Monday September 3, 2018

09:00-09:10  Welcome Remarks

Plenary  Chair : K.K.S. Lau
Drexel University, USA
09:10-09:50  Mo-PL-1 Invited
Current status of Cat-CVD technology
- history of research and current status of industrial implementation -
H. Matsumura
Japan Advanced Institute of Science and Technology (JAIST), Japan

Keynote I  Chair : K.K.S. Lau
Drexel University, USA
09:50-10:30  Mo-KE-1 Invited
Hot-wire CVD developments and applications
L. Schäfer
Fraunhofer Institute for Surface Engineering and Thin Films IST, Germany

10:30-10:50  Coffee break

Special Tutorial  Chair : H. Horibe
Osaka City University, Japan
10:50-11:30  Mo-ST-1 Invited
Detection of molecular radical species in catalytic and initiated chemical vapor deposition processes
H. Umemoto
Shizuoka University, Osaka City University, Japan

11:30-13:00  Lunch

Fundamentals  Chair : K. Ohdaira
Japan Advanced Institute of Science and Technology (JAIST), Japan
13:00-13:40  Mo-O1-1 Invited
Modeling of chemical vapor deposition reactions and processes
M. Kawase
Kyoto University, Japan

13:40-14:00  Mo-O1-2  No shown
A computational model for n-butyl acrylate film deposition in initiated chemical vapor deposition process
S. Ates*, O. Ebil
*Izmir Institute of Technology, Turkey

14:00-14:20  Mo-O1-3
Decomposition of hexamethyldisilazane on a hot tungsten filament and gas-phase reactions in a hot-wire chemical vapor deposition reactor
E. Ampong, Y. Shi*
*University of Calgary, Canada

14:20-14:40  Mo-O1-4
Surface reactions on the metal catalysts with ethane and four-membered-ring organosilicon molecules
Y. Shi
University of Calgary, Canada

14:40-15:00  Coffee break
Processes I
Chair: A.Y. Kovalgin
University of Twente, Netherlands

15:00-15:40 Mo-O2-1 Invited
The highs and lows of iCVD
K.K.S. Lau
Drexel University, USA

15:40-16:00 Mo-O2-2
Deposition of polymer films onto moving substrates
C. Cheng*, M. Gupta
*University of Southern California, USA

16:00-16:20 Mo-O2-3 Withdrawn
Polymeric thin film fabrication via initiated chemical vapor deposition for protection of optical surfaces
M. Ozpirin*, O. Ebil
*Izmir Institute of Technology, Turkey

Applications I
Chair: Y. Katamune
Kyushu Institute of Technology, Japan

16:20-17:00 Mo-O3-1 Invited
Various applications of hot-wire chemical vapor deposition to solar-cell fabrication technologies
A. Masuda
National Institute of Advanced Industrial Science and Technology (AIST), Japan

17:30-19:30 Social

Tuesday September 4, 2018

Processes II
Chair: Y. Shi
University of Calgary, Canada

09:00-09:40 Tu-O1-1 Invited
Hotwire-assisted atomic layer deposition: principles and examples
A.Y. Kovalgin
University of Twente, Netherlands

09:40-10:00 Tu-O1-2
Selective coating of nanostructures in normal pressure and temperature based on surface curvature
V.A. Lovikka*, M. Leskelä
*University of Helsinki, Finland

10:00-10:20 Tu-O1-3
A simplest Cat-CVD apparatus without direct substrate heating system
*Japan Advanced Institute of Science and Technology (JAIST), Japan

10:20-10:40 Tu-O1-4
How hot is the wire: optical, electrical and combined methods of filament temperature determination
A.J. Onnink*, A.Y. Kovalgin, J. Schmitz
*University of Twente, Netherlands

10:40-11:00 Coffee break

Processes III
Chair: S. Ohmagari
National Institute of Advanced Industrial Science and Technology (AIST), Japan

11:00-11:40 Tu-O2-1 Invited
Leading role of HWCVD for diamond and related thin films and coating materials: from advanced instrumentation, industrial applications to future devices
R.D. Vispute
Blue Wave Semiconductors, Inc., USA
Charge effect on diamond nanoparticles generated in gas phase in hot filament chemical vapor deposition.
H.Y. Kim*, B.-K. Song, K.-S. Kim, N.-M. Hwang
*Seoul National University, Korea

Withdrawn
Hot wire chemical vapour deposition aided growth of nano-graphene at low substrate temperature
S. Ramakrishna, R.O. Dusane
*Indian Institute of Technology Bombay, India

Materials I
Chair: M. Sato
Kitami Institute of Technology, Japan

13:40-14:20 Invited Tu-O3-1 Transfer-free 4-inch-scale high-quality monolayer graphene synthesis on Ti-buffered substrates
*Chungnam National University, Korea

14:20-14:40 Tu-O3-2 Low-temperature formation of nanographene on Cu substrate using pentacene
A. Heya*, N. Matsuo
*University of Hyogo, Japan

14:40-15:00 Coffee break

Materials II
Chair: A. Heya
University of Hyogo, Japan

15:00-15:20 Tu-O4-1 Growth of graphene on non-catalytic substrate by the vapor pressure of catalytic metal
J. Baek*, J. Kim, J. Kim, T. Suh, B. Shin, S. Jeon
*Korea Advanced Institute of Science and Technology (KAIST), Korea

15:20-15:40 Tu-O4-2 High quality and monolayer graphene synthesized directly at 150 °C via chemical vapor deposition without transfer process
B.-J. Park, S.-G. Yoon*
*Chungnam National University, Korea

15:40-16:00 Tu-O4-3 Synthesis of vertically aligned carbon nanoflakes by hot wire chemical vapor deposition: influence of process pressure and substrate temperature
M. Singh, H.S. Jha, P. Agarwal
*Indian Institute of Technology Guwahati, India

16:00-16:20 Coffee break

16:20-18:00 Poster session

Wednesday September 5, 2018

Materials III
Chair: K. Yasui
Nagasaki University of Technology, Japan

09:40-10:20 Invited We-O1-1 Transparent passivated contact and phosphorous catalytic-doping for crystalline silicon solar cells
M. Pomaska*, Y. Liu, F. Komoll, A. Lambertz, W. Duan, H. Li, D. Qiu, M. Köhler, F. Finger, U. Rau, K. Ding
*Forschungszentrum Juelich, Germany
We-O1-2  Withdrawn
Effect of filament temperature on optoelectronic properties of hydrogenated microcrystalline silicon thin films deposited by HWCVD
S. Shende, N. Wadibhasme, S.V. Ghaisas, R.O. Dusane
Indian Institute of Technology Bombay, India

We-O1-3  Withdrawn
Hot wire CVD driven silicon nanowire growth below eutectic temperature using Sn nanotemplate
N. Meshram*, A. Kumbhar, R.O. Dusane
*Indian Institute of Technology Bombay, India

10:20-10:40  We-O1-4  Silicon carbide charged nanoparticles generated during a hot filament chemical vapor deposition
D.-Y. Kim*, D. Kim, J.H. Kwon, N.-M. Hwang
*Seoul National University, Korea

10:40-11:00  Coffee break

Materials IV  Chair: S.-G. Yoon
Chungnam National University, Korea

11:00-11:20  We-O2-1  Large reduction of threading dislocation in diamond by hot-filament CVD
National Institute of Advanced Industrial Science and Technology (AIST), Japan

11:20-11:40  We-O2-2  Surface morphology of homoepitaxial diamond grown by hot-filament CVD using organic phosphorus solutions.
Y. Katamune*, D. Arikawa, D. Mori, A. Izumi
*Kyushu Institute of Technology, Japan

11:40-12:00  We-O2-3  Synthesis and characterization of diamond capsules for direct-drive inertial confinement fusion
*Osaka University, Japan

12:00-12:20  We-O2-4  Nitrogen doping of ZnO films using Ir hot-wire in catalytic reaction-assisted CVD
*Nagoya University of Technology, Japan

12:20-14:00  Lunch

Applications II  Chair: M. Pomaska
Forschungszentrum Juelich, Germany

14:00-14:20  We-O3-1  Conformal deposition of thin film silicon solar cells with ultrathin photoabsorbers on nanostructured surfaces
R.E.I. Schropp*, L.W. Veldhuizen, Y. Kuang
* University of the Western Cape, South Africa

We-O3-2  Withdrawn
Development of silicon based thin film solar cells using HWCVD on low cost mild steel substrates
N.A. Wadibhasme, P.K. Bijalwan, A. Chikhalkar, M. Agarwal, M. Dutta, R.O. Dusane*
*Indian Institute of Technology Bombay, India
Applications III  Chair: M. Pomaska  
Forschungszentrum Juelich, Germany  
14:20-14:40  We-O4-1  Conversion of conduction type of Cat-CVD p-type a-Si by ion implantation  
*Japan Advanced Institute of Science and Technology (JAIST), Japan  

14:40-15:00  We-O4-2  Withdrawn  
A novel processing method to pattern hot wire chemical deposited a-Si:H for application in pressure sensing device  
V. Pandey, M.P. Gururajan, R.O. Dusane  
*Indian Institute of Technology Bombay, Ujjain Engineering College, India  

15:00-15:20  We-O4-3  Chemical vapor deposition of ultra-thin functional polymer layers for the development of advanced biosensors & microfluidic devices  
C. Neikirk*, Y. Melnik, P. Narwankar  
*Applied Materials, USA  

16:30-  Field trip & Banquet  

Thursday September 6, 2018  

Keynote II  Chair: R.E.I. Schropp  
University of the Western Cape, South Africa  
09:00-09:40  Th-KE-1  Invited  
HW/CAT-CVD for high performance crystalline silicon heterojunction solar cells  
Q. Wang  
Jinko Solar, China  

Applications IV  Chair: R.E.I. Schropp  
University of the Western Cape, South Africa  
Th-O1-1  Withdrawn  
Optimization of boron doped hydrogenated amorphous Si layers prepared by hot wire CVD technique for n type crystalline Si heterojunction solar cells  
A. Mandal, N. Wadibhasme, A. Kumbhar, S.V. Ghaisas, R.O. Dusane*  
*Indian Institute of Technology Bombay, India  

10:00-10:20  Th-O1-2  Annealing behavior of Cat-CVD p-type a-Si for c-Si surface passivation and its superiority over PECVD counterparts  
H.T.C. Tu*, K. Ohdaira, H. Matsumura  
*Japan Advanced Institute of Science and Technology (JAIST), Japan  

10:20-10:40  Coffee break  

Applications V  Chair: K. Shimizu  
Nihon University, Japan  
10:40-11:00  Th-O2-1  Excellent passivation quality of MPAT crystalline silicon textures for solar cells by using proper chemical cleaning and Cat-CVD SiNx/a-Si stacked layers  
C.T. Nguyen*, K. Ohdaira, H. Matsumura  
*Japan Advanced Institute of Science and Technology (JAIST), Japan  

11:00-11:20  Th-O2-2  Improvement in the passivation quality of Cat-CVD SiNx films on crystalline Si at room temperature  
J. Miyaura, K. Ohdaira*  
*Japan Advanced Institute of Science and Technology (JAIST), Japan
11:20-11:40  Th-O2-3  **Tunnel oxide passivated contact for crystalline silicon solar cells using hot-wire chemical vapor deposition**  
*Forschungszentrum Jülich, Germany

11:40-12:00  Closing Remarks
10th International Conference on Hot Wire (Cat) & Initiated Chemical Vapor Deposition (HWCVD10)

Poster session

Tuesday September 4, 2018 16:20-18:00

Tu·P-01 Oxygen additive effects on decomposition rate of poly(vinyl phenol)-based polymers using hydrogen radicals produced by a tungsten hot-wire catalyst
M. Yamamoto*, S. Nagaoka, K. Ohdaira, H. Umemoto, H. Horibe
*National Institute of Technology, Kagawa College, Japan

Tu·P-02 Removal of carbon contamination on easily-oxidizable-metal coated mirrors for synchrotron radiation beamline using atomic hydrogen
M. Niibe*, T. Harada, A. Heya, T. Watanabe, N. Matsuo
*University of Hyogo, Japan

Tu·P-03 Role of chamber pressure on crystallinity and composition of silicon films using silane and methane as precursors in HWCVD technique
R. Madaka, J. Kumari, V. Kanneboina, H.S. Jha, P. Agarwal*
*Indian Institute of Technology Guwahati, India

Tu·P-04 In situ cleaning of silicon substrate by atomic hydrogen and argon and its application for solar cells
Y. Someya*, K. Shimizu
*Nihon University, Japan

Tu·P-05 Passivation of crystalline silicon surfaces with a few μm-sized pyramids by Cat-CVD silicon nitride films
J. Liu, Y. Wen*, N. Ooyagi, Y. Yamamoto, K. Ohdaira
*Japan Advanced Institute of Science and Technology (JAIST), Japan

Tu·P-06 Influence of ITO sputtering on the performance of silicon heterojunction solar cells with Cat-CVD amorphous silicon films
T. Konishi, K. Ohdaira*
*Japan Advanced Institute of Science and Technology (JAIST), Japan

Tu·P-07 Large area HWCVD processes for Si heterojunction solar cells
O. Astakhov, M. Justianto, T. Harig, M. Höfer, V. Sittinger, K. Ding*
*Forschungszentrum Jülich GmbH, Germaney

Tu·P-08 HWCVD for silicon photonics: a new industrial application
*University of Southampton, UK

Tu·P-09 Growth of highly nanocrystalline cubic silicon carbide (3C-SiC) thin films prepared by hot wire chemical vapor deposition technique
H.S. Jha*, P. Agarwal
*Indian Institute of Technology Guwahati, India, Gifu University, Japan

Tu·P-10 Substrate temperature dependence of SiO$_2$ layer formed on Si(100) by H$_2$O/H$_2$ decomposed species
S. Tahara*, K. Fukushima, Y. Katamune, A. Izumi
*Kyushu Institute of Technology, Japan
Tu·P-11  Evaluation of composition and electrical characteristics of SiOCN thin films deposited by HWCVD
M. Matsumoto*, H. Tsutsui, Y. Katamune, A. Izumi
*Kyushu Institute of Technology, Japan

Tu·P-12  Evaluation of corrosion resistance of SiOCN film by HWCVD method
K. Fukushima*, S. Tahara, Y. Katamune, A. Izumi
*Kyushu Institute of Technology, Japan

Tu·P-13  Cu diffusion properties of SiCN films deposited by hot-wire chemical vapor deposition
H. Tsutsui*, S. Hayashida, Y. Katamune, A. Izumi
*Kyushu Institute of Technology, Japan

Tu·P-14  Preparation of ZrO$_2$N$_x$ film at low temperatures by reactive sputtering assisted by hot-wire
M. Sato*, H. Kitada, M.B. Takeyama
*Kitami Institute of Technology, Japan

Tu·P-15  Hot-wire hydrogenation for In-Sn-Zn-O and improvement of the TFT reliability
T. Yanagisawa*, Y. Someya, K. Shimizu
*Nihon University, Japan

Tu·P-16  Investigation of diamond growth on SiCN films deposited by hot wire CVD
F. Morishita*, Y. Katamune, A. Izumi
*Kyushu Institute of Technology, Japan

Tu·P-17  Micro-sized diamond growth using organic phosphorus solution by hot filament chemical vapor deposition
D. Arikawa*, D. Mori, Y. Katamune, A. Izumi
*Kyushu Institute of Technology, Japan

Tu·P-18  Structural evaluation of polycrystalline diamond films grown by hot filament CVD using organic phosphorus solutions
D. Mori*, D. Arikawa, Y. Katamune, A. Izumi
*Kyushu Institute of Technology, Japan

Tu·P-19  Thermally stable diamond resistors fabricated by hot-filament CVD accompanying metal masks
S. Suzuki*, S. Ohmagari, H. Kawashima, H. Umezawa
*National Institute of Advanced Industrial Science and Technology (AIST), Japan

Tu·P-20  Change in optical transmittance of carbon nanowall by oxygen plasma treatment
*Gifu University, Japan

Tu·P-21  Investigation for large area deposition of carbon nanowall by hot-wire chemical vapor deposition
*Gifu University, Japan

Tu·P-22  Semiconducting properties of nitrogen doped-graphene by in-situ synthesis at 150 °C
Y.-Han*, B.-J. Park, M.-W. Nam, S.-G. Yoon
*Chungnam National University, Korea