace, Y.J. Chabal, Univ. of Texas at Dallas

Atomic Layer Deposition for the Fabrication of Large-area Microchannel Plates
A.U. Mane, Argonne National Lab; O.H.W. Siegmund, Univ. of California, Berkeley; J. Mcphate, Univ. of California;
W.G. Robert, Argonne National Lab; M.J. Wetstein, A. Elagin, Enrico Fermi Institute, Univ. of Chicago;
M.J. Minot, A. O'mahony, Incom, Inc.; H.J. Frisch, Enrico Fermi Institute; J.W. Elam, Argonne National Lab

Development of an Open-ended Rotary Reactor for Plasma-assisted ALD on Particles
J.W. Clancey, J. Yin, L. Baker, A.S. Cavanagh, S.M. George, Univ. of Colorado

Pressure Dependence of Atomic Layer Deposition on Nanoparticles in Fluidized Bed Reactors
K. Akut, A. Goulas, D. Valdesueiro, M. De_niet, M. Talebi, J.R. Van Oommen, Delft Univ. of Technology

Atomic Layer Deposition of Intrinsic ZnO for Use in $Cu(In_{1-x}Ga_x)Se_2$ Photovoltaic Cells
P.A. Hersh, HelioVolt Corp.; A.A. Dameron, M.V. Hest, D.S. Ginley, National Renewable Energy Lab; B.J. Stanbery, HelioVolt Corp.

Reference Band Assignments for Alkylamide Precursors for Elucidation of Atomic Layer Deposition Reaction Mechanisms Using In Situ Infrared Spectroscopy
B.A. Sperling, J. Hoang, J.E. Maslar, W.A. Kimes, National Institute of Standards and Technology; M.D. Halls, Schrödinger Inc.

High-throughput Quantum Chemistry and Virtual Screening for Thin Film Deposition Precursors
M.D. Halls, D.J. Giesen, A. Goldberg, T.F. Hughes, Y. Cao, Schrödinger Inc.

Atomic Layer Deposition of Cadmium Sulfide As an Emitter Layer in Thin-film Poly Crystalline Photovoltaics
K. Hurst, K. Ramanathan, National Renewable Energy Lab; D. Nordlund, T. Weng, A. Mehta, SLAC National Accelerator Lab;
R. Noufi, S. Christensen, National Renewable Energy Lab

Dual Passivation of Defects on InGaAs(001)-(2x4)
M. Edmonds, T. Kent, Univ. of California, San Diego; R. Droopad, Texas State Univ.; E. Chagarov, A. Kummel, Univ. of California, San Diego

Mitigating Surface Energies to Optimize Interfaces in ALD-Pt/C Catalysts
A.A. Dameron, J.B. Bult, S. Kocha, S.T. Christensen, J. Zack, B.S. Pivovar, K.E. Hurst, NREL

Growth Window and Characterization of PEALD ZnO Films Using Dimethyl Zinc Precursor
R.J. Nemanich, M. Kaur, X. Wang, Arizona State Univ.

Enhancement in Efficiency of CZTS Thin Film Solar Cell with ALD Grown Intrinsic ZnO Layer
T.P. Dhakal, C. Peng, D. Vanhart, Binghamton Univ.

Core-shell Photoelectrochemical Electrodes for Water Splitting by Atomic Layer Deposition
Q. Peng, Duke Univ.; P. Hoertz, A. Miller, Research Triangle Institute International; I. Cordova, J. Liu, Duke Univ.; T.J. Meyer, Univ. of North Carolina-Chapel Hill; G.N. Parsons, North Carolina State Univ.; J.T. Glass, Duke Univ.

ALD N-ZnO/P-SiC Heterojunction--Structural and Electronic Properties
M. Guziewicz, W. Jung, R. Kruszka, A. Piotrowska, J.Z. Domagala, Institute of Electron Technology; T. Krajewski, E. Guziewicz, Institute of Physics, Polish Academy of Science

Surface-reaction-limited Pulsed Chemical Vapor Deposition for Creating Three-dimensional Nanowire Architectures
X. Wang, Univ. of Wisconsin-Madison

EXAFS Analysis of ZnS/Cu2S Multi-layer Films Prepared Using ALD
L. Jewell, A. Short, A. Bielecki, A. Myers, T. Keiber, Univ. of California, Santa Cruz; J. Norman, Air Products;; F. Bridges, S.A. Carter, G. Alers, Univ. of California, Santa Cruz

Amine Catalyzed Atomic Layer Deposition of (3-mercaptopropyl)trimethoxysilane for the Production of Heterogenous Sulfonic Acid Catalysts
D.H. Jackson, D. Wang, J.M.R. Gallo, Univ. of Wisconsin - Madison; A.J. Crisci, S.L. Scott, Univ. of California, Santa Barbara; J.A. Dumesic, T.F. Kuech, Univ. of Wisconsin-Madison

Particle ALD: Equipment, Process Control and Scale-up
J. Spencer, K. Trujillo-sullivan, C. Gump, ALD NanoSolutions

Low-temperature (<200°C) PEALD TiN and Ru diffusion barrier liners for Cu interconnect and TSV applications
N. Samal, K. Chetry, H. Du, A. Hayes, F. Cerio, A. Devasahayam, Veeco

Co-Pt Core-shell Nanostructured Catalyst Prepared by Selective Chemical Vapor Pulse Deposition (CVPD) of Pt on Co As a Cathode in PEFCs
S. Seo, SKKU

Catalytic Activity of Pt/Ru Formed by Atomic Layer Deposition
Q. Takmeel, S. Moghaddam,, Univ. of Florida

Ultrathin ALD Tan Barrier Films for Sub-22nm Technologies: Challenges in Fabrication and Characterization
J. Nag, A.H. Simon, O.V.D. Straten, A. Madan, P.W. Dehaven, T.L.L. Tai, J.C. Rowland, M.A. Zaitz, S.E. Molis, R.J. Murphy, F.H. Baumann, IBM; T. Bolom, J.Y. Lee, GLOBAL FOUNDRIES, Inc.; C. Niu, STMicroelectronics, Inc.; H. Kim, Samsung Electronics Co., Ltd; X. Zhang, GLOBAL FOUNDRIES, Inc.; S.A. Krishnan, IBM.

Poster Session II

Tuesday, July 30, 2013

Posters, Exhibits, & Networking: 5:00-8:00

Low Temperature Film Properties of HfO_2 Grown with H_2O, O_3 or Remote O_2- Plasma
C. Richter, U. Schroeder, T. Mikolajick, NaMLab gGmbH

Impact of Crystal Orientation of GaAs on the Interfacial Structures and Electrical Properties of HfLaOx Films
T. Jia, X. Cheng, D. Cao, D. Xu, Z. Wang, C. Xia, Y. Yu, Shanghai Institute of Microsystem and Information Technology

The Impact of Physisorption in ALD Thin Film Growth at Reactor and Feature Scales
A. Yanguas-gil, J.W. Elam, Argonne National Lab

Thermal Chemistry of Cu(I) s-butyl Amidinate, an Atomic Layer Deposition (ALD) Precursor, on Ni and Cu Surfaces
Y. Yao, F. Zaera, Univ. of California, Riverside

Selective Chemistry for the Atomic Layer Deposition (ALD) of Alumina Oxide on Silicon Surfaces
L. Guo, X. Qin, F. Zaera, Univ. of California, Riverside

Optimized Gas Delibery System for Run/Vent Switching Applications
A. Bousetta, T. Dibiase, J. Baxter, Swagelok Company

Atomic Layer Deposition of Ag Nanoparticles: Synthesis and Characterization
S. Masango, R.P.V. Duyne, P.C. Stair, Northwestern Univ.

Antireflection Coatings and Optical Filters for High Performance Detectors
A.D. Jewell, J. Hennessy, Jet Propulsion Lab; E.T. Hamden, Columbia Univ.; T. Goodsall, T. Jones,
A. Carver, M. Hoenk, S. Nikzad, Jet Propulsion Lab

ALD with an Advanced Multi-station Sequential Deposition Platform
H. Kang, S. Swaminathan, R. Chandrasekharan, K. Leeser, A. Lavoie, Lam Research Corp.

PEALD TaSiN Films with Stable and High Resistivity
G. Wei, P. Ma, F. Gungor, D. Wu, Applied Materials

H_2O-based Atom Layer Deposition of HfO_2 on Graphene
L. Zheng, X. Cheng, Z. Wang, D. Cao, C. Xia, T. Jia, Y. Yu, Shanghai Institute of Micro-system & Information Technology

Enhanced Performance of Solid-state Dye-sensitized Solar Cells by Atomic Layer Deposited Aluminum Oxide Barrier Layer on Porous TiO_2
W. Dong, T. Meng, Q. Chen, Beijing Institute of Graphic Communication

Atomic Layer Deposition Process and Chracterization of $(GeTe_2)x(Sb_2Te_3)ySbz$ Layers for Phase Change Memories
T. Eom, T. Gwon, S.J. Yoo, Seoul National Univ.; M-S. Kim, Air Products Korea; M. Xiao, I. Buchanan,
Air Products and Chemicals, Inc.; C.S. Hwang, Seoul National Univ.

Screening Of Atomic-layer-deposited Thin Films for Cu Diffusion Barrier Applications
R.L. Puurunen, J. Salonen, A. Nurmela, O.M.E. Ylivaara, H. Viljanen, J. Molarius, P. Monnoyer, VTT; S. Yliniemi,
M. Pudas, T. Lehto, W.M. Li, Picosun

Atomic Layer Deposited TiO_2/Al_2O_3 Bilayer Gate Stacks for Gemanium pMOSFETS
L. Zhang, P.C. Mcintyre, Stanford Univ.

Atomic Layer Deposition of Manganese Borate and Cobalt Borate Thin Films Using Bis(Tris(Pyrazolyl)borate) Precursors
J.P. Klesko, C.H. Winter, Wayne State Univ.

Deposition of Copper Films by Atomic Layer Deposition Using an Amine Borane Adduct As the Reducing Agent
L.C. Kalutarage, C.H. Winter, Wayne State Univ.

Crystalline Phase Discrimination through Oxidant Selection Alone: The Low Temperature ALD of Iron Oxides
S. Riha, J. Racowski, M. Lanci, J. Klug, A. Hock, A. Martinson, Argonne National Lab

Barrier Properties of Plastic Films Coated with Al_2O_3 by Roll-to-roll ALD
W. Li, T. Hirvikorpi, R. Laine, Picosun Oy; M. Vähä-nissi, E. Salo, VTT; V. Kilpi, S. Lindfors, Picosun Oy; J. Vartiainen, E. Kenttä, J. Nikkola, A. Harlin, VTT; J. Kostamo, Picosun Oy

ALD of Indium Oxide Thin Films: Evaluation of Guanidinate Based Indium Complexes as Potential Precursors and Its ALD Characteristics
M. Gebhard, K. Xu, H. Parala, A. Devi, Inorganic Materials Chemistry

Novel Guanidinate Precursors for the ALD of Zirconium Oxide
T. Blanquart, J. Niinistö, Univ. of Helsinki; N. Aslam, Research Centre Juelich; M. Banerjee, Ruhr-Univ. Bochum; Y. Tomczak, Univ. of Helsinki; M. Gavagnin, Vienna Univ. of Technology; V. Longo, Technische Universiteit Eindhoven; H.D. Wanzenboeck, Vienna Univ. of Technology; W.M.M. Kessels, Technische Universiteit Eindhoven; A. Devi, Ruhr-Univ. Bochum; S. Hoffmann-eifert, Research Centre Juelich; M. Ritala, M. Leskela, Univ. of Helsinki

Characterization of Self-forming AlOx Layer as Cu Diffusion Barrier Using Alternative Atomic Layer Deposition
J. Park, D. Han, Y. Kang, S. Shin, J. Park, Hanyang Univ.

Insights into the Surface Chemistry of Zinc Tin Oxide ALD by Experimental and Theoretical Methods
J. Tanskanen, M. Mullings, C. Hägglund, Y. Yee, S. Bent, Stanford Univ.

Dielectric Characteristics of Phase Controlled $Hf_{1-x}ZrxO_2$ High-k Materials
J.H. Lee, I. Yu, S.Y. Lee, C.S. Hwang, Seoul National Univ.

Plasma-enhanced Atomic Layer Deposition of Nickel Nitride Films Deposited for Transistor Contact Applications
S. Bönhardt, S. Riedel, J. Sundqvist, Fraunhofer Center Nanoelectronic Technologies (IPMS-CNT)

Ultra Conformal Si Precursors for Plasma Enhanced Atomic Layer Deposition with New Chemical Structure Design
S.J. Jang, J.H. Cho, S.D. Lee, J.H. Kim, J.H. Seok, S.I. Lee, M.W. Kim, DNF Co. LTD.

XPS Analysis of AlGaN/GaN MOS-HEMT Devices with High-k Dielectrics
J.H. Woo, D. Johnson, H.R. Harris, Texas A&M Univ.

Analyses of Current Conduction Mechanism of Al2O3 Films Prepared by Thermal- and Plasma-mode Atomic Layer Deposition Methods
S.F. Chen, Y.F. Chang, C.L. Liao, C.L. Ho, M.C. Wu, National Tsing Hua Univ.

High Speed and Reliable GaN-based Green Light-emitting Diode with Gallium-doped ZnO by Atomic Layer Deposition
C.L. Liao, S.F. Chen, Y.F. Chang, C.C. Huang, W.J. Wang, C.L. Ho, M.C. Wu, Institute of Electronics Engineering; A.S. Liu, Research and Development Center

Influence of Co-reagents on the Atomic Layer Deposition of Copper and Silver Thin Films
P.R. Chalker, P.A. Marshall, S. Romani, J. Roberts, Univ. of Liverpool; S. Hindley, P.A. Williams, SAFC Hitech

Influencing Precursor Manufacturing Cost
D. Niyogi, W. Stibbs, R. Laxman, J. Guy, Digital Specialty Chemicals

The Growth Behavior and Film Properties of Conductive ALD SnOx Using Tdmasn and Hydrogen Peroxide
D. Choi, Hanyang Univ.; J. Kwon, Korea Institute of Materials Science; K. Chung, Dankook Univ.; J. Park, Hanyang Univ.

ALD Membrane Strength Measurement with a Stylus Profilometer
F. Gao, R. Puurunen, A. Laukkanen, L. Kilpi, H. Ronkainen, J. Kiihamäki, VTT Technical Research Centre of Finland

Organic-inorganic Nano-laminate Deposited by Molecular-atomic Layer Deposition (MALD) for Electronics Applications
J. Huang, M. Lee, A. Lucero, J. Kim, The Univ. of Texas at Dallas

Surface Chemistry of $MeCpMn(Co)_3$, an Atomic Layer Deposition (ALD) Precursor, Studied by X-ray Photoelectron Spectroscopy
X. Qin, H. Sun, F. Zaera, Univ. of California, Riverside

Surface Chemistry of the Atomic Layer Deposition of Copper on Chemically Deposited Manganese Films on Silicon Oxide Substrates
H. Sun, F. Zaera, Univ. of California, Riverside

Functional Cellular Bulk Materials Via Atomic Layer Deposition
M. Biener, J. Biener, T. Baumann, S. Shin, M. Wang, J. Satcher, S. Gammon, LLNL

Vibration Atomic Layer Deposition for Conformal Nanoparticle Coating
S.W. Park, J.W. Kim, H.J. Choi, J.H. Shim, Korea Univ.

Roll to Roll Spatial ALD and Ultra Barriers
M. Söderlund, Beneq Oy; B. Aitchison, Beneq Inc; P. Soininen, Beneq Oy

A New Ge Precursor for Atomic Layer Deposition of Germanium Telluride
M-S. Kim, Air Products Korea; M. Xiao, I. Buchanan, S. Ivanov, Air Products and Chemicals

Reducing Micro-defect Formation in Atomic Layer Deposited $SrTiO_3$ Films during Crystallization Annealing
W. Lee, W. Jeon, Y.W. Yoo, C.H. An, C.S. Hwang, Seoul National Univ.

Atomic Layer Deposition of Tantalum Oxide Film Using $Ta(N(C_4H_9))(C_5H_4)(N(C_2H_5)_2)_2$ and Plasma-activated H_2O
S.J. Song, Seoul National Univ.; S.W. Lee, Harvard Univ.; J.Y. Seok, J.H. Yoon, K.J. Yoon, Seoul National Univ.; C. Lansalot, C.H. Ko, Air Liquide; C.S. Hwang, Seoul National Univ.

Characteristics of High Quality TiN Film at Low Temperature Using SDPCVD System
J. Kwak, B. Cho, H. Kim, JUSUNG Engineering Co., Ltd.

Improving Step Coverage of $SrRuO_3$ Film Grown by Combining ALD SrO and CVD RuO_2 or Ru Layers
C.H. An, W. Jeon, W. Lee, Y.W. Yoo, C.S. Hwang, Seoul National Univ.

Atomic Layer Deposition of W-Si-N Thin Films Using a Silicon and Nitrogen-containing W Metallorganic Precursor and H_2 Plasma and Application to Diffusion Barrier for Cu Metallization
J. Jung, S. Kim, T. Cheon, Yeungnam Univ.; T.M. Jung, C.G. Kim, S.J. Yeo, Korea Research Institute of Chemical Technology

Atomic Layer Deposition of MoS_2 Thin Film as an Active Channel Layer of Bottom Gate Thin Film Transistor
Y. Jang, T. Cheon, S.H. Kim, Yeungnam Univ.; E.S. Kim, Samsung Advanced Institute of Technology; J.Y. Kwon, S. Yang, Yonsei Univ.

Atomic Layer Deposited ZrO_2 Films on Various Substrates with New Zr Precursor
Y.W. Yoo, W. Lee, W. Jeon, C.H. An, Seoul National Univ.; W.S. Han, UP Chemical Co., Ltd.; C.S. Hwang, Seoul National Univ.

New Si Containing Hf Precursor as High Barrier Potential for Laminated High-k Metal Gate Oxide
J.H. Cho, J.H. Kim, S.J. Yim, H.S. Shin, M.J. Han, W.M. Chae, S.D. Lee, C.Y. Ahn, J.H. Seok, S.I. Lee, M.W. Kim, DNF Co.LTD

Impact of Sulfur Passivation on GaAs MOS Capacitors Using Atomic Layer Deposited TiAlO Gate Stacks
Y. Geng, S.B. Zhu, W. Yang, P.F. Wang, Q.Q. Sun, S.J. Ding, H.L. Lu, D.W. Zhang, Fudan Univ.

Diffusion Barrier Properties of Molybdenum Nitride Thin Film Prepared by Atomic Layer Deposition
J. Park, B. Han, J. Hwang, Sejong Univ.; C. Dussarrat, Air Liquide; W. Lee, Sejong Univ.

Investigation on Charge-trapping Memory Device with $SiO_2/HfTiO/SiO_2$ Layers Grown by Atomic Layer Deposition
S.B. Zhu, Y. Geng, Y. Zhang, Q.Q. Sun, P. Zhou, S.J. Ding, H.L. Lu, D.W. Zhang, Fudan Univ.

Development of a Novel Ruthenium Precursor for Non-oxidative Thermal CVD/ALD Processes
K. Iwanaga, T. Yamamoto, H. Oike, A. Maniwa, K. Kawano, TOSOH Corp.; K. Tada, Sagami Chemical Research Institute

ALD Deposited $SrCoO_{3-\delta}$
E. Ahvenniemi, M. Matvejeff, M. Karppinen, Aalto Univ.

Plasma-enhanced Atomic Layer Deposition and Analysis of Gan Deposited from Triethyl Gallium and Ammonia Plasma
T.R. Sharp, A.K. Peter, C.J. Hodson, R. Gunn, Oxford Instruments Plasma Technology

The Sandwich Structure of Ga-doped ZnO Thin Films Grown via H_2O-, O_2-, and O_3-based ALD
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Critical Issues in the Atomic Layer Epitaxy of Sro on Si Substrates with Sr/Si Buffer Layers
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Advances Using Carbene as a Ligand in Group 11 Precursors for ALD of Copper and Gold
S.T. Barry, J.P. Coyle, Carleton Univ.; M. Pemble, D.J. Hagen, Univ. College Cork; M. Leskelä, M. Ritala,
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Structural and Electrical Properties of Zinc Oxide Films Deposited by ALD at Low Temperature
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Low-temperature (<200°C) Atomic Layer Deposition of Ruthenium Thin Films
N. Samal, K. Chetry, H. Du, R. Bubber, J. Wang, A. Hayes, A. Devasahayam, Veeco

Ruthenium Nanowires by Selective Atomic Layer Deposition
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ALD-ML of Oxide Films on Silicon Substrate
V.E. Drozd, A.P. Baraban, E.O. Filatova, I.O. Nikiforova, V. Dmitriev, V. Prokofev, A.A.G.A.A. Gadgala,
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Area Selective Molecular Layer Deposition of Polyurea Films
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Performance Improvement of ALD Based ZnO:Ga Film by Oxygen Ion Bombardment
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M.C. Wu, Institute of Electronics Engineering

Study of the Initial Surface Reactions of Tungsten Nitride Atomic Layer Deposition by In-situ Infrared Spectroscopy
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Conformal Doping Via Plasma-activated Atomic Layer Deposition
S. Swaminathan, J. Qian, A. Lavoie, Lam Research Corp.

Deposition of Tantalum-based Films Using Solution-based ALD Precursors
C. Ma, K. Kim, A. Athalye, Linde LLC

Electrical Characteristics of a Non-volatile MIM Based Memory ($Al/Al_2O_3/W$) Fabricated on Glass at 300C for BEOL Processing
J. Molina, R. Valderrama, C. Zuniga, P. Rosales, W. Calleja, A. Torres, E. Gutierrez, National Institute of Astrophysics,
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Increased Conductivity of ALD TiN Electrodes by Deposition of a Silicon Capping Layer
B. Milligan, ASM America; V. Machkaoutsan, J. Maes, ASM Belgium; F. Alokozai, M. Verghese, E. Shero, ASM America

Structure and Reactivity of Transition Metal Diazadienyl Precursors
S.D. Elliott, Tyndall National Institute

Cryogenic Single Particle Detection Enabled by High Aspect Ratio ALD of Functional Nanofilms
D. Gorelikov, N. Sullivan, P.D. Rouffignac, H. Li, J. Narayanamoorthy, A.S. Tremsin, Arradiance, Inc.

Atomic Layer Deposition of Transparent Conducting Tin and Zinc Tin Oxides Using Tetraethyltin and Ozone
E.J. Warner, F. Johnson, S.A. Campbell, W.L. Gladfelter, Univ. of Minnesota

High Surface Area /High Aspect Ratio ALD Process Optimization Using Anodic Aluminum Oxide
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Patterned Atomic Layer Deposition of TiO_2 on Silicon Surfaces
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Investigation of the Growth Mechanism of Al_2O_3-ALD on Silver Surfaces
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Characterizing Metalorganic Precursor Consumption Efficiency Using In Situ Gas Phase Diagnostics
J.E. Maslar, W.A. Kimes, B.A. Sperling, NIST

Mechanistic Understanding of Atomic Layer Deposition of Silicon Nitride by In-situ Characterization
A. Vega, The Univ. of Texas at Dallas; M. Boleslawski, R. Novak, Nova-Kem, Seward, IL, USA; Y.J. Chabal, The Univ. of Texas at Dallas

Improved Growth of Atmospheric Pressure ALD Using a Novel Ozone/Water Exposure Step
M.M. Mousa, C.J. Oldham, G.N. Parsons, North Carolina State Univ.

Permeation Half-life Control with Plastic Ablator Capsules for ICF Experiments
M. Schoff, D. Steinman, General Atomics; A. Alberti, Purdue Univ.; H. Huang, A. Nikroo, General Atomics

Interface Electronic State Characterization of Remote PEALD Dielectric/AlGaN/GaN Structures
B. Eller, J. Yang, R.J. Nemanich, Arizona State Univ.

Atomic Layer Deposition of Silicon Nitride Films Using Silicon Chlorides and Ammonia
S. Woo, H. Lee, L. Yusup, B. Han, Sejong Univ.; W. Koh, UP Chemical Co. Ltd.; W. Lee, Sejong Univ.

Atomic Layer Deposition of Gate Oxides: Precursor Consumption and Oxide Quality
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Time Dependent Precursor Quality Variation of Liquid $CpZr(DMA)_3$ and Its ALD-ZrO_2 Film
S. Seong, Y. Jung, M. Lee, I. Park, Hanyang Univ.; J. Yun, J. An, J. Kim, Korea Research Institute of Standards and Science; J. Ahn, Hanyang Univ.

Growth and Characterization of Radical Enhanced Atomic Layer Deposited Aluminum Nitride Films
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Effect of Oxidant and Deposition Temperature on ALD Iron Oxide
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In-situ Electrical Studies of Atomic Layer Deposition of Dielectrics on Thin MoS_2 Layers
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In-situ Electrical Monitoring of ALD Deposited Dielectrics on Graphene
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Atomic Layer Deposition of High-quality $(Ti,Nb)O_2$ Thin Films from $TiCl_4$, $Nb(OEt)_5$ and H_2O Precursors
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Recent Development of ALD Processes for Metallization
W-M. Li, Piscosun Oy

Low Resistive Pure Ni ALD Precursor
C. Lansalot-matras, Air Liquide Labs Korea; J. Gatineau, Air Liquide Asia Pacific; J. Yokota, C. Ko, Air Liquide Labs

Development of Ag Metallization Using ALD TiN Diffusion Barrier
C-W. Ho, R-J. Chung, C-A. Jong, National Nano Device Labs

Effects of In-situ Hydrogen Plasma Treatment on ZnO ALD Films Grown by Using Water at Low Temperature of 100^oC
J. Kwon, K. Nam, J. Park, Korea Institute of Materials Science

Atomic Layer Deposited Aluminum Oxide Barrier Coatings for Encapsulation of Plastics-based Polymer Solar Cells
Q. Lei, C. Zhang, L. Sang, Q. Chen, Beijing Institute of Graphic Communication

High Performance OLED Encapsulation at Low Temperature Using Organic-inorganic Hybrid Thin Film
S.J. Kim, K.S. Han, K.H. Yoon, M.M. Sung, Hanyang Univ.

Zn- and Ti-containing Inorganic-organic Hybrid Thin Films Based on Amines
P. Sundberg, A. Sood, M. Karppinen, Aalto Univ.

Comparative Studies of Thermal and Plasma Enhanced Atomic Layer Deposited Al_2O_3-films by XPS, UV-VIS and MIR Ellipsometry
H. Gargouri, F. Naumann, B. Gruska, M. Arens, J. Haeberle, M. Tallarida, K. Henkel, D. Schmeiber, BTU Cottbus

Transparent Conductive Hf- and Zr-doped ZnO Gas-permeation Barriers by Atomic Layer Deposition
C. Chou, P. Yu, M. Tseng, C. Hsu, F. Tsai, J. Shyue, C. Wang, National Taiwan Univ.

Radio Frequency Plasma Power Dependence on the Moisture Permeation Barrier Characteristics of Al_2O_3 Films Deposited by Remote Plasma Atomic Layer Deposition
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Composition and Trace Metal Analysis of Zinc Telluride Thin Films
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