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Third Edition

ICPST-33

Scientific Program

**The 33rd International Conference
of
Photopolymer Science and Technology
Materials & Processes
for
Advanced Microlithography, Nanotechnology
and Phototechnology**

June 22-24, 2016

International Conference Hall
Makuhari Messe, Chiba, Japan
(5 minutes walk from JR Kaihin Makuhari Station)

Sponsored and Organized by
The Society of Photopolymer Science and Technology (SPST)

*In Cooperation with
Chiba University*

The Technical Association of Photopolymer, Japan

The Japan Society of Applied Physics

The Chemical Society of Japan

The Society of Polymer Science, Japan

International Conference Schedule

June 21(Tuesday) Registration 15:00-17:00 (Room D)

	June 22 Wednesday	June 23 Thursday	June 24 Friday
Lobby	Registration 9:00-17:00	Registration 9:00-17:00	Registration 9:00-15:00
Room A	193 nm Lithography Extension EB Lithography, Next Generation Lithography and Nanotechnology Chemistry for Advanced Photopolymer Science p.3	Directed Self Assembly (DSA) Computational / Analysis Approach For Lithography PST Award Ceremony p.7	Computational / Analysis Approach For Lithography EUV Lithography p.12
Room B	Nanoimprint Lithography Panel Symposium p.5	Advanced Materials for Photonics / Electronic Device and Technology Advanced 3D Packaging Photopolymers in 3-D Printing/Additive Manufacturing p.10	Next Generation MEMS Nanobiotechnology p.14
Room C	ポリイミド及び 高温耐熱樹脂- 機能化と応用 Japanese Symposium: Polyimides and High Temperature Polymers -Functionalization and Practical Applications- p.17	プラズマ光化学 と高分子表面 機能化 Japanese Symposium: Plasma Photochemistry and Functionalization of Polymer Surface p.20	Organic Solar Cells – Materials, Device Physics, and Processes p.16
Room D	光機能性デバイス材料 Japanese Symposium: Photofunctional Materials for Electronic Devices p.18		一般講演 Japanese Symposium: General Scopes of Photopolymer Science and Technology レジスト除去技術 Japanese Symposium: Resist Removal Technology p.21

June 22, Wednesday

Room A (Room 301)

English Symposia: Materials & Processes for Advanced Microlithography, Nanotechnology and Phototechnology

Opening Session

10:00-10:15 Chairperson: Haruyuki Okamura, Osaka Pref. Univ.

Opening Remarks

Minoru Tsuda, President of the Society of Photopolymer Science & Technology (SPST)

Overview of Scientific Program ICPST-33

Masayuki Endo, Chairperson of the Program Committee ICPST-33

193 nm Lithography Extension

10:15-11:35 Chairpersons: Wang Yueh, Intel and Yoshio Kawai, Shin-Etsu Chemical

A-01 Novel Approaches to Extend 193nm Immersion Technology to Advanced Device Nodes

James Cameron, Dow Electronic Materials

A-02 Development of Materials-based Pitch Split Process

Yoichi Hori, Ryoji Watanabe, Rikita Tsunoda, Takayoshi Mori, Hiroaki Shimizu, and Akiyoshi Yamazaki, Tokyo Ohka Kogyo

A-03 Spin-on Metal Oxides and Their Applications for Next Generation Lithography

Huirong Yao (1), Salem Mullen (1), Elizabeth Wolfer (1), Douglas Mckenzie (1), Alberto Dioses (1), Dalil Rahman (1), Joon Yeon Cho (1), Munirathna Padmanaban (1), Claire Petermann (2), and SungEun Hong (2), Geert Mannaert (3), Toby Hopf (3), Danilo De Simone (3), Diziana Vangoidsenhoven (3), Christophe Lorant (3), Farid Sebaai (3), Efraín Altamirano Sanchez (3), (1) EMD Performance Material, (2) Merck Performance Materials, (3) IMEC

A-04 Development of spin-on metal oxide hardmask for ArF extension

Shunsuke Kunita (1), Tatsuya Sakai (1), Yoshio Takimoto (1), Motoyuki Shima (1), and Tooru Kimura (2), (1) Semiconductor Materials Laboratory, Fine Electronic Materials Research Laboratories, JSR, (2) Fine Electronic Materials Research Laboratories, JSR

11:35-11:40 Break

11:40-13:20 Chairpersons: Wang Yueh, Intel and Yoshio Kawai, Shin-Etsu Chemical

A-05 New Approach for ArFi Extension by Dry Development Rinse Process

Wataru Shibayama, Shuhei Shigaki, Satoshi Takeda, Ryuji Onishi, Makoto Nakajima, and Rikimaru Sakamoto, Nissan Chemical Industries

A-06 Extension of 193nm lithography by chemical shrink process

Takashi Sekito, Yuriko Matsuura, Tatsuro Nagahara, Merck Performance Materials Manufacturing

A-07 Challenges for Immersion Lithography Extension based on Negative Tone Imaging (NTI) Process

Michihiro Shirakawa, Keita Kato, Hajime Furutani, Hideaki Tsubaki, FUJIFILM

EB Lithography, Next Generation Lithography and Nanotechnology

A-08 Electron-Beam Induced Shrinkage Effects on Line-Space Patterns of ZEP Resist

Cong Que Dinh (1), Akihiro Oshima (1,2), Shigehiro Nishijima (1), and Seiichi Tagawa (1,2), (1) Graduate School of Engineering, Osaka University, (2) The Institute of Scientific and Industrial Research, Osaka University

A-09 Unique Characteristics of a Metal-Containing Film

Stephanie Dilocker, Scott Mullane, and Akshay Kumar, Purelight Labs

13:20-13:30 Break

Chemistry for Advanced Photopolymer Science

13:30-14:35 Chairpersons: Xavier Allonas, University of Haute Alsace and Yasuo Norikane, National Institute of Advanced Industrial Science and Technology (AIST)

Keynote Lecture A-10 New Photochemical Processes for Macromolecular Syntheses and Lithography
Gorkem Yilmaz (1) and OYusuf Yagci (1,2), (1) King Abdulaziz University, (2) Istanbul Technical University

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June 22, Wednesday

Room A (Room 301)

English Symposia: Materials & Processes for Advanced Microlithography, Nanotechnology and Phototechnology

A-11 UV Curable Formulations for UV-C LEDs

Haruyuki Okamura (1), Shoich Niizeki (2), Tetsumi Ochi (2), and Akikazu Matsumoto (1), (1) Osaka Prefecture University, (2) Nikkiso Giken

14:35-14:40 Break

14:40-15:40 Chairpersons: Yusuf Yagci, Istanbul Technical University and Ken'ich Aoki, Tokyo University of Science

A-12 Rheological Investigation of Gel Time and Shrinkage in Organic/inorganic UV Curable Films

M.M.R. Nayini (1), S. Bastani (1,2), S. Moradian (2), C. Croutxé-Barghom (3), and O.X. Allonas (3), (1) Institute for Color Science and Technology, Tehran, (2) Center of Excellence for Color Science and Technology, Tehran, (3) University of Haute Alsace

A-13 Advances of Near Infrared Sensitized Radical and Cationic Photopolymerization: from Graphic Industry to Traditional Coatings

Bernd Strehmel (1), Thomas Brömme (1), and Christian Schmitz (1), Annett Halbhuber (1), Dennis Oprych (1), and Jochen S. Gutmann (2), (1) Niederrhein University of Applied Sciences, (2) University of Duisburg-Essen

A-14 Photopolymerization of Functionalized Monomers Derived from Oleic Acid

Sebastian Walther (1), Nadine Strehmel (2), Matthias Schlörholz (3), Bernd Strehmel (1), and Veronika Strehmel (1), (1) Niederrhein University of Applied Sciences, (2) Leibniz Institute of Plant Biochemistry, (3) Heidelberger Druckmaschinen AG

15:40-15:45 Break

15:45-16:45 Chairpersons: Bernd Strehmel, Niederrhein University of Applied Sciences and Haruyuki Okamura, Osaka Prefecture University

A-15 Photopolymerization Kinetics of Different Chain Size of Bi-functional Acrylic Monomers using Real Time FT-IR

Kentaro Taki (1)*, Takehiro Taguchi (2), Ryota Hayashi (1), and Hiroshi Ito (2), (1) Kanazawa University, (2) Yamagata University

A-16 Photo-induced Polymerization and Degradation of Formulations Containing Photolabile Crosslinkers Monitored in a Rheometer

Hideki Tachi (1) and Kanji Suyama (2), (1) Technology Research Institute of Osaka Prefecture, (2) Osaka Prefecture University

A-17 Synthesis of Polynorborne Dendrimers to Apply to Thiol-ene Photopolymers with Excellent Photosensitivity

Ryota Imanishi (1) and Ken'ichi Aoki (1,2), (1) Graduate School of Chemical Sciences and Technology, Tokyo University of Science, (2) Department of Chemistry, Faculty of Science, Tokyo University of Science

16:45-16:50 Break

16:50-17:50 Chairpersons: Kentaro Taki, Kanazawa University and Haruyuki Okamura, Osaka Prefecture University

A-18 Study on Radical Photo-Polymerization of Negative-Tone Acrylic Resist for High Resolution Patterning

Yukiko Muramatsu, Hitachi Chemical

A-19 Photoalignment control of photopolymer stabilized liquid crystal systems

Atsushi Shishido and Kyohei Hisano, Tokyo Institute of Technology

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June 22, Wednesday

Room A (Room 301)

English Symposia: Materials & Processes for Advanced Microlithography, Nanotechnology and Phototechnology

A-20 Photoinduced Phase Transitions in Rod-shaped Azobenzene with Different Alkyl Chain Length

Yasuo Norikane (1), Emi Uchida (1), Satoko Tanaka (1), Kyoko Fujiwara (1), Hideki Nagai (2), and Haruhisa Akiyama (3), (1) Electronics and Photonics Research Institute, National Institute of Advanced Industrial Science and Technology (AIST), (2) Research Institute for Measurement and Analytical Instrumentation, National Institute of Advanced Industrial Science and Technology (AIST), (3) Research Institute for Sustainable Chemistry, National Institute of Advanced Industrial Science and Technology (AIST)

17:50-18:00 Break

**18:00-20:00 Panel Symposium in English: “Nanoimprint Lithography and the Related Chemistry”
at Room B (Room 302)**

June 22, Wednesday

Room B (Room 302)

English Symposia: Materials & Processes for Advanced Microlithography, Nanotechnology and Phototechnology

Nanoimprint Lithography

12:30-14:45 Chairpersons: Yoshihiko Hirai, Osaka Prefecture University and Jun Taniguchi, Tokyo University of Science

Keynote Lecture A-21 Nanoimprint System for High Volume Semiconductor Manufacturing; Requirement for Resist Materials

Toshiki Ito (1), Keiji Emoto (1), Tsuneo Takashima (1), Keita Sakai (1), Weijun Liu (2), James DeYoung (2), Zhengmao Ye (2), and Dwayne LaBrake (2), (1) Canon, (2) Canon Nanotechnologies

Keynote Lecture A-22 Design of Release Interface for UV-NIL Material

Kazuyuki Usuki and Yuichirou Goto, FUJIFILM

Keynote Lecture A-23 Development of Enlarged Nanoimprinting Mold by Step and Repeat Process

Yasuo Suto, Yukihiko Miyazawa, and Takahide Mizawa, Soken Chemical & Engineering

14:45-14:55 Break

14:55-16:15 Chairpersons: Qing Wang, Shandong University of Science and Technology and Shigeru Kubota, Yamagata University

A-24 Ultraviolet Nanoimprint Lithography in the Mixture of Condensable Gases with Different Vapor Pressures

Kenta Suzuki, Sung-Won Youn, and Hiroshi Hiroshima, National Institute of Advanced Industrial Science and Technology

A-25 Development of Nanoimprint Lithography Template Materials using Biomass

Shinya Nakajima (1), Satoshi Takei (1), Ziqi Zhou (1), Hirotaka Maki (1), Kigen Sugahara (1), Makoto Hanabata (1), Yoko Matsumoto (2), and Atsushi Sekiguchi (2), (1) Toyama Prefectural University, (2) Litho Tech Japan

A-26 Effects of Adhesion Force of Mold Surface on Imprinted Polymer Deformation

Qing Wang (1,2), Lijun Ma (1,2), Rui Zhang (1,2), Tong Zheng (1,2) and Xu Zheng (1,2), (1) Shandong University of Science and Technology, (2) Shandong Provincial Key Laboratory of Civil Engineering Disaster Prevention and Mitigation

A-27 Anisotropic Oxygen Reactive Ion Etching for Removing Residual Layers from 45 nm-width Imprint Patterns

Takuya Uehara (1), Shoichi Kubo (2), Nobuya Hiroshiba (1), and Masaru Nakagawa (1), (1)Tohoku University, (2) National Institute for Materials Science

16:15-16:25 Break

16:25-17:50 Chairpersons: Jun Taniguchi, Tokyo University of Science and Hiroaki Kawata, Osaka Prefecture University

A-28 FDTD Analysis for Light Passing Through Glass Substrate and Its Application to Organic Photovoltaics with Moth Eye Antireflection Coating [Invited] (25 min.)

Shigeru Kubota (1), Kensaku Kanomata (1), Bashir Ahmmad (1), Jun Mizuno (2), and Fumihiko Hirose (1), (1) Yamagata University, (2) Waseda University

A-29 Impact of Wafer Deformation on Pattern Fabrication for Thermal Nanoimprint Lithography

Hiroaki Kawata, Masaaki Yasuda, and Yoshihiko Hirai, Osaka Prefecture University

A-30 Metallic Color Filter Fabrication using Photo-curable Polymer Stacking

Jun Taniguchi and Takahiro Tsuji, Tokyo University of Science

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June 22, Wednesday

Room B (Room 302)

English Symposia: Materials & Processes for Advanced Microlithography, Nanotechnology and Phototechnology

A-31 Study on Induced Stress and Strain in Direct Nanoimprint Lithography

Tastuya Iida, Masaaki Yasuda, Hiroaki Kawata, and Yoshihiko Hirai, Osaka Prefecture University

17:50-18:00 Break

***Panel Symposium in English: Nanoimprint Lithography and the Related Chemistry ***

18:00-20:00 Chairpersons: Yoshihiko Hirai and Haruyuki Okamura, Osaka Pref. University

Panel Symposium: “Nanoimprint Lithography and the Related Chemistry”

What is the current state of the art for nanoimprint lithography?

What are the current and future applications of nanoimprint lithography?

Let's go to the fantastic voyage in the field of nanoimprint lithography.

Panelist:

Toshiki Ito, Canon

**“Nanoimprint System for High Volume Semiconductor Manufacturing;
Requirement for Resist Materials”**

Kazuyuki Usuki, FUJIFILM

“Resist materials for UV nanoimprint lithography”

Takahide Mizawa, Soken Chemical

“Development of Enlarged Nanoimprinting Mold by Step and Repeat Process”

Yoshinobu Tsujii, Kyoto Univ.

“Precision Surface Modification by Concentrated Polymer Brushes”

June 23, Thursday

Room A (Room 301)

English Symposia: Materials & Processes for Advanced Microlithography, Nanotechnology and Phototechnology

Directed Self Assembly (DSA)

9:00-10:45 Chairpersons: Paul F. Nealey, University of Chicago and Seiji Nagahara, Tokyo Electron

Keynote Lecture A-32 Directed Self-Assembly of Block Copolymer Thin Films on Chemically Modified Graphene
Hyeong Min Jin, Joo Young Kim, and Sang Ouk Kim, Korea Advanced Institute of Science and Technology (KAIST)

A-33 Fabrication of Half Pitch Sub-10 nm Metal Wire Circuits using Directed Self-Assembly of Block Copolymers [Invited]

T. Azuma, Y. Seino, H. Sato, Y. Kasahara, K. Kobayashi, H. Kubota, H. Kanai, K. Kodera, N. Kihara, Y. Kawamonzen, S. Minegishi, K. Miyagi, H. Yamano, T. Tobana, M. Shiraishi, and S. Nomura, EUVL Infrastructure Development Center (EIDEC)

A-34 DSA as Patterning Option for Memory and Logic [Invited]

Geert Vandenbergh, Roel Gronheid, IMEC

A-35 Directed Self-Assembly (DSA) contact hole shrinkage [Invited]

Tsung-Han Ko, Kuan-Hsin Lo, and Ching-Yu Chang, Taiwan Semiconductor Manufacturing Company

10:45-10:50 Break

10:50-11:50 Chairpersons: Redouane Borsali, CERMAV and Tsukasa Azuma, EIDEC

A-36 Three Dimensional Assembly in Directed Self-assembly of Block Copolymers [Invited]

Paul F. Nealey, Tamar Segal-Peretz (1,2), Chun Zhou (1), Jiaying Ren (1), Takahiro Dazai (3), Leonidas E. Ocola (2), Ralu N. S. Divan (2) and Paul F. Nealey (1,2), (1) University of Chicago, (2) Argonne National Laboratory, (3) Tokyo Ohka Kogyo

A-37 Monitoring thermally induced cylindrical microphase separation of polystyrene-block-poly(methyl methacrylate) by atomic force microscopy

Nobuya Hiroshiba (1), Ryo Okubo (1), Azusa N. Hattori (2), Hidekazu Tanaka (2), and Masaru Nakagawa (1), (1) Tohoku University, (2) Osaka University

A-38 Graphoepitaxy DSA Process Versatility: Template Affinity Role [Invited]

M. Argoud (1), A. Gharbi (1), G. Claveau (1), F. Delachat (1), P. Pimenta-Barros (1), G. Chamiot Maitral (1), S. Bouanani (1), C. Lapeyre (1), R. Tiron (1), C. Nicolet (2), X. Chevalier (2), C. Navarro (2), A. Erdmann (3), P. Michalak (3), and T. Fühner (3), (1) CEA-LETI, (2) ARKEMA FRANCE, (3) Fraunhofer IISB

11:50-12:00 Break

12:00-13:40 Chairpersons: Geert Vandenbergh, IMEC and Takehiro Seshimo, Tokyo Ohka Kogyo

A-122 Block Polymers for High Resolution Patterning: A Progress Report [Invited]

C. Grant Willson (1), Gregory Blachut (1), Michael Maher (1), Yasunobu Someya (1), Yusuke Asano (1), Steven Sirard (2), Austin Lane (1), Xiaomin Yang (3), and Christopher Ellison (1), (1) The University of Texas at Austin, (2) Lam Research, (3) Seagate Corporation

A-121 Carbohydrate-based block copolymer self-assemblies: Sub_10nm highly nanostructured thin films and DSA patterning [Invited]

T. Gomez (1), I. Otsuka (1), S. Halila (1), C. Bouilhac (3), E. Reynaud (1), W.-C. Chen (4), H. Sato (2), Y. Seino (2), T. Azuma (2) and R. Borsali (1)*, (1) CNRS, (2) EIDEC, (3) CNRS-UM-ENSCM, (4) National Taiwan University

A-39 Ionic Liquids for Directed Self-Assembly of PS-*b*-PMMA

Akiya Kawaue (1), Tasuku Matsumiya (1), Takehito Seo (1), Takaya Maehashi (1), Takehiro Seshimo (1), Hitoshi Yamano (1), Ken Miyagi (1), Takahiro Dazai (1,2), Xuanxuan Chen (2,3), Paulina Rincon-Delgadillo (3), Roel Gronheid (3), Paul F. Nealey (2), and Katsumi Ohmori (1), (1) Tokyo Ohka Kogyo, (2) University of Chicago, (3) IMEC

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June 23, Thursday

Room A (Room 301)

English Symposia: Materials & Processes for Advanced Microlithography, Nanotechnology and Phototechnology

A-40 Advanced Formulation for DSA Resists

Celia Nicolet (1), Xavier Chevalier (1), Julien Beausoleil (1), Kumba Sakavuyi (2), John Berron (2), Darron Juradja (2), Nick Brakensiek (2), Christophe Navarro (1), and Ian Cayrefourcq (1),
(1) Arkema France, (2) Brewer Science

A-41 Neutral Layer Material Filtration for Directed Self Assembly Lithography

Toru Umeda (1), Tasuku Matsumiya (2), Hitoshi Yamano (2), and Shuichi Tsuzuki (1), (1) Nihon Pall.
(2) Tokyo Ohka Kogyo

13:40-13:45 Break

13:45-15:05 Chairpersons: Sang Ouk Kim, KAIST and Naoko Kihara, Toshiba

A-42 Directed Self-Assembly Materials for High Resolution beyond PS-*b*-PMMA [Invited]

Eri Hirahara (1), Yi Cao (1), Margareta Paunescu (1), Orest Polishchuk (1), EunJeong Jeong (1), Edward Ng (1), Jianhui Shan (1), Jian Yin (1), Jihoon Kim (1), Jin Li (2), SungEun Hong (1), Durairaj Baskaran (1), and Guanyang Lin (1), (1) EMD Performance Materials,
(2) Merck Performance Materials Manufacturing

A-43 Synthesis and Thin-film Self-assembly of Cylinder-Forming High- χ Block Copolymers [Invited]

Ankit Vora, Gabriela Alva, Anindarupa Chunder, Kristin Schmidt, Teddie Magbitang, Elizabeth Lofano, Noel Arellano, Joy Cheng, and Daniel P. Sanders, IBM

A-44 Perpendicularly oriented cylinders of Si-containing block copolymers by atmospheric thermal annealing [Invited]

Takehiro Seshimo (1,2), Rin Odashima (1), Rina Maeda (1), Yutaka Takenaka (1), Daisuke Kawana (2), Katsumi Ohmori (2), and Teruaki Hayakawa (1,3),
(1) Tokyo Institute of Technology, (2) Tokyo Ohka Kogyo
(3) PRESTO, Japan Science and Technology Agency (JST)

A-45 Development of Directed Self-Assembly Block Copolymer for Sub-5nm Patterning

Toshiyuki Himi, Yukio Kawaguchi, Terumasa Kosaka, Ryosuke Ogaki, and Kazuhiro Hirahara, HORIBA STEC

15:05-15:10 Break

15:10-16:10 Chairpersons: Ankit Vora, IBM and Teruaki Hayakawa, Tokyo Institute of Technology

A-46 "Click" Osylation for Sugar-Based Block Copolymers

Sami Halila, Redouane Borsali, and Issei Otsuka, Grenoble-Alpes University

A-47 Synthesis and characterization of Si-containing block co-polymers with resolution beyond 10 nm

Yasunobu Someya (1), Yusuke Asano (1), Michael J. Maher (1), Gregory Blachut (1), Austin P. Lane (1), Stephen Sirard (2), Christopher J. Ellison (1), and C. Grant Willson (1),
(1) The University of Texas at Austin, (2) Lam Research

A-48 Precise Synthesis of Fluorine-containing Block Copolymers via RAFT

Ryuichi Nakatani (1), Hiroki Takano (1), Lei Wang (1), Yuki Tanaka (1), Rina Maeda (1), Naoko Kihara (2), Shinya Minegishi (2), Ken Miyagi (2), Yuusuke Kasahara (2), Hironobu Sato (2), Yuriko Seino (2), Tsukasa Azuma (2), Christopher K. Ober (3), and Teruaki Hayakawa (1),
(1) Tokyo Institute of Technology, (2) EUVL Infrastructure Development Center, (3) Cornell University

16:10-16:15 Break

*** Computational/ Analysis Approach for Lithography ***

16:15-18:20 Chairpersons: Stefan Hunsche, ASML (USA) / Brion Technologies and Kenji Yoshimoto, Kyoto University

Keynote Lecture A-49 From computational lithography to holistic lithography for advanced pattern control
Stefan Hunsche, ASML (USA) / Brion Technologie

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June 23, Thursday

Room A (Room 301)

English Symposia: Materials & Processes for Advanced Microlithography, Nanotechnology and Phototechnology

A-50 Direct Self-Assembly for Non-Periodic Designs [Invited]

Kenji Yoshimoto (1,2), Akihiro Yoshida (2), and Masahiro Ohshima (2), (1) Center for the Promotion of Interdisciplinary Education and Research, (2) Kyoto University

A-51 A direct source/mask/DSA optimization approach [Invited]

Tim Fühner (1), Przemysław Michalak (1), Maxime Argoud (2), Antoine Fouquet (2), Jérôme Hazart (2), Raluca Tiron (2), and Andreas Erdmann (1), (1) Fraunhofer IISB, (2) CEA-LETI

A-52 Challenges in Development of Sub-10 nm Resist Materials [Invited]

Takahiro Kozawa (1), Julius Joseph Santillan (2), and Toshiro Itani (2), (1) Osaka University, (1) EUVL Infrastructure Development Center (EIDEC)

A-53 Profile prediction of NTD process: getting insights through molecular simulations [Invited]

Chrysostomos Batistakis (1), Tom Wallow (2), and Sander Wuister (1), (1) ASML research, (2) ASML Brion

18:20-18:25 Break

PST Award Ceremony

18:25-18:40 Chairperson: Haruyuki Okamura, Osaka Pref. Univ.

Report on the Selection of the Photopolymer Science and Technology Award 2016

Minoru Tsuda, President of the Society of Photopolymer Science and Technology

The Photopolymer Science and Technology Award 160010, The Outstanding Achievement Award 2016

Takumi Ueno, Shinshu University

The Photopolymer Science and Technology Award 160100, The Best Paper Award 2016

Tatsuhiko Yajima, Wenfeng Hai, Tei Hi, and Keita Shimizu, Saitama Institute of Technology

The Photopolymer Science and Technology Award 160200, The Best Paper Award 2016

Hiroki Takano¹, Lei Wang¹, Yuki Tanaka¹, Rina Maeda¹, Naoko Kihara², Yuriko Seino², Hironobu Sato², Yoshiaki Kawamonzen², Ken Miyagi², Shinya Minegishi², Tsukasa Azuma², Christopher K. Ober³, and Teruaki Hayakawa¹, Tokyo Institute of Technology¹, EUVL Infrastructure Development Center², Cornell University³

18:45-20:45 **Conference Banquet at Room E (Room 103, 1F)**

June 23, Thursday

Room B (Room 302)

English Symposia: Materials & Processes for Advanced Microlithography, Nanotechnology and Phototechnology
Advanced Materials for Photonic / Electronic Device and Technology

9:00-9:40 Chairperson: Shu Seki, Kyoto University

A-54 Electron Injection from a CdS Quantum Dot to a TiO₂ Conduction Band as an Efficiency Limiting Process: Comparison of QD Depositions between SILAR and Linker Assisted Attachment [Invited] (40 min.)

Ji-Won Lee (1,2), Satoshi Makuta (1), Sonthirid Sukarasep (1), Jiang Bo (1), Tsuneo Suzuki (2), Tadachika Nakayama (2), Hisayuki Suematsu (2), Koichi Niihara (2), and Yasuhiro Tachibana (1,3,4), (1) RMIT University, (2) Nagaoka University of Technology, (3) Osaka University, (4) PRESTO, JST

9:40-10:00 Chairpersons: Shu Seki, Kyoto University and Hideyuki Nakano, Muroran Institute of Technology

A-55 Correlation between Physical and Electrical Properties in Pentacene and C8-BTBT-based Organic Thin Film Transistors

Safizan Shaari (1,2), Shigeki Naka (1), and Hiroyuki Okada (1), (1) Universiti Malaysia Perlis, (2) University of Toyama

10:00-10:20 Chairpersons: Takashi Yamashita, Tokyo University of Technology and Shu Seki, Kyoto University

A-56 Aggregation Induced Emission of 4-[Bis(4-methylphenyl)amino]acetophenone

Kazuki Shishido and Hideyuki Nakano, Muroran Institute of Technology

10:20-10:40 Chairpersons: Yasuhiro Tachibana, RMIT University and Hideyuki Nakano, Muroran Institute of Technology

A-57 Fabrication of Fluorescent Nanowires via High-Energy Particles-Triggered Polymerization Reactions

Akifumi Horio (1), Tsuneaki Sakurai (1), Vikas S. Padalkar (1), Daisuke Sakamaki (1), Tetsuya Yamaki (2), Masaki Sugimoto (2), and Shu Seki (1), (1) Kyoto University, (2) Japan Atomic Energy Agency

10:40-10:50 Break

Advanced 3D Packaging

10:50-12:20 Chairpersons: Sanjay Malik, FUJIFILM Electronic Materials and Takumi Ueno, Shinshu University

Keynote Lecture A-58 The Increasing Role Of Polymers In Advanced Packaging - From Stress Buffer Layers to Wafer Level Underfills and Beyond

Andy Miller, Kenneth J Rebibis, Fabrice D D Duval, Teng Wang, John Slabbekoom, Joeri De Vos, and Eric Beyne, IMEC

A-59 Low Temperature Curable Polyimide for Advanced Package [Invited] (25 min.)

Takahiro Sasaki, Asahi Kasei E-Materials

A-60 Surface Wettability Controllable Polyimides by UV Light Irradiation for Printed Electronics [Invited]

Yusuke Tsuda, Kurume National College of Technology

12:20-13:05 Lunch

13:05-14:45 Chairpersons: Andy Miller, IMEC and Yusuke Tsuda, Kurume National College of Technology

A-61 Via and RDL Formation in Photosensitive and non-photosensitive Polymer Film using Excimer Laser

Lee Seongkuk (1), Markus Arendt (1), Habib Hichri (1), Ognian Dimov (2), Raj Sakamuri (2), Sanjay Malik (2), and Dimitre Latev (3), (1) SÜSS MicroTec Photonic Systems, (2) Fujifilm Electronic Materials, (3) Fujifilm-Dimatix

A-62 Novel Trench Wiring Formation Process using Photosensitive Insulation Film for Next Generation Packaging

Kenichi Iwashita, Tetsuya Katoh, Akihiro Nakamura, Yasuharu Murakami, and Tomio Iwasaki, Hitachi Chemical

A-63 Development of Liquid Photoresist for IMS (Injection Molded Solder) with High Thermal Stability

Jun Mukawa (1), Seiichirou Takahashi (1), Chihiro Kobata (1), Kenzo Ohkita (1), Shiro Kusumoto (1), Koichi Hasegawa (1), Toyohiro Aoki (2), Eiji Nakamura (2), Takashi Hisada (2), Hiroyuki Mori (2), and Yasumitsu Orii (2), (1) JSR, (2) IBM Japan

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June 23, Thursday

Room B (Room 302)

English Symposia: Materials & Processes for Advanced Microlithography, Nanotechnology and Phototechnology

A-64 Novel Non-Conductive Film (NCF) with Nano-sized Filler Particle Enabling Highly Reliable Solder Interconnect

Junichi Kaneko, Tamotsu Owada, Katsuyuki Ebisawa, Tomoyuki Ishimatsu, Hidekazu Yagi, Takayuki Saito, and Keiji Honjo, Dexerials

A-65 Development of a High-Intensity UV Exposure Apparatus under a High-Pressure CO₂ Gas Atmosphere to Manufacture Large-Area Porous Ultralow-k Polyimide Substrates for Flexible Print Circuits

Kentaro Taki, Kanazawa University

14:45-14:55 Break

Photopolymers in 3-D Printing/Additive Manufacturing

14:55-16:10 Chairpersons: Robert Allen, IBM and Hidemitsu Furukawa, Yamagata University

Keynote Lecture A-66 3D printing functional objects with mask projection microstereolithography:

Expanding the polymer toolbox

Timothy E. Long, Virginia Tech

A-67 Functional Materials for 3D Manufacturing using Carbon's CLIP Technology [Invited] (30 min.)

Jason Rolland, Carbon3D

16:10-16:20 Break

16:20-17:50 Chairpersons: Rober Allen, IBM and Hidemitsu Furukawa, Yamagata University

A-68 Revolutionary 3-D Printing Systems of Designable Gels for Novel Applications [Invited] (30 min.)

Hidemitsu Furukawa (1), Masaru Kawakami (1), Azusa Saito (1), Kazuyuki Sakai (1), Taizo Hayashida (2), and Kei Toba (3), (1) Yamagata University, (2) JSR, (3) Sunarrow

A-69 3D Printing of Polymeric Hydrogels for Biomedical Application [Invited] (30min.)

Hareem Maune (1), Musan Zhang (1), Ankit Vora (1), Wei Han (1), Rudy J. Wojtecki (1), Alexander Le (2), Leslie Thompson (1), Gary M. McClelland (1), Federico Ribet (2), Amanda C. Engler (3), and Alshakim Nelson (4), (1) IBM, (2) KTH Royal Institute of Technology, (3) 3M, (4) University of Washington

A-70 3D printer in Science and Medicine: Molecular model and organ replica [Invited] (30 min.)

Masaru Kawakami, Yamagata University

18:25-18:40 ***PST Award Ceremony* at Room A (Room 301)**

Chairperson: Haruyuki Okamura, Osaka Pref. Univ.

18:45-20:45 **Conference Banquet at Room E (Room 103, 1F)**

June 24, Friday

Room A (Room 301)

English Symposia: Materials & Processes for Advanced Microlithography, Nanotechnology and Phototechnology

Computational/ Analysis Approach for Lithography

9:00-10:20 Chairpersons: Tim Fühner, Fraunhofer IISB and Takahiro Kozawa, Osaka University

A-71 Multiphysics Simulation of Nanopatterning in Electron Beam Lithography [Invited]

Masaaki Yasuda (1), Kazuhiro Tada (2), and Masatoshi Kotera (3), (1) Osaka Prefecture University, (2) National Institute of Technology, Toyama College, (3) Osaka Institute of Technology

A-72 Stochastic Effects in EUV Lithography [Invited]

Peter De Bisschop, IMEC

A-73 Improving Directed Self-Assembly with Blends of Block Copolymers with Different Architectures: Trends in Morphology and Defectivity

Bongkeun Kim (1)*, Peter Trefonas (2), Phillip Hustad (2), Kris T. Delaney (1), Craig J. Hawker (1), and Glenn H. Fredrickson (1), (1) University of California, Santa Barbara, (2) Dow Electronic Materials

A-74 Solubility Prediction of Organic Ionic Compounds by Computational Methods for Photoresist Application

Eui-Hyun Ryu (1), Myung Yeol Kim (1), Yoo Jung Yoon (1), Kwang-Hwyi Im (1), Hae-Mi Jeong (1), Han Kyul Lee (2), and Hyungjun Kim (2), (1) Dow Electronic Materials, (2) Korea Advanced Institute of Science and Technology (KAIST)

10:20-10:25 Break

EUV Lithography

10:25-11:10 Chairpersons: Taku Hirayama, Merck Performance Materials Manufacturing G.K. and Patrick Naulleau, Lawrence Berkeley National Laboratory

Keynote Lecture A-75 EUV Lithography, Status & Prospects

Jos Benschop and Sander Wuister, ASML

11:10-12:40 Chairpersons: Taku Hirayama, Merck Performance Materials Manufacturing G.K. and Danilo De Simone, IMEC

A-76 EUV Progress Toward HVM Readiness [Invited] (25 min.)

Britt Turkot, Intel

A-77 EUV Research Activity at Center for EUVL [Invited] (25 min.)

Takeo Watanabe and Tetsuo Harada, University of Hyogo

A-78 Outgassing Study for EUV Alternative Resist [Invited]

Eishi Shiobra, EUVL Infrastructure Development Center

A-79 Acid Generation Efficiency of EUV PAGs via Low Energy Electron Exposure [Invited]

Steven Grzeskowiak, Amrit Narasimhan, Eliran Rebeyev, Shresht Joshi, Robert L. Brainard, and Greg Denbeaux, SUNY Polytechnic Institute

12:40-13:25 Lunch

13:25-15:40 Chairpersons: Takeo Watanabe, University of Hyogo and Christopher Ober, Cornell University

A-80 Electron-Beam Induced Shrinkage Effects on Line-Space Patterns of ZEP Resist

Cong Que Dinh, Akihiro Oshima, Shigehiro Nishijima, and Seiichi Tagawa, Osaka University

A-81 Dry Development Rinse Process (DDRP) and Materials (DDRM) for EUVL [Invited] (25 min.)

Wataru Shibayama, Shuhei Shigaki, Makoto Nakajima, Satoshi Takeda, Ryuji Onishi and ○Rikimaru Sakamoto, Nissan Chemical Industries

A-82 Novel rinse material to improve EUV lithography performance, Kazuma Yamamoto,

Yuriko Matsuura, Tomoyasu Yashima, Tatsuro Nagahara, Merck Performance Materials Manufacturing

A-83 Illuminating the path to 1x and smaller EUV resists [Invited] (25 min.)

Patrick Naulleau, Lawrence Berkeley National Laboratory

Continued to the following page

June 24, Friday

Room A (Room 301)

English Symposia: Materials & Processes for Advanced Microlithography, Nanotechnology and Phototechnology

- A-84 Novel High Sensitivity EUV Photoresist for Sub-7 nm Node [Invited] (25 min.)
Tomoki Nagai (1), ○Hisashi Nakagawa (1), Takehiko Naruoka (1), Satoshi Dei (2),
Seiichi Tagawa (3,4), Akihiro Oshima (3,4), Seiji Nagahara (5), Gosuke Shiraishi (6),
Kosuke Yoshihara (6), Yuichi Terashita (6), Yukie Minekawa (6), Elizabeth Buitrago (7),
Yasin Ekinci (7), Oktay Yildirim(8), Marieke Meeuwissen (8), Rik Hoefnagels (8),
Gijsbert Rispens (8), Coen Verspaget (8), Raymond Maas (8), (1) JSR, (2) JSR Micro,
(3) Graduate School of Engineering, Osaka University, (4) Institute of Scientific and Industrial
Research, Osaka University, (5) Tokyo Electron, (6) Tokyo Electron Kyushu,
(7) Paul Scherrer Institute, (8) ASML
- A-85 Negative-tone Imaging with EUV Exposure toward 13 nm Hp [Invited]
Hideaki Tsubaki, Wataru Nihashi, Michihiro Shirakawa, and Fumiyuki Nishiyama, FUJIFILM
- 15:40-15:45 Break
- 15:45-17:55 Chairpersons: Takeo Watanabe, University of Hyogo and Patrick Naulleau, Lawrence Berkeley
National Laboratory
- A-86 Challenges to Overcome Trade-off between High Resolution and High Sensitivity in
EUV Lithography [Invited]
Kensuke Matsuzawa, Tatsuya Fujii, Shogo Matsumaru, Tomotaka Yamada, Yoshitaka Komuro,
Daisuke Kawana, and Katsumi Ohmori, Tokyo Ohka Kogyo
- A-87 Synthesis and Resist Properties of Calixarene Polymers with Pendant Haloalkyl Groups [Invited]
Hiroto Kudo (1), Hiroki Ogawa (1), Hiroki Yamamoto (2), Takahiro Kozawa (2),
(1) Kansai University, (2) Osaka University
- A-88 Development of the transmittance measurement for EUV resist by direct-resist coating
on a photodiode
Daiki Mamezaki, Masanori Watanabe, Tetsuo Harada, and Takeo Watanabe, University of Hyogo
- A-89 Metal Containing Resist Readiness for HVM EUV Lithography [Invited] (25 min.)
Danilo De Simone, Ming Mao, Frederic Lazzarino, and Geert Vandenberghe, IMEC,
- A-90 Positive Tone Nanoparticle Photoresists: New Insight on the Patterning Mechanism [Invited] (25 min.)
Mufei Yu (1), Hong Xu (1), Vasiliki Kosma (1), Jeremy Odent (1), Kazuki Kasahara (2),
Emmanuel Giannelis (1), ○Christopher Ober (1), (1) Cornell University, (2) JSR
- A-91 Less than 20 nm Dense Contact Hole Formation by New Resist Sensitivity Enhancement Method:
EUV/EB Lithography of Photosensitized Chemically Amplified Resists
Seiichi Tagawa (1), Akihiro Oshima (1), Cong Que Dinh (1), Shigehiro Nishijima (1),
Hisashi Nakagawa (2) Takehiko Naruoka (2), Tomoki Nagai (2), Seiji Nagahara (3),
Michael Carcasi (4), Gosuke Shiraishi (5), Yuichi Terashita (5), Yukie Minekawa (5),
Kosuke Yoshihara (5), (1) Osaka University, (2) JSR, (3) Tokyo Electron,
(4) Tokyo Electron America, (5) Tokyo Electron Kyushu

17:55-18:00 Closing Remarks: Itaru Osaka, RIKEN

June 24, Friday

Room B (Room 302)

English Symposia: Materials & Processes for Advanced Microlithography, Nanotechnology and Phototechnology

Next Generation MEMS

9:30-10:40 Chairpersons: Takashiro Tsukamoto, Tohoku University and Sanjay Malik, FUJIFILM Electronic Materials

Keynote Lecture A-92 Heterogeneous Integration and Packaging Technology for Microsystems
Shuji Tanaka, Tohoku University

A-93 Printed flexible sensor sheets [Invited] (25min.)
Kuniharu Takei, Osaka Prefecture University

10:40-10:50 Break

10:50-12:00 Chairpersons: Shuji Tanaka, Tohoku University and Robert Allen, IBM

A-94 Rapid X-ray Fabrication of Microstructured Polytetrafluoroethylene Substrates by Anisotropic, Pyrochemical Microetching [Invited] (25 min.)

Akinobu Yamaguchi, Hideki Kido, and Yuichi Utsumi, University of Hyogo

A-95 Thermal Imaging Device using Infrared-to-Visible Converter Made of Temperature Sensitive Phosphor [Invited] (25 min.)

Takashiro Tsukamoto, Min Wang, and Shuji Tanaka, Tohoku University

A-96 Micro-structure characterization effect on wettability on polyimide surfaces

Yuxuan Han (1,2), ○Yingwei Liu (2), Minami Takato (1), and Fumio Uchikoba (1), (1) Nihon University, (2) Xi'an University of Technology

12:00-12:45 Lunch

Nanobiotechnology

12:45-13:50 Chairpersons: Takanori Ichiki, The University of Tokyo and Takanori Akagi, The University of Tokyo

Keynote Lecture A-97 Polymer Micro-Fabrication and Its Application to Biomicrofluidic Devices
Hirofumi Nabesawa (1), Masumi Yamada (2), and ○Minoru Seki (2),
(1) Toyama Industrial Technology Center, (2) Chiba University

A-98 Safe Polymer Gels For In-vivo Space Filler [Invited]
Takamasa Sakai, The University of Tokyo

13:50-14:00 Break

14:00-15:00 Chairpersons: Takanori Ichiki, and Takanori Akagi, The University of Tokyo

A-99 Implantable Microfluidic Device with Hydrogel Permeable Membrane for Delivering Chemical Compounds and Imaging Neural Cells in Living Mice [Invited]

Hiroaki Takehara (1,2), Akira Nagaoka (1), Jun Noguchi (1), Takanori Akagi (1), Haruo Kasai (1), and Takanori Ichiki (1), (1) The University of Tokyo, (2) Nara Institute of Science and Technology

A-100 Atomic force microscopy observation of extracellular vesicles immobilized on polyethylene glycol-lipid-modified surface in a microfluidic channel

Takanori Akagi (1), Masashi Kobayashi (1), Mio Sasaki (1), Motonobu Sumikawa (1),

Hiromi Kuramochi (1), and Takanori Ichiki (1,2), (1) The University of Tokyo, (2) Innovation Center of NanoMedicine (iCONM)

A-101 Development of high-density microarray technology for DNA aptamer screening using self-assembled beads

Ankita Jain (1), Shingo Ueno (2), Shusuke Sato (2), Takanori Ichiki (1),

(1) The University of Tokyo, (2) Innovation Center of NanoMedicine (iCONM)

15:00-15:10 Break

Continued to the following page

June 24, Friday
Room B (Room 302)

English Symposia: Materials & Processes for Advanced Microlithography, Nanotechnology and Phototechnology

- 15:10-16:50 Chairpersons: Takanori Ichiki, The University of Tokyo and Hiroaki Takehara, Nara Institute of Science and Technology
- A-102 “Borono-lectin” based platforms for bio-sensing and drug delivery applications [Invited]
Akira Matsumoto and Yuji Miyahara, Tokyo Medical and Dental University
- A-103 In vivo Imaging Based on Rare-earth Doped Ceramic Nanophosphors [Invited]
Taichi Ito, The University of Tokyo
- A-104 Applications of Gold Nanoparticle-Loaded Thermosensitive Elastin-Mimetic Dendrimer to Photothermal Therapy [Invited]
Chie Kojima and Daichi Fukushima, Osaka Prefecture University
- A-105 Oral supplementation of long-circulating redox nanoparticles prevent skin photoaging and reduce skin inflammatory disorders induced by prolonged UV exposure in vivo
Chitho P. Feliciano and Yukio Nagasaki, University of Tsukuba
- A-106 Over-1000 nm Near-infrared Fluorescence and SPECT/CT Dual-modal *in vivo* Imaging Based on Rare-earth Doped Ceramic Nanophosphors
Masao Kamimura (1), Rie Saito (1), Hiroshi Hyodo (1), Kosuke Tsuji (1), Izumi O. Umeda (2), Hirofumi Fujii (2), Kohei Soga (1), (1) Tokyo University of Science, (2) National Cancer Center Hospital East

17:55-18:00 Closing Remarks at Room A (Room 301): Itaru Osaka, RIKEN

June 24, Friday

Room C (Room 303)

English Symposia: Materials & Processes for Advanced Microlithography, Nanotechnology and Phototechnology

Organic Solar Cells – Materials, Device Physics, and Processes

9:30-11:00 Chairpersons: Itaru Osaka, RIKEN and Yutaka Ie, Osaka University

Keynote Lecture A-107 Tailoring Charge Transferring Interfaces for High Performance Organic Photovoltaics
Kilwon Cho, Pohang University of Science and Technology (POSTECH)

A-108 Precisely Measuring the LUMO Levels of Organic Semiconductors [Invited] (25 min.)
Hiroyuki Yoshida, Chiba University

A-109 Modification of Donor/Acceptor Interface for Efficient Organic Photovoltaics
Kyohei Nakano, Yujiao Chen, Kaori Suzuki, Keisuke Tajima, RIKEN

11:00-11:15 Break

11:15-12:30 Chairpersons: Yasuhiro Kobori, Kobe University and Pierre M. Beaujuge, KAUST

A-110 Ternary Blend of Conjugated Polymers for Broadening the Absorption Bandwidth of
Polymer Solar Cells [Invited] (30 min.)
Hiroaki Benten, Takaya Nishida, Daisuke Mori, Hideo Ohkita, Shinzaburo Ito, Kyoto University

A-111 ESR Study of Degradation Mechanism Due to Charge Formation in Polymer Solar Cells
[Invited] (25 min.)
Kazuhiro Marumoto (1,2), Dong Liu (1), Masaki Yabusaki (1), (1) Division of Materials Science,
University of Tsukuba, (2) Tsukuba Research Center for Interdisciplinary Materials Science (TIMS),
University of Tsukuba

A-112 Semitransparent Inverted Organic Solar Cells Using an Oxide/Metal/Oxide Transparent Top Anode
Shunjiro Fujii (1), Kosei Hashiba (2), Tetsuo Shimizu (1), Yasuhiro Nishioka (2),
Hiromichi Kataura (1), (1) National Institute of Advanced Industrial Science and Technology (AIST),
(2) Nihon University

14:00-15:35 Chairpersons: Hideo Ohkita, Kyoto University and Kazuhiro Marumoto, University of
Tsukuba

A-113 Thiophene and Naphtho[1,2-c:5,6-c]bis[1,2,5]thiadiazole Based Alternating Copolymers for
Polymer Solar Cells [Invited] (30 min.)
Yuxiang Li (1), Tack Ho Lee (2), Jihyeon Kim (1), Song Yi Park (2), Seyeong Song (2),
Sungu Hwang (1), Jin Young Kim (2), and Han Young Woo (3), (1) Pusan National University,
(2) Ulsan National Institute of Science and Technology, (3) Korea University

A-114 Morphology Effect on the Geometry of Photoinduced Charge-Separated State in P3HT:PCBM
Blend Films as Studied by Time-Resolved EPR Spectroscopy [Invited] (25 min.)
Taku Miura, Takashi Tachikawa, and Yasuhiro Kobori, Kobe University

A-115 Control of Phase Separation of Benzothienoisindigo–Benzodithiophene Copolymer for Organic
Photovoltaics
Marina Ide, Yoshiko Koizumi, and Akinori Saeki, Osaka University

A-116 Dithienylthienothiophenebisimide-Based Semiconducting Polymers for Organic Solar Cells with High
Open-Circuit Voltage
Masahiko Saito, Itaru Osaka, Kazuo Takimiya, RIKEN

15:35-15:50 Break

15:50-17:25 Chairpersons: Hiroyuki Yoshida, Chiba University and Han Young Woo, Korea University

A-117 Molecular Packing Effects and Morphologies in High-Efficiency Bulk Heterojunction Solar Cells
[Invited] (30 min.)
Pierre M. Beaujuge, King Abdullah University of Science and Technology (KAUST)

A-118 Synthesis, Properties, and Photovoltaic Performance of a Donor–Acceptor Copolymer Having
Pyradinobisthiazole as the Acceptor Unit [Invited] (25 min.)
Yutaka Ie, Shohei Sasada, Makoto Karakawa, and Yoshio Aso, Osaka University

A-119 Reduced Bimolecular Recombination in Polymer Solar Cells
Tomohiro Fukuhara, Miki Osaka, Yasunari Tamai, Hideo Ohkita, Hiroaki Benten, Shinzaburo Ito,
Kyoto University

A-120 Organic–Inorganic Hybrid Perovskite Solar Cells Using Hole Transport Layer Based on α -Naphthyl
Diamine Derivative
Vincent Obiozo Eze, and Tatsuo Mori, Aichi Institute of Technology

17:55-18:00 Closing Remarks at Room A (Room 301): Itaru Osaka, RIKEN

June 22, Wednesday

Room C (Room 303)

Japanese Symposium: Polyimides and High Temperature Polymers
-Functionalization and Practical Applications-

日本語シンポジウム: ポリイミド及び高温耐熱樹脂機能化と応用

9:30-10:20 座長: 岩手大学 大石好行、東京工業大学 早川晃鏡

B1-01 ゴルゲル法によるポリアミドイミド-シリカ複合材料の作製

(1) 茨城大学, (2) 日立電線 森川敦司 (1), 鈴木和則 (2), 浅野健二 (2)

B1-02 様々な溶媒を用いて調製したビススピロノルボルナン構造脂環式ポリイミドの特性

(1) 東京工芸大学, (2) JX エネルギー 小澤将希 (1), 石黒榮梨子 (1), 松本利彦 (1), 小松伸一 (2)

10:20-10:45 座長: 茨城大学 森川敦、久留米高等専門学校 津田祐輔

B1-03 2,5-チオフェンジカルボン酸を用いたポリエーテルケトンの合成

岡山大学 兼高悠輔, 山崎慎一, ○木村邦生

10:45-11:00 休憩

11:00-11:25 座長: 茨城大学 森川敦、久留米高等専門学校 津田祐輔

B1-04 Well-ordered Nanostructure Formation of Wholly Aromatic Poly(amic acid)s in Spin-casted Thin Films

Ling Gao, Koei Azuma, Yuta Kushima, Kenta Okuhara, and Teruaki Hayakawa, Tokyo Institute of Technology

11:25-11:50 座長: 東京工芸大学 松本利彦、東京工業大学 難波江裕太

B1-05 リン含有芳香族ポリシアヌレート合成と光学特性

岩手大学 野呂 仁一朗、高橋 有沙、菅野 凌太、芝崎 祐二、○大石 好行

11:50-13:00 昼食休憩

13:00-14:00 座長: 東京工業大学 柿本雅明、東レ 富川真佐夫

基調講演 B1-06 New Trend of Functional High-Performance Polymers for Optoelectronic

Applications

Guey-Sheng Liou, National Taiwan University

14:00-14:25 座長: 東京工芸大学 松本利彦、東京工業大学 難波江裕太

B1-07 ATR-IR 分光法を用いたポリイミドおよび汎用高分子材料の熱放射特性の解析

東京工業大学 岡田朋大, 安藤慎治

14:25-15:15 座長: 横浜国立大学 大山俊幸、東レ 小山祐太郎

B1-08 Micro-structure characterization effect on Leidenfrost temperature on micro-structured polyimide surfaces

Yingwei Liu (1), Yuxuan Han (1,2), Fumio Uchikoba (2), and Yasuhiro Nishioka (2), (1) Xi'an University of Technology, (2) Nihon University

B1-09 アミノフェナントロリン錯体を利用した鉄含有ポリイミド微粒子の合成とその炭素化物による酸素還元触媒反応

東京工業大学 難波江裕太, 永田信輔

15:15-15:30 休憩

15:30-16:10 座長: 岡山大学 木村邦生、東レ 小山祐太郎

B1-10 スルホン化ブロック・グラフトポリイミド電解質膜の燃料電池特性とそのナノファイバー化

首都大学東京 王 剛、山崎 浩太、田中 学、○川上 浩良

B1-11 側鎖に t-BOC 基を有する紫外線照射表面濡れ性制御ポリイミド

久留米高等専門学校 志岐亮輔、津田祐輔

16:10-17:00 座長: 東京工業大学 安藤慎二、首都大学東京 川上浩良

B1-12 反応現像画像形成 (RDP) に基づく感光性ポリイミド-シリコンコポリマー

横浜国立大学 大山 俊幸、笠 原彩、安田 めぐみ、高橋 昭雄

B1-13 Development of Novel Low-temperature Curable Positive-Tone Photosensitive Polyimide with High Elongation

Yu Shoji, ○Yutaro Koyama, Yuki Masuda, Keika Hashimoto, Kimio Isobe, and Ryoji Okuda, Toray Industries

18:00-20:00 *パネルシンポジウム (英語) *“Nanoimprint Lithography and the Related Chemistry”

at Room B (Room 302)

June 22, Wednesday

Room D (Room 304)

Japanese Symposium: Photofunctional Materials for Electronic Devices

日本語シンポジウム：光機能性デバイス材料

10:00-11:20 座長：高分子学会フェロー 長谷川悦雄、東芝 木原尚子

B3-01 側鎖に *o*-ニトロベンジル基を有する紫外線照射表面濡れ性制御ポリイミド
久留米高専 津田祐輔, 坂田大地

B3-02 高分子安定化液晶素子における高分子ネットワーク構造の液晶材料による影響
秋田大学 山口留美子, 井上洸一, 黒沢諒

B3-03 液晶中における赤橙色蛍光色素の光応答挙動

(1) 埼玉工業大学工学部, (2) 埼玉工業大学大学院工学研究科,
(3) 東京工業大学資源化学研究所 木下基 (1,2), 古川元行 (2), 岡沙樹 (1),
青木恭弘 (1,2), 宍戸厚 (3)

B3-04 エレクトロクロミック特性を有したイミン型メタロ超分子ポリマーの開発と評価

(1) 物質・材料研究機構 (2) JST-CREST 金尾美樹 (1,2), 樋口昌芳 (1,2)

11:20-13:00 昼食休憩

13:00-13:45 座長：東芝 木原尚子、高分子学会フェロー 長谷川悦雄

基調講演 B3-05 静電スプレーを用いた有機デバイスの作製技術

理化学研究所 田島右副, 高久英明, 早川晴美, 岡本翔太, 青山哲也, 松下聖志郎

13:45-13:55 休憩

13:55-15:15 座長：物質・材料研究機構 安田剛、高分子学会フェロー 長谷川悦雄

B3-06 高効率で電気を光に変換する有機エレクトロルミネッセンス材料

京都大学 志津功将, 梶弘典

B3-07 動作点モデルを利用した有機 EL 素子の電子電流の評価

(1) 愛知工業大学, (2) 名古屋大学, (3) 岩手大学 森竜雄 (1), 今西雅人 (2), 西川尚男 (3)

B3-08 塗布成膜可能なリン光ホストを用いた塗布型有機 EL 素子の高効率化

山形大学 千葉貴之、深田 新、五十嵐正拓、引地達也、大久哲、城戸淳二、夫 勇進

B3-09 塗布製膜と積層可能な dendritic 型熱活性化遅延蛍光材料

(1) 東京工業大学, (2) 九州大学 アルブレヒト建 (1), 松岡健一 (2), 藤田克彦 (2), 山元 公寿 (1)

15:15-15:25 休憩

15:25-16:25 座長：愛知工業大学 森竜雄、東芝 木原尚子

B3-10 光重合性液晶モノマー/C8-BTBT 混合系における有機半導体の移動度向上に向けた基礎検討

東京理科大学 佐々木仁, 庄司健一, 野口勇人, 黒田温子, 古江広和

B3-11 ビスオクチルフェニルクリセンを用いた有機薄膜トランジスタの作製と評価

(1) 東海大学, (2) ウシオケミックス 村田修平 (1), 大槻裕之 (2), 岡本一男 (2), 功刀義人 (1)

B3-12 光酸発生剤を用いた導電性ポリマーの光ドーピングと有機熱電変換材料への応用

富士フイルム 青合利明, 西尾亮, 林直之, 杉浦寛記, 金澤吉憲, 野村公篤

16:25-17:25 座長：富士フイルム 青合 利明、高分子学会フェロー 長谷川悦雄

B3-13 静電式インクジェット法を用いた楕円体 TiO₂ 光電極の作製と色素増感太陽電池への応用

(1) 東海大学大学院工学研究科応用理化学専攻, (2) 東海大学大学院理学研究科化学専攻
水野 真帆 (1), 関 彩希江 (1), 富田 恒之 (2), 功刀 義人 (1)

B3-14 直接的アリール化反応により重合したピチアゾール系ポリマーの光電変換特性

(1) 物質・材料研究機構, (2) 筑波大学 安田剛 (1), 桑原純平 (2), 韓 礼元 (1), 神原貴樹 (2)

B3-15 エレクトロスピンニング法で付与された高分子ファイバー膜の圧電的性質の評価

(1) 産業技術総合研究所, (2) 豊橋技術科学大学, (3) 北陸先端科学技術大学院大学
延島大樹 (1), 石井佑弥 (2), 酒井平祐 (3), 植村聖 (1), 吉田学 (1)

18:00-20:00 *パネルシンポジウム (英語) * “Nanoimprint Lithography and the Related Chemistry”
at Room B (Room 302)

June 23, Thursday

Room C (Room 303)

Japanese Symposium: Plasma Photochemistry and Functionalization of Polymer Surface

日本語シンポジウム プラズマ光化学と高分子表面機能化

9:30-11:00 座長：近畿大工 井原辰彦、松山大薬 山内行玄

B2-01 水素化テトラヘドラルアモルファスカーボンコーティングチタン上における骨芽細胞および破骨細胞の分化挙動

広島大 (1)、岡山理大 (2)、トーヨーエイテック(3)、岡山県工業技術センター (4)

首藤 崇裕 (1)、○中谷 達行 (2)、岡本 圭司 (3)、才崎 菜都美 (1)、三村 純代 (1)、

國次 真輔 (4)、二川 浩樹 (1)

B2-02 低温アンモニア水プラズマによるポリカーボネートおよびポリプロピレンフィルム表面の超親水化
埼玉工大院 (1)、埼玉工大 (2) 程 飛 (1)、片山友貴 (2)、○矢嶋龍彦 (1,2)

B2-03 有機シラン分子のプラズマ重合による微粒子生成と堆積物の微細構造

千葉工大 (1)、千葉工大院 (2)、関東学院大 (3) 井上 泰志 (1)、小池 遼 (2)、高井 治 (3)

11:00-11:15 休憩

11:15-12:00 座長：静岡大院工 永津雅章、埼玉工大 矢嶋龍彦

基調講演 B2-04 大気圧グロー放電を用いたフッ素系高分子の表面処理

上智大名誉教授 (1)、上智大 (2) ○小駒益弘 (1)、高橋和夫 (2)、田中邦翁 (2)

12:00-13:15 昼食休憩

13:15-15:15 座長：岐阜薬大 近藤伸一、九州大 林 信哉

B2-05 プラズマ分子導入時の細胞膜透過機構の人工細胞を用いた検討

愛媛大 (1)、パール工業 (2)、(株)Y's (3) 本村英樹 (1)、相原大二郎 (1)、永岩秀憲 (1)、

木戸祐吾 (1,2)、池田善久 (1)、佐藤晋 (1,3)、神野雅文 (1)

B2-06 In-situ UV Absorption Spectroscopy for Observing Dissolved Ozone in Water

高知工科大 (1)、高知工科大 (2)、ORC Manufacturing (3)、金沢大院 (4)、金沢大 (5)

Jun-Seok Oh (1,2)、Hideki Yajima (3)、Tsunehisa Ono (4)、Tatsuo Ishijima (5)、

Izumi Serizawa (5)、and Akimitsu Hatta (1,2)

B2-07 ナノキャピラリー大気圧プラズマジェットを用いたポリマー基板のマスクレス微細表面修飾

静岡大総科技 (1)、静岡大創科技院 (2) 永津 雅章 (1,2)、岡田 充 (1)、Tomy Abuzairi (2)

B2-08 H₂O - O₂ プラズマで生成された HO₂/O₂⁻ ラジカルの滅菌効果

近畿大 佐多平 恒成、仲宗根 薫、井原 辰彦

15:15-15:30 休憩

15:30-17:30 座長：岡山理大 中谷達行、愛媛大 神野雅文

B2-09 プラズマにより構築した流動性あるリン脂質膜を用いる高分子ナノフィルムの開発

岐阜薬大 (1)、松山大薬 (2)、中部学院大 (3) 近藤伸一 (1)、楠本達也 (1)、笹井泰志 (1)、土井直樹 (1)、

山内行玄 (2)、葛谷昌之 (3)

B2-10 低温アンモニア水プラズマによるポリテトラフルオロエチレンの超親水化とその経時的退行メカニズム

埼玉工大院 (1)、埼玉工大 (2) 程 飛 (1)、片山友貴 (2)、○矢嶋龍彦 (1,2)

B2-11 大気圧プラズマによって生成される活性種を用いた口腔がん細胞の不活化

九州大 (1)、佐賀大 (2) 小野大帝 (1)、大坪哲也 (1)、林信哉 (1)、合島怜央奈 (2)、

山下佳雄 (2)、後藤昌昭 (2)

B2-12 プラズマ技法による新規薬物放出制御剤の開発について

松山大薬 (1)、中部学院大 (2)、岐阜薬大 (3) 山内行玄 (1)、葛谷昌之 (2)、笹井泰志 (3)、

土井直樹 (3)、近藤伸一 (3)

18:25-18:40 *PST Award Ceremony* at Room A

Chairperson: Haruyuki Okamura, Osaka Pref. Univ.

18:45-20:45 Conference Banquet at Room E (Room 103, 1F)

June 24, Friday

Room D (Room 304)

Japanese Symposium: General Scopes of Photopolymer Science and Technology

日本語シンポジウム：一般講演

10:00-11:00 座長：千葉大学 高原茂、東京理科大学 有光晃二

B4-01 液晶マトリックス露光における液晶表示の階調制御による露光フィールド内パターン線幅の均一化

東京電機大学 堀内敏行, 羽根石翔太, 吉田有美香, 小林宏史

B4-02 マイクロ凸レンズアレイの反転型用凹球面レジストパターンの形成

東京電機大学 堀内敏行, 笹木龍之介

B4-03 EB/UV ハイブリッドリソグラフィによるポジ型レジストのネガ型パターン形成

長岡技術科学大学 中野 弘基, 高橋 健太, 河合 晃

11:00-11:10 休憩

11:10-11:50 座長：東京電機大学 堀内敏行、千葉大学 高原茂

B4-06 ジスルフィド結合を有する二官能塩基増殖剤の合成と光反応性材料への応用

東京理科大学 古谷昌大, 柿沼斐晃, 有光晃二

B4-07 NIR-Sensitized Photopolymerization with Iodonium Salts Bearing Weak Coordinating Anions

(1) サンアプロ、(2) Niederrhein University of Applied Sciences 白石篤志 (1)、上田安宏 (1)、Thomas Brömme (2)、Michael Schläpfer (2)、Christian Schmitz (2)、and Bernd Strehmel (2)

11:50-12:00 休憩

12:00-12:40 座長：東京電機大学 堀内敏行、東京理科大学 有光晃二

B4-08 Water Soluble Onium Salt Type Photo Amphoteric Compound Generators

千葉大学 柏井大樹、金子唯一、澤田拓麻、佐藤勇介、高原茂

B4-09 微細加工テンプレートによる金ナノ粒子の配列

(1) 大阪大学、(2)北海道大学 山本洋揮 (1)、大沼明 (2)、大谷文章 (2)、古澤 孝弘 (1)

12:40-13:30 昼食休憩

Japanese Symposium: Resist Removal Technology

日本語シンポジウム：レジスト除去技術

13:30-14:30 座長：産業技術総合研究所 高橋正好、香川高等専門学校 山本雅史

B4-10 水を原料ガスとするマイクロ波励起プラズマを用いたレジスト除去法の開発

(招待講演) [30分]

(1) 金沢大学理工研究域サステナブルエネルギー研究センター、(2) 金沢大学自然科学研究科電子情報科学専攻、(3) 産業技術総合研究所、(4) ミニマルファブ技術研究組合 石島達夫 (1)、北野卓也 (2)、伊藤卓也 (2)、鈴木宏明 (2)、田中康規 (1,2)、上杉善彦 (1,2)、クンプアンソマワシ (3,4)、原史朗 (3,4)

B4-11 オゾンマイクロバブル水によるレジスト用ポリマーの分解における温度依存性

(1) 大阪市立大学、(2) 香川高等専門学校、(3) 大阪工業大学、(4) 産業技術総合研究所、(5) 岩谷産業 松浦 昂平 (1)、西山 聖 (1)、佐藤 絵理子 (1)、山本 雅史 (2)、神村 共住 (3)、高橋 正好 (4)、小池 国彦 (5)、堀邊 英夫 (1)

B4-12 タングステン触媒体を用いて生成した原子状水素による PMMA 系ポリマーの分解過程

(1) 大阪市立大学、(2) 香川高等専門学校、(3) 大阪工業大学、(4) 東京応化工業 高木誠司 (1)、西山聖 (1)、山本雅史 (2)、佐藤絵理子 (1)、神村共住 (3)、緒方寿幸 (4)、堀邊英夫 (1)

14:30-14:40 休憩

June 24, Friday

Room D (Room 304)

Japanese Symposium: Resist Removal Technology

日本語シンポジウム：レジスト除去技術

14:40-15:40 座長：産業技術総合研究所 高橋正好、香川高等専門学校 山本雅史

B4-13 レーザー照射を用いたポリビニルフェノールレジストの剥離技術（招待講演）

(1) 大阪工業大学、(2) 大阪大学、(3) 大阪市立大学 神村共住 (1)、布晃輔 (1)、黒木雄太(1)、山城鷹之 (1)、辻本慎吾 (1)、中村亮介 (2)、高木誠司 (3)、西山聖 (3)、堀邊英夫 (3)

B4-14 水素ラジカルを用いたレジスト除去における酸素添加による除去均一性の向上

(1) 香川高等専門学校、(2) 静岡大学、(3) 北陸先端科学技術大学院大学、(4) 大阪市立大学 山本雅史 (1)、前島和真 (1)、梅本宏信 (2)、大平圭介 (3)、鹿間共一 (1)、西山聖 (4)、堀邊英夫 (4)

B4-15 高温マイクロバブルがフォトレジストに与える影響（招待講演）

(1) 産業技術総合研究所、(2) 東北大学、(3) オプトクリエーション、(4) 大阪市立大学 高橋正好 (1)、白井泰雪 (2)、寺本章伸 (2)、高橋常二郎 (3)、田寺克己 (3)、松浦昂平 (4)、堀邊英夫 (4)

17:55-18:00 Closing Remarks at Room A (Room 301)

Registration for Overseas Participants

Registration fee of whole conference including banquet is ¥ 35,000 yen until May 31, 2016 and ¥50,000 yen after June 1, 2016.

All the participants including speakers are requested to register in [Conference → Registration] at SPST Homepage before May 31, 2016.

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Banquet

Banquet will be open at 18:40 on June 23, 2016.

Language & Presentation

English is used for presentations in English Symposia and Panel Symposium, "Nanoimprint Lithography and the Related Chemistry". Japanese and English are used for presentations in Japanese Symposia.

Each presentation will not be longer than 20 minutes including discussion except for the notified lectures.

A liquid-crystal display (LCD) projector operating with Windows 7-10 compatible PC (PowerPoint) is available at every room. All the speakers are requested to bring their files in a USB memory to the audio visual assistant of their presentation rooms in advance. The files stored in different media can be transferred to a USB memory. Speakers may connect their own PC (including Macintosh) to projectors when they request.

Accommodation

You can make directly reserve rooms at the web site (<http://www.spst-photopolymer.org/conference/accommodation/>).

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国際フォトポリマーコンファレンス
マイクロリソグラフィ、ナノテクノロジー、
フォトテクノロジー
—材料とプロセスの最前線—

平成28年6月22日(水)～24日(金)
幕張メッセ国際会議場
(JR 海浜幕張駅下車徒歩5分)

主催

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