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Final Edition

ICPST-36

Scientific Program

The 36th International Conference of Photopolymer Science and Technology

Materials & Processes for Advanced Microlithography, Nanotechnology and Phototechnology

June 24-27, 2019

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
The Technical Association of Photopolymer, Japan
The Chemical Society of Japan
The Society of Polymer Science, Japan
Chiba University
Endorsed by
The Japan Society of Applied Physics

International Conference Schedule

June 24 (Monday) Registration 15:00-17:00 (Room D)
June 24 (Monday) Registration and Welcome Reception 17:00-19:00 (Room D)

	June 25 Tuesday		June 26 Wednesday	June 27 Thursday
Lobby	Registration 9:00-17:00		Registration 9:00-17:00	Registration 9:00-15:00
Room A	Morning Session Plenary Session EUV Lithography p.3	Afternoon Session EUV Lithography Advanced Materials for Photonics /Electronic Device and Technology p.8	EUV Lithography Strategies and Materials for Advanced Packaging, Next Generation MEMS Photopolymers in 3-D Printing/Additive Manufacturing PST Award Ceremony p.9	EUV Lithography Computational / Analysis Approach For Lithography p.15
Room B	Nanoimprint Lithography Panel Symposium p.6		Chemistry for Advanced Photopolymer Science Fundamentals and Applications of Biomimetics Materials and Processes p.11	Fundamentals and Applications of Biomimetics Materials and Processes Directed Self Assembly (DSA) p.17
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.21		Organic and Hybrid Solar Cells – Materials, Device Physics, and Processes p.13	Flexible Packaging 193 nm Lithography Extension Next Generation Lithography, EB Lithography and Nanotechnology General Scopes of Photopolymer Science and Technology p.19
Room D	光機能性デバイス材料 Japanese Symposium: Photofunctional Materials for Electronic Devices p.22		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 レジスト除去技術 Japanese Symposium: Resist Removal Technology p.23	レジスト除去技術 Japanese Symposium: Resist Removal Technology 一般講演 Japanese Symposium: General Scopes of Photopolymer Science and Technology p.25
Room E	Nanobiotechnology p.4			

June 25, Tuesday

Room A (Room 301)

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

Published conference paper

＊Opening Session＊

9:30-9:45 Chairperson: Minoru Tsuda, Conference Chair of ICPST-36

Opening Remarks
Takeo Watanabe, Symposium Chair of EUV Lithography, the Symposium of most contributing to Journal of Photopolymer Science and Technology, **31** (2018)

Overview of Scientific Program ICPST-36
Masayuki Endo, Chairperson of the Program Committee ICPST-36

＊Plenary Session＊

9:45-10:35 Chairpersons: Takeo Watanabe, University Hyogo and Tomoki Nagai, JSR

(9:45-10:35) **Plenary Lecture A-1** AI, Quantum, and the Future of Computing: Challenges and Opportunities for Materials Research
Daniel P. Sanders, IBM

As scaling of 2D semiconductor devices to achieve cost-effective performance gains became more challenging, the industry has moved to non-planar device designs and innovative packaging solutions. Increasingly, hardware designers are now aggressively developing specific hardware to accelerate artificial intelligence (AI) workloads. Simultaneously, long-awaited quantum computer systems based on superconducting qubits have arrived onto the scene. With the rise of AI and emergence of quantum computing, what is a materials researcher to do? This talk will discuss the changing computing environment and highlight some challenges and opportunities these developments present the materials research community.

10:35-10:45 Break

＊EUV Lithography＊

10:45-12:00 Chairpersons: Takeo Watanabe, University of Hyogo and Patrick Naulleau, Berkeley, LBNL

(10:45-11:30) **Keynote Lecture A-2** Leading Edge Short Wavelength Light Source (DUV/EUV) and its Application for Semiconductor Manufacturing
Hakaru Mizoguchi, Gigaphoton Inc.

(11:30-12:00) **A-3** Photoresist Challenges for Logic and Memory using 0.33NA EUV Lithography [Invited] (30 min.)
Danilo De Simone, Geert Vandenberghe, IMEC

12:00-13:00 Lunch

Continue to the following page

＊Nanobiotechnology＊

13:00-14:55 Chairpersons: Kyohei Okubo, Tokyo University of Science and Hirotaka Ejima, The University of Tokyo

(13:00-13:25) **A-4** Polymer conjugated fluorescent nanoparticles for NIR-II imaging [Invited] (25 min.)
Masao Kamimura and Kohei Soga, Department of Materials Science and Technology, Tokyo University of Science

(13:25-13:50) **A-5** Photodynamic therapy utilizing functional polymers that exert pH-responsive isothermal phase transition [Invited] (25 min.)
Takahiro Nomoto, Sjaikhurrizal El Muttaqien, Hiroyasu Takemoto, Makoto Matsui and Nobuhiro Nishiyama, Laboratory for Chemistry and Life Science, Institute of Innovative Research, Tokyo Institute of Technology

(13:50-14:15) **A-6** Label-free nucleic acid amplification detection using electrochemical sensors for liquid biopsy [Invited] (25 min.)
Miyuki Tabata and Yuji Miyahara, (1) Institute of Biomaterials and Bioengineering, Tokyo Medical and Dental University

(14:15-14:35) **A-7** Au "Edged hole array" for sensor application
Hirotaka Yamada (1), Daiki Kawasaki (1), Chigusa Inoue (1), Kenichi Maeno (1), Kenji Sueyoshi (1), Hideaki Hisamoto (1) and Tatsuro Endo (1,2), (1) Osaka Prefecture University, (2) JST PRESTO

(14:35-14:55) **A-8** Adsorption phenomena of anionic and cationic nanoliposomes on surface of poly(dimethylsiloxane) (PDMS) microchannel
Virendra Majarikar (1), Hiroaki Takehara (1, 2) and Takanori Ichiki (1,2), (1) The University of Tokyo, (2) Institute of Industry Promotion-Kawasaki

14:55-15:10 Break

Continue to the following page

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

15:10-17:10 Chairpersons: Takahiro Nomoto, Tokyo Institute of Technology and Masao Kamimura, Tokyo University of Science

(15:10-15:35) **A-9** Control and real-time imaging of in vivo distribution and excretion of near-infrared fluorescent nanoparticles [Invited] (25 min.)
Masakazu Umezawa (1), Masao Kamimura (1,2), Kyohei Okubo (1) and Kohei Soga (1,2), (1) Department of Materials Science and Technology, Faculty of Industrial Science and Technology, Tokyo University of Science, (2) Imaging Frontier Center (IFC), Research Institute for Science and Technology (RIST), Tokyo University of Science

(15:35-16:00) **A-10** Metal-polyphenol complexation for nano- and bio-interface engineering [Invited] (25 min.)
Hirotaka Ejima, The University of Tokyo

(16:00-16:25) **A-11** Biological deep temperature imaging with fluorescence lifetime of rare-earth-doped ceramics particles in the second NIR biological window [Invited] (25 min.)
Kyohei Okubo (1,2), Takumi Chihara (1), Masakazu Umezawa (1), Keiji Miyata (1), Shota Sekiyama (1), Naoki Hosokawa (1), Masao Kamimura (1,2) and Kohei Soga (1,2), (1) Department of Materials Science and Technology, Tokyo University of Science, (2) Imaging Frontier Center (IFC), Research Institute for Science and Technology (RIST), Tokyo University of Science

(16:25-16:50) **A-12** Polymer nanosheet wrapping for high quality imaging of tissues and suspension cells [Invited] (25 min.)
Yosuke Okamura, Tokai University

(16:50-17:10) **A-13** Photostabilization of indocyanine green dye by energy transfer in phospholipid-PEG micelles
Gil Yeroslavsky (1,2), Kyohei Okubo (1, 2) and Kohei Soga (1, 2), (1) Department of Material Science and Technology, Tokyo University of Science, (2) Imaging Frontier Center (IFC), Research Institute for Science and Technology (RIST), Tokyo University of Science

17:10-18:00 Break

18:00-19:00 **Panel Symposium in English: "Nanoimprint Lithography for Next Generation" at Room B (Room 302)**

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

＊Nanoimprint Lithography＊

14:00-15:20 Chairpersons: Yoshihiko Hirai, Osaka Prefecture University and Jun Taniguchi, Tokyo University of Science

(14:00-14:40) **Keynote Lecture A-14** Nanoimprint Lithography for the High Volume Manufacturing of Semiconductor Devices: Progress and Status (40 min.)
Jin Choi, Douglas J. Resnick, Canon Nanotechnologies

(14:40-15:00) **A-15** Solubility Property of Condensable Gases of Trans-1-Chloro-3,3,3-Trifluoropropene and Trans-1,3,3,3-Tetrafluoropropene in UV Nanoimprint
Kenta Suzuki, Sung-Won Youn, Hiroshi Hiroshima, National Institute of Advanced Industrial Science and Technology

(15:00-15:20) **A-16** Progress in Micro Imprint Lithography Using Gas Permeable Mold Derived From Cellulose
Kazuho Kurematsu (1), Kento Mizui (1), Naoto Sugino (1,2), Makoto Hanabata (1), Satoshi Takei (1), (1) Toyama Prefectural University, (2) SANKO GOSEI

15:20-15:30 Break

15:30-17:00 Chairpersons: Yoshihiko Hirai, Osaka Prefecture University and Jun Taniguchi, Tokyo University of Science

(15:30-16:00) **A-17** Exploiting the uniqueness of NIL: replication - making complex surface topographies [Invited] (30 min.)
Robert Kirchner, Technische Universität Dresden

(16:00-16:20) **A-18** Fabrication of self-standing polystyrene thin films with fine through holes by use of water-soluble resin sacrificial layer
Hiroaki Kawata, Keito Uchida, Masaaki Yasuda, Yoshihiko Hirai, Osaka Prefecture University

(16:20-16:40) **A-19** Durability evaluation of antireflection structure replica mold using high hardness and antifouling UV-curable resin
Junya Kawauchi (1), Shin Hiwasa (2), Jun Taniguchi (1), (1) Tokyo University of Science, (2) AUTEX

(16:40-17:00) **A-20** Evaluation of scratch durability of moth-eye structures made of high hardness ultraviolet curable resin
Masaki Ono (1), Shin Hiwasa (2), Jun Taniguchi (1), (1) Tokyo University of Science, (2) AUTEX

17:00-18:00 Break

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

＊Panel Symposium in English: "Nanoimprint Lithography for Next Generation"＊

18:00-19:00 Chairperson: Yoshihiko Hirai, Osaka Prefecture University

Panel Symposium: "Nanoimprint Lithography for Next Generation"

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:

Jin Choi, Canon Nanotechnologies
"The Status of Nanoimprint Lithography for High Volume Semiconductor Manufacturing"

Christopher Bowman, University of Colorado
"The Use and Implementation of Covalent Adaptable Networks in Nanoimprint Lithography"

Robert Kirchner, Technische Universität Dresden
"Exploiting the uniqueness of NIL: replication - making complex surface topographies"

June 25, Tuesday

Room A (Room 301)

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

＊EUV Lithography＊

13:00-14:10 Chairpersons: Hiroaki Oizumi, Gigaphoton and Danilo De Simone, IMEC

(13:00-13:20) **A-21** Characterization and Control of Hole Missing Defect in EUV Patterning
Hidetami Yaegashi, Arisa Hara, Soichiro Okada, Satoru Shimura, Tokyo Electron

(13:20-13:50) **A-22** Relationship between Resolution Blur and Stochastic Defect of Chemically Amplified Resists Used for Extreme Ultraviolet Lithography [Invited] (30 min.)
Takahiro Kozawa (1), Julius Joseph Santillan (2), and Toshiro Itani (2), (1) Osaka University, (2) Evolving Nano Process Infrastructure Development Center (EIDEC)

(13:50-14:10) **A-23** Materials Challenges in EUV Stochastics
Anuja De Silva, IBM Research

14:10-14:20 Break

14:20-15:10 Chairpersons: Taku Hirayama, Merck and Florian Gstrein, Intel

(14:20-14:50) **A-24** Synthesis and Properties of Iodine- and Tellurium-Containing Resist Materials [Invited] (30 min.)
Hiroto Kudo (1), Kazumasa Okamoto (2), Takahiro Kozawa (2), Takeo Watanabe (3), (1) Kansai University, (2) Osaka University, (3) University of Hyogo

(14:50-15:10) **A-25** Metal Based Materials for EUV Lithography
Vasiliki Kosma, Danilo De Simone, Geert Vandenberghe, IMEC

15:10-15:20 Break

＊Advanced Materials for Photonic / Electronic Device and Technology＊

15:20-16:20 Chairpersons: Tsuneaki Sakurai and Shu Seki, Kyoto University

(15:20-15:40) **A-26** Exciton management for unique molecular emission characteristics [Invited]
Shuzo Hirata, The University of Electro-Communications

(15:40-16:00) **A-27** Novel Metallo-Superamolecular Tb-poly of Redox Active Tridentate Schiff's Base Organic Ligand: Study of Electrochromic and Memristive Properties
Deepa Oberoi (1), Anansuya Bandyopadhyay (2), IIT Roorkee Saharanpur Campus

(16:00-16:20) **A-28** Vapochromic Emission Observed for Amorphous Molecular Materials
Yuya Kitamura, Ayaka Sato, Hideyuki Nakano, Muroran Institute of Technology

16:20-16:30 Break

16:30-17:30 Chairpersons: Shuzo Hirata, The University of Electro-Communications and Hideyuki Nakano, Muroran Institute of Technology

(16:30-16:50) **A-29** Cold Crystallization of Ferrocene-Hinged π-Conjugated Molecules Induced by Limited Conformational Freedom of Ferrocene
Tsuneaki Sakurai (1), Yuki Tsujimoto (1), Yuichiro Ono (1), Shusaku Nagano (2), Shu Seki (1), (1) Department of Molecular Engineering, Kyoto University, (2) Nagoya University Venture Business Laboratory, Nagoya University.

(16:50-17:10) **A-30** Novel Simple Method for Surface Relief Patterning on Conventional Polyimide films by Stimuli-Responsive Self-Organization.
Fumiaki Kodera, Takashi Yamashita, Tokyo University of Technology

(17:10-17:30) **A-31** Wavelength dependence of Poly(hydroxystyrene) Ablation by Mid- Infrared-Free-Electron Laser, Minoru Toriumi (1,2), Takayasu Kawasaki (2), Mitsunori Araki (2), Takayuki Imai (2), Koichi Tsukiyama (2,3), (1) Laboratory for Interdisciplinary Science and Technology, (2) IR FEL Research Center, Tokyo University of Science, (3) Department of Chemistry, Tokyo University of Science

17:30-18:00 Break

18:00-19:00 **Panel Symposium in English: "Nanoimprint Lithography for Next Generation" at Room B (Room 302)**

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

＊EUV Lithography＊

9:00-10:15 Chairpersons: Takeo Watanabe, University of Hyogo and Patrick Naulleau, Berkeley Lab

(9:00-9:45) **Keynote Lecture A-32** EUV lithography technology for high-volume production of semiconductor devices
Junji Miyazaki, Anthony Yen, Technology Development Center, ASML Japan

(9:45-10:15) **A-33** Novel EUV Resist Materials - Progress, Challenges, and Opportunities [Invited] (30 min.)
Florian Gstrein, Intel

10:15-10:25 Break

＊Strategies of Advanced Packaging, Next Generation MEMS＊

10:25-11:50 Chairpersons: Takumi Ueno, Shinshu University and Sanjay Malik, FUJIFILM Electronic Materials

(10:25-10:45) **A-34** Are Current Generation Materials Ready to Meet Challenges of Advanced Packaging?
Sanjay Malik, FUJIFILM Electronic Materials U.S.A

(10:45-11:10) **A-35** Direct Writing of Flexible Microdevices Using Femtosecond Laser Reduction of Metal Oxide Nanoparticles [Invited] (25 min.)
Mizue Mizoshiri, Nagaoka University of Technology

(11:10-11:30) **A-36** Via Interconnections for Half-Inch Packaging of Electronic Devices Using Minimal Fab Process Tools [Invited]
Fumito Imura (1, 2), Michihiro Inoue (1), Sommawan Khumpuang (1, 2), Shiro Hara (1, 2), (1) National Institute of Advanced Industrial Science and Technology (AIST), (2) Minimal Fab Promoting Organization

(11:30-11:50) **A-37** Small Plasma Space with a Small Plasma Source and Its Advantage in Minimal Fab [Invited]
Hiroyuki Tanaka (1,2), Sommawan Khumpuang (1,2), Shiro Hara (1,2) (1) AIST Tsukuba, (2) Minimal Fab Promoting Org.

11:50-12:50 Lunch

12:50-14:15 Chairpersons: Sanjay Malik, FUJIFILM Electronic Materials, Tomonori Minegishi, Hitachi Chemical

(12:50-13:15) **A-38** AI-infused Materials Development: New Materials for Advanced Packaging Applications [Invited] (25 min.)
Joseph Dennis (1), Daniel P. Sanders (1), Andy Tek (1), Dmitry Zubarev (1), Robert D. Allen (1), Hiroyuki Urano (2), Masashi Iio (2), Katsuya Takemura (2), Yoshio Kawai (2), (1) IBM, (2) Shin-Etsu Chemical

(13:15-13:35) **A-39** Temporary Bonding and Debonding Study with the Newly Developed Room Temperature Mechanical Debonding Material
Seiya Masuda, Akira Yamauchi, Yu Iwai, Mitsuru Sawano, Kotaro Okabe, Kazuto Shimada, FUJIFILM

(13:35-13:55) **A-40** Application for Advanced Package at Positive Working Photosensitive Dielectric Materials
Sakiko Suzuki, Takuji Ikeda, Tomonori Kenmochi, Junya Kusunoki, SUMITOMO BAKELITE

(13:55-14:15) **A-41** Development of Low Dk Df photo sensitive polyimides
Masao Tomikawa, Hitoshi Araki, Hisashi Ogasawara, Masaya Jukei, Yohei Kiuchi, Kazuyuki Matsumura, Akira Shimada, Toray Industries Inc.

14:15-14:25 Break

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

＊Photopolymers in 3-D Printing/Additive Manufacturing＊

14:25-15:45 Chairpersons: Robert Allen, IBM and Akira Watanabe, Tohoku University

(14:25-15:05) **Keynote Lecture A-42** Development of Biocompatible Resin for 3D Printer and Attempt to Manufucture Direct Aligner (40 min.)
Haruhisa Nakano (1), Riyu Kato (1), Hiroaki Okamoto (2), Katsuyoshi Mamada (3), Koutaro Maki (1), (1) Showa University, (2) Okamoto Chemical Industry, (3) Rapid Manufacturing Akihabara

(15:05-15:45) **Keynote Lecture A-43** P Production Redefined: Using Carbon's Digital Light Synthesis Platform to Manufacture High-Performance Polymeric Products (40 min.)
Jason P. Rolland, Carbon, Inc.

15:45-15:55 Break

15:55-17:25 Chairpersons: Robert Allen, IBM and Takumi Ueno, Shinshu University

(15:55-16:20) **A-44** Direct Writing of Three-dimensional Microstructures Using Femtosecond Laser Reduction of Metal Oxide Nanoparticles [Invited] (25 min.)
Mizue Mizoshiri, Nagaoka University of Technology

(16:20-16:45) **A-45** Model Based Curing Depth Control of Aerosol Jet Stereolithography [Invited] (25 min.)
Arndt Hohnholz (1), Cemil Can (2), Stefan Kaierle (1), Ludger Overmeyer (1), (1) Laser Zentrum Hannover e.V. (2) Materialise GmbH

(16:45-17:05) **A-46** Laser direct writing of microstructure on graphene oxide/metal oxide hybrid film
Akira Watanabe (1), Mohammod Aminuzzaman (2) Jinguang Cai (3), Md. Akhtaruzzaman (4), Sayaka Ogawa (1), Eiji Aoyagi (5), Shun Ito (5), (1) Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, (2) Universiti Tunku, (3) China Academy of Engineering Physics, (4) Universiti Kebangsaan Malaysia, (5) Institute for Materials Research, Tohoku University

(17:05-17:25) **A-47** Mechanical and Thermal Properties of 3D-Printed Thermosets by Stereolithography [invited]
Sungmin Park, Anna Smallwood, ○Chang Y. Ryu, Department of Chemistry and Chemical Biology, Rensselaer Polytechnic Institute

17:25-17:40 Break

＊PST Award Ceremony＊

17:40-17:55 Chairperson: Haruyuki Okamura, Osaka Prefecture University
Report on the Selection of the Photopolymer Science and Technology Award 2019
Minoru Tsuda, President of the Society of Photopolymer Science and Technology

The Photopolymer Science and Technology Award 191100, The Outstanding Achievement Award 2019
Robert D. Allen, IBM
The Photopolymer Science and Technology Award 192100, The Best Paper Award 2019
Hiroaki Takehara, Yukihiro Kanda, and Takanori Ichiki, The University of Tokyo
The Photopolymer Science and Technology Award 192200, The Best Paper Award 2019
Satoshi Takei, Makoto Hanabata, Kento Mizui, Kazuho Kurematsu, and Shinya Nakajima, Toyama Prefectural University

18:15-20:00 **Conference Banquet at Room F (Room 103, 1F)**

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

＊Chemistry for Advanced Photopolymer Science＊

9:00-9:45 Chairpersons: Marco Sangermano, Politecnico di Torino and Haruyuki Okamura, Osaka Prefecture University

(9:00-9:45) **Keynote Lecture A-48** Smart, Responsive Polymers Based on Covalent Adaptable Networks: Photoswitchable States of Matter
Brady Worrell, Matthew McBride, Sudheendran Mavila, Alina Martinez, and ○Christopher N. Bowman, University of Colorado

9:45-10:35 Chairpersons: Cristopher N. Bowman, University of Colorado and Haruyuki Okamura, Osaka Prefecture University

(9:45-10:15) **A-49** Photopolymerization as Potential Tools for Materials Synthesis [Invited] (30 min.)
Marco Sangermano, Politecnico di Torino

(10:15-10:35) **A-50** Hybrid UV LED Device for Simulating Spectrum of High-Pressure Mercury Lamp: Evaluation in UV Curing Process
Kentaro Taki, Keigo Sawa, Kanazawa University

10:35-10:45 Break

10:45-12:05 Chairpersons: Koji Arimitsu, Tokyo University of Science and Kentaro Taki, Kanazawa University

(10:45-11:05) **A-51** Secondary Patternable UV-Imprinted Reworkable Resin by Additional Photoirradiation
Haruyuki Okamura (1), Hideki Tachi (2), (1) Osaka Prefecture University, (2) Osaka Research Institute of Industrial Science and Technology

(11:05-11:25) **A-52** Refractive index modulation by photo-Fries rearrangement of main chain-type aromatic polyurethanes
Akira Takahashi, Taichi Watanabe, Yutaro Kishi, Atsushi Kameyama, Kanagawa University

(11:25-11:45) **A-53** Deposition of polytetrafluoroethylene film assisted by synchrotron radiation irradiation
Masaya Takeuchi, Akinobu Yamaguchi, Yuichi Utsumi, University of Hyogo

(11:45-12:05) **A-54** Modification of the Transmittance of Bulk Polytetrafluoroethylene via Synchrotron Radiation Irradiation
Masaya Takeuchi (1), Akinobu Yamaguchi (1), Toshiro Kobayashi (2), Yuichi Utsumi (1), (1) University of Hyogo, (2) National Institute of Technology, Tsuyama College

12:05-13:05 Lunch

13:05-14:25 Chairpersons: Shota Suzuki, Fuji Film and Haruyuki Okamura, Osaka Prefecture University

(13:05-13:25) **A-55** Near Infrared Light Sensitive Photoinitiators: From Molecular Design to Efficient Photopolymerization
Junzhe Zhu (1), Xiuchen Zou (1), Ren Liu (1,2), Yagci Yusuf (3), ○Zhiquan Li (1,2), (1) International Research Center for Photoresponsive Molecules and Materials, Jiangnan University, (2) School of Chemical and Material Engineering, Jiangnan University, (3) Department of Chemistry, Istanbul Technical University

(13:25-13:45) **A-56** Structural analysis of ionic photobase generators and lithographic patterning of polysilane films containing the photobase generators
Kunihiro Noda (1,2), Shun Kikuchi (2), Naohiko Ikuma (1), Dai Shiota (1), Masahiro Furutani (2), Koji Arimitsu (2), (1) Tokyo Ohka Kogyo, (2) Tokyo University of Science

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(13:45-14:05) **A-57** Fluorescent assembly system capable of light-driven phase transition and fluorescence switching based on light-induced molecular switches
Ikue Abe (1), Mitsuo Hara (2), Takahiro Seki (2), Sung June Cho (3), Masaki Shimizu (4), Kazunori Matsuura (1), ○Mina Han (1,5), (1) Tottori University, (2) Nagoya University, (3) Chonnam National University, (4) Kyoto Institute of Technology, (5) Kongju National University

(14:05-14:25) **A-58** Photo-induced Aggregation of Single-walled Carbon Nanotubes from Dispersion by Using a Photochromic Dispersant
Yuki Seki (1), Kazuki Matsunaga (1), Toma Takebayashi (1), Masaya Ninoyu (1), Keiji Kakugawa (1), Vannajan Sanghiran Lee (2), Shigeru Takahara (1), (1) Chiba University, (2) University of Malaya

14:25-14:35 Break

＊Fundamentals and Applications of Biomimetics Materials and Processes＊

14:35-16:05 Chairpersons: Atsushi Sekiguchi, Litho Tech Japan and Tomoki Nisino, Ritsumeikan University

(14:35-15:20) **Keynote Lecture A-59** Wetting phenomena and energy dissipation on structured surfaces, Hiroyuki Mayama, Asahikawa Medical University

(15:20-15:45) **A-60** Living organisms under an electron microscope: the NanoSuit® [Invited] (25 min.)
Takahiko Hariyama (1), Hideya Kawasaki (1), Hiroshi Suzuki (2), Yasuharu Takaku (1), Chiaki Suzuki (1), Sayuri Takehara (1), Preeminent Medical Photonics Education & Research Center, Institute for NanoSuit Research, Hamamatsu University School of Medicine (1), Department of Chemistry, Hamamatsu University School of Medicine (2)

(15:45-16:05) **A-61** Multi-Functionalities on the Moth-Eye Surfaces
Yoshihiro Uozu, Mitsubishi Chemical

16:05-16:15 Break

16:15-17:35 Chairpersons: Atsushi Sekiguchi, Litho Tech Japan and Tomoki Nisino, Ritsumeikan University

(16:15-16:35) **A-62** Biomimetic Design Inspired Sharkskin Denticles for Growth Suppression of Biofilm
Mariko Miyazaki (1), Hiroshi Moriya (1), Akihiro Miyauchi (2), Hitachi (1), Tokyo Medical Dental University (2)

(16:35-16:55) **A-63** Barnacle settlement behaviors on microstructured surfaces with different geometric parameters
Takayuki Murosaki (1), Yasuyuki Nogata (2), Yuji Hirai (3), Asahikawa Medical University (1), Central Research Institute of Electric Power Industry (2), Chitose Institute of Science and Technology (3)

(16:55-17:15) **A-64** Bio-mimic motion of gel material dispersed with hard-magnetic particles
Minori Furusawa (1), Seiji Azukizawa (2), Hayato Shinoda (2), Kazuki Maede (2), Fujio Tsumori (3), Department of Kansei Science, Graduate School of Kyushu University (1), Department of Mechanical Engineering, Graduate School of Kyushu University (2), Department of Mechanical Engineering, Kyushu University (3)

(17:15-17:35) **A-65** Imprint Process with In-plane Compression Method for Bio-functional Surface
Kazuki Tokumaru (1,2), Fujio Tsumori (1), Kazuhiro Yonekura (1), Kyushu University (1), JSPS Research Fellow DC (2)

17:35-17:40 Break

17:40 -17:55 **＊PST Award Ceremony＊ at Room A** (Room 301)

18:15-20:00 **Conference Banquet at Room F (Room 103, 1F)**

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

＊Organic and Hybrid Solar Cells – Materials, Device Physics, and Processes＊

9:00-10:35 Chairpersons: Hideo Ohkita, Kyoto University and Yasuhiro Tachibana, RMIT University

(9:00-9:45) **Keynote Lecture A- 66** Materials for Efficient Perovskite Solar Cells
Atsushi Wakamiya, Kyoto University

(9:45-10:15) **A-67** Thermally Stable, Planar Hybrid Perovskite Solar Cells with High Efficiency [Invited] (30 min.)
Taiho Park, Pohang University of Science and Technology (POSTECH)

(10:15-10:35) **A-68** Thermal Stability Improvement in Perovskite Solar Cells without 4-*tert*-Butylpyridine
Yongyoon Cho (1,2), Hyung Do Kim (2), Hideo Ohkita (2), Shujuan Huang (1), Anita Ho-Baillie (1), (1) University of New South Wales, (2) Kyoto University

10:35-10:50 Break

10:50-12:10 Chairpersons: Itaru Osaka, Hiroshima University and Tomoya Higashihara, Yamagata University

(10:50-11:20) **A-69** Loss Processes in Non-Fullerene Acceptor Organic Solar Cells [Invited] (30 min.)
Frédéric Laquai, King Abdullah University of Science and Technology (KAUST)

(11:20-11:50) **A-70** Energetic Driving Force for Charge Generation in Bilayer Organic Solar Cells [Invited] (30 min.)
Kyohei Nakano, ○Keisuke Tajima, RIKEN Center for Emergent Matter Science (CEMS)

(11:50-12:20) **A-71** Development of Electron-accepting π-Conjugated Systems Containing Fluorine-substituted Naphthobisthiadiazole [Invited] (30 min.)
Yutaka Ie (1), Kakeru Izuno (1), Shreyam Chatterjee (1), Taichi Moriyama (2), and Yoshio Aso (1), (1) Osaka University, (2) Ishihara Sangyo Kaisha, Ltd.

12:20-13:45 Lunch

13:45-15:25 Chairpersons: Atsushi Wakamiya, Kyoto University and Itaru Osaka, Hiroshima University

(13:45-14:15) **A-72** Structure design Design of metal Metal halide Halide perovskite Perovskite solar Solar cells Cells by charge Charge carrier Carrier dynamics Dynamics [Invited] (30 min.)
Yasuhiro Tachibana (1,2), (1) RMIT University, (2) Osaka University

(14:15-14:45) **A-73** Colloidal Synthesis of Phase-Stable and Less-Defect Perovskite Nanocrystals for Application in Solar Cells [Invited] (30 min.)
Qing Shen (1), Feng Liu (1), Chao Ding (1), Yaohong Zhang (1), Hironobu Yasuda (1), Taro Toyoda (1), Shuzi Hayase (2), (1) The University of Electro-Communications, (2) Kyushu Institute of Technology

(14:45-15:05) **A-74** Comparative Study of Charge Carrier Dynamics in Bismuth-based Dimers and Double Perovskites
Ryosuke Nishikubo (1), Akinori Saeki (1,2), (1) Osaka University, (2) PRESTO, Japan Science and Technology Agency

(15:05-15:25) **A-75** Determine the Chemical Composition of the Termination Layer of Solution-processed Perovskite Film by Electron Spectroscopies
Abduheber Mirzehmet, Hiroyuki Yoshida, Chiba University

15:25-15:40 Break

Continue to the following page

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

15:40-17:00 Chairpersons: Keisuke Tajima, RIKEN CEMS and Hideo Ohkita, Kyoto University

(15:40-16:10) **A-76** Materials Development for Solution-Processed Solar Cells [Invited] (30 min.)
Liming Ding, Zuo Xiao, National Center for Nanoscience and Technology

(16:10-16:40) **A-77** Synthesis, Morphology, and Optoelectronic Properties of Stretchable Semiconducting Block Copolymers [Invited] (30 min.)
Tomoya Higashihara, Yamagata University

(16:40-17:00) **A-78** Crystalline and Amorphous Conjugated Polymers for Organic Photovoltaics
Itaru Osaka, Hiroshima University

17:00 -17:40 Break

17:40 -17:55 **＊PST Award Ceremony＊ at Room A** (Room 301)

18:15-20:00 **Conference Banquet at Room F (Room 103, 1F)**

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

＊EUV Lithography＊

9:00-10:20 Chairpersons: Taku Hirayama, Merck and Greg Denbeaux, SUNY

(9:00-9:30) **A-79** High NA EUV Research at Berkeley Lab [Invited] (30 min.)
Patrick Naulleau, Berkeley Lab

(9:30-10:00) **A-80** Alternative Developer Solutions and Processes for EUV and ArFi Lithography [Invited] (30 min.)
Julius Joseph Santillan, Toshiro Itani, Osaka University

(10:00-10:20) **A-81** Resonant Soft X-ray Scattering for the Stochastic Origin Analysis in EUV Resist
Jun Tanaka, Takuma Ishiguro, Tetsuo Harada, Takeo Watanabe, Center for EUV Lithography, Laboratory of Advanced Science and Technology for Industry, University of Hyogo

10:20-10:35 Break

10:35-12:15 Chairpersons: Julius Joseph Santillan, Osaka University and Danilo De Simone, IMEC

(10:35-10:55) **A-82** Resonant Soft X-ray Reflectivity for the Chemical Analysis in Thickness Direction of EUV Resist
Takuma Ishiguro, Jun Tanaka, Tetsuo Harada, Takeo Watanabe, Center for EUV Lithography, Laboratory of Advanced Science and Technology for Industry, University of Hyogo

(10:55-11:25) **A-83** Thermally Induced Acid Generation [Invited] (30 min.)
Jesus Barragan, David Gregory, Robert, L. Brainard, Greg Denbeaux, Colleges of Nanoscale Science and Engineering, SUNY Polytechnic Institute

(11:25-11:55) **A-84** Finding the Proton Sources for Acid Generation in Chemically Amplified Resists [Invited] (30 min.)
Steven Grzeskowiak, Michael Murphy, Sean Gibbons, Robert L. Brainard, Greg Denbeaux, Colleges of Nanoscale Science and Engineering, SUNY Polytechnic Institute

(11:55-12:15) **A-130** Metal Organic Cluster Photoresists for EUV Lithography
Kazunori Sakai (1,2), Seok Heon Jung (1), Wenyang Pan (1), Emmanuel P. Giannelis (1), and Christopher K. Ober (1), (1) Cornell University, (2) JSR

12:15-13:30 Lunch

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

＊Computational /Analysis Approach For Lithography＊

13:30-14:35 Chairpersons: Chris A. Mack, Fractilia, LLC and Tomoki Nagai, JSR

(13:30-14:15) **Keynote Lecture A-85** Using Unbiased Roughness Power Spectral Density Measurements
Chris A. Mack, Fractilia, LLC

(14:15-14:35) **A-87** Modeling the Impact of Shrinkage Effects on Photoresist Development [Invited]
Sean D'Silva (1), Thomas Muelders (2), Hans-Juergen Stock (2), Andreas Erdmann (1), (1) Fraunhofer IISB, (2) Synopsys

14:35-15:10 Break

15:10-17:10 Chairpersons: Chris A. Mack, Fractilia, LLC and Tomoki Nagai, JSR

(15:10-15:30) **A-88** Computational Study of Pattern Formation for Chemically Amplified Resist in Extreme Ultraviolet Lithography [Invited]
Masaaki Yasuda, Masanori Koyama, Kosei Fukunari, Masamitsu Shirai, Hiroaki Kawata, Yoshihiko Hirai, Department of Physics and Electronics, Osaka Prefecture University

(15:30-15:50) **A-89** Stochastic Effects in EUV Lithography - Exploring Sensitivities Through Simulation [Invited]
Hironobu Taoka, Ulrich Welling, Hans-Juergen Stock, Wolfgang Demmerle, Synopsys

(15:50-16:10) **A-90** Built-in Lens Mask Technology for Generating Three Dimensional Image based on Computational Lithography
Akio Misaka, Daiki Sugihara, Kousuke Sato, Masaru Sasago, Yoshihiko Hirai, Department of Physics and Electronics, Osaka Prefecture University

(16:10-16:30) **A-91** Resist patterning characteristics using KrF laser-ablation process
Julius Joseph Santillan, Toshiro Itani, Osaka University

(16:30-16:50) **A-92** Understanding of Strategic Design of Resist Formulation Through Studying of Acid Diffusion Controllers and Those Contributions to High Resolution Patterning
Choong-Bong Lee, James Park, Charlotte Cutler, Jason DeSisto, Rochelle Rena, Tomas Marangoni, Emad Aqad, James W. Thackeray, Dupont

(16:50-17:10) **A-129** Roughness Power Spectral Density as a Function of Aerial Image and Basic Process/Resist Parameters
Charlotte Cutler (1), ○Choong-Bong Lee (1), James W. Thackeray (1), Peter Trefonas (1), John Nelson (1), Jason DeSisto (1), Rochelle Rena (1), Chris Mack (2), (1) Dupont, (2) Fractilia, LLC

17:10-18:00 Break

18:00-18:10 **Closing Remarks: at Room B (Room 302)**

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

＊Fundamentals and Applications of Biomimetics Materials and Processes＊

9:00-10:00 Chairpersons: Atsushi Sekiguchi, Litho Tech Japan and Tomoki Nisino, Ritsumeikan University

(9:00-9:20) **A-93** Fabrication of morpho structure using lithography technology
Tomoki Nishino (1), Hiroshi Tanigawa (2), and Atsushi Sekiguchi (2), College of Science and Engineering, Ritsumeikan University (1), The Research Organization of Science and Technology, Ritsumeikan University (2)

(9:20-9:40) **A-94** The Study of bile duct stent having antifouling properties using biomimetics technique
Atsushi Sekiguchi (1), Tomoki Nishino (1), Masayasu Aikawa (2), Yoko Matsumoto (3), Hiroko Minami (3), Kazuki Tokumaru (4), Fujio Tsumori (4), Hiroshi Tanigawa (1), Ritsumeikan University (1), Saitama Medical University (2), Litho Tech Japan (3), Kyushu University (4)

(9:40-10:00) **A-95** Evaluation of oil repellent effect by metamaterial structure
Tomoki Nishino (1), Hiroshi Tanigawa (2), and Atsushi Sekiguchi (2), College of Science and Engineering, Ritsumeikan University (1), The Research Organization of Science and Technology, Ritsumeikan University (2)

10:00-10:10 Break

＊Directed Self Assembly (DSA)＊

10:10-11:35 Chairpersons: Tsukasa Azuma, Toshiba Memory Corporation and Seiji Nagahara, Tokyo Electron Ltd.

(10:10-10:55) **Keynote Lecture A-96** Designed Block Copolymers for Directed Self-Assembly and Nanofabrication
Teruaki Hayakawa, Tokyo Institute of Technology

Chairpersons: Tsukasa Azuma, Toshiba Memory Corporation and Seiji Nagahara, Tokyo Electron Ltd.

(10:55-11:15) **A-97** Si Nanostructures via Sequential Infiltration Synthesis in Self-Assembled Block-Copolymer Templates [Invited]
Michele Perego (1), Gabriele Seguini (1), Federica E. Caligiore (1), Elena Cianci (1), Soonmin Yim (2), Paul Nealey (2), Ahmed Gharbi (3), Raluca Tiron (3), (1) IMM-CNR, Unit of Agrate Brianza, (2) Institute for Molecular Engineering, The University of Chicago, (3) CEA-LETI

(11:15-11:35) **A-98** New Approaches for the Integration of L/S Chemo-Epitaxy DSA [Invited]
Tommaso J. Giammaria (1), Ahmed Gharbi (1), Anne Paquet (1,2), Aurelie Le Pennec (1), Christophe Navarro (2), Celia Nicolet (2), Paul F. Nealey (3), Raluca Tiron (1), (1) CEA-LETI, (2) Arkema GRL, (3) University of Chicago

11:35-12:35 Lunch

12:35-13:55 Chairpersons: Florian Gstrein, Intel and Seiji Nagahara, Tokyo Electron Ltd.

(12:35-12:55) **A-99** DSA: Current Status and the Future Needs [Invited]
Chandra Sarma, Intel Corp

(12:55-13:15) **A-100** DSA of Lamellar and Cylindrical Phases of Block Copolymers: Nano-Imprint Lithography and Corrugated Surfaces
David Andelman (1), Patrick Guenoun (2), Jean Daillant (3), Henri Orland (4), Karim Aissou (5), Yanyan Zhu (6), Xingkun Man (6), (1) School of Physics and Astronomy, Tel Aviv University, (2) IRAMIS, SIS2M LIONS, CEA-Saclay, (3) Synchrotron SOLEIL, (4) Institute for Theoretical Physics, CEA-Saclay, (5) European Institute of Membranes, Montpellier University, (6) School of Physics and Nuclear Energy Engineering, Beihang University

(13:15-13:35) **A-101** Self-assembly of Block Copolymer materials with 7-5 nm microdomains
Xuemiao Li, ○Hai Deng, Fudan University

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

(13:35-13:55) **A-102** EUV & DSA: complementary technologies for future nodes [Invited]
Douglas J. Guerrero, Nick Brakensiek, Mary Ann Hockey, Richard Daugherty, James Lamb III, Brewer Science, Inc.

13:55-14:05 Break

14:05-15:25 Chairpersons: Teruaki Hayakawa, Tokyo Institute of Technology and Takehiro Seshimo, Tokyo Ohka Kougyo

(14:05-14:25) **A-103** High-Chi Silicon Containing Block Copolymers: Materials and Processes for Orientation Control and Directed Self-Assembly [Invited]
Christopher J. Ellison (1) and C. Grant Willson (2), (1) Department of Chemical Engineering and Materials Science, University of Minnesota, (2) Departments of Chemistry and Chemical Engineering, University of Texas at Austin

(14:25-14:45) **A-104** Chemical Modification of Poly(Styrene-block-Methyl Methacrylate) for Increased Self Assembly Performance in Thin Films
Kevin Wylie, Yuta Nabae and Teruaki Hayakawa, Tokyo Institute of Technology

(14:45-15:05) **A-105** Design of Block Copolymer Resists for Sub-10 nm Lithography
J. Sun (1), K. Azuma (2), T. Hayakawa (2), ○P. Gopalan (1), (1) University of Wisconsin-Madison, (2) Tokyo Institute of Technology

(15:05-15:25) **A-106** Fluorination Effect on Morphological Behavior of PS-b-PtBMA from Disorder to Order Structures
Seongjun Jo, Seongjin Park, Taesuk Jun, Yeongsik Kim, and Du Yeol Ryu, Department of Chemical and Biomolecular Engineering, Yonsei University, Korea

15:25-15:35 Break

15:35-17:55 Chairpersons: Teruaki Hayakawa, Tokyo Institute of Technology and Tsukasa Azuma, Toshiba Memory Corporation

(15:35-15:55) **A-107** Precise Syntheses of Copolymers with Controlled Sequence and Topology toward Unique Self-Assembly [Invited]
Makoto Ouchi, Kyoto University

(15:55-16:15) **A-108** Hemicellulose Block Copolymers for Advanced Lithography Process [Invited]
Kazuyo Morita (1), Kimiko Yamamoto (1), Masahiko Harumoto (2), Yuji Tanaka (2), Chisayo Nakayama (2), Yo Arisawa (2), Tomohiro Motono (2), Masaya Asai (2) and Charles Pieczulewski (2), (1) Oji Holdings, (2) SCREEN Semiconductor Solutions

(16:15-16:35) **A-109** New Synthetic Approach for Block Copolymers with Sub-5 nm Feature Size
Zhilong Li, Hai Deng, Fudan University

(16:35-16:55) **A-110** Precise synthesis of Block Copolymers for Directed Self-Assembly
Youki Kou, Hisakazu Tanaka, DIC

(16:55-17:15) **A-111** Synchrotron radiation for the understanding of block copolymer self assembly [Invited]
Marta Fernandez-Regulez, Christian Pinto-Gomez, Francesc Perez-Murano, Instituto de Microelectronica de Barcelona

(17:15-17:35) **A-112** Ultrafast Self-Assembly of High &chi& Block Copolymer by Flash Light for Large-Scale Sub-10nm Nanopattern
Kyu Hyo Han (1), Hyeong Min Jin (2), Keon Jae Lee (1), ○Sang Ouk Kim (1), (1) Korea Advanced Institute of Science and Technology (KAIST), (2) Korea Atomic Energy Research Institute (KAERI)

(17:35-17:55) **A-113** Laser Induced Block Copolymer Self-assembly on Chemically Modified Graphene Light Absorbing Layer
Geon Gug Yang, Hyeong Min Jin, ○Sang Ouk Kim, Korea Advanced Institute of Science and Technology (KAIST)

17:55-18:00 Break

18:00-18:10 **Closing Remarks:** Seiji Nagahara, Symposium Chair of Directed Self Assembly (DSA), the Symposium most contributing to ICPST-36 (2019)

＊Flexible Packaging＊

9:00-10:15 Chairpersons: Sanjay Malik, FUJIFILM Electronic Materials, Kuniharu Takei, Osaka Prefecture University and Masao Tomikawa, Toray Industries Inc.

(9:00-9:25) **A-114** High-performance Flexible Near-infrared Photodetectors [Invited] (25 min.)
Johnny C. Ho, City University of Hong Kong

(9:25-9:50) **A-115** Transparent and Stretchable Electrodes for Long Therapeutic Bio-Applications [Invited] (25 min.)
Teppei Araki, Takafumi Uemura, Shusuke Yoshimoto, Yuki Noda, Shintaro Izumi, Tsuyoshi Sekitani, Osaka University

(9:50-10:15) **A-116** Flexible and Printed Sensor Devices for Healthcare [Invited] (25 min.)
Tomohito Sekine (1), Yasunori Takeda (1), Daisuke Kumaki (1) Fabrice Domingues dos Santos (2), Atsushi Miyabo (3), Shizuo Tokito (1), (1) Yamagata University, (2) Piezotech, (3) ARKEMA

10:15-10:25 Break

10:25-12:30 Chairpersons: Robert Allen, IBM and Akira Watanabe, Tohoku University

(10:25-10:50) **A-117** Bio-inspired Materials for Flexible Sensors [Invited] (25 min.)
Hyunhyub Ko, Ulsan National Institute of Science and Technology

(10:50-11:15) **A-118** Ultra-Flexible Organic Electronics for Bio-Medical Application [Invited] (25 min.)
Tomoyuki Yokota, Takao Someya, The University of Tokyo

(11:15-11:40) **A-119** Inkjet-Printed Stretchable Electronic Devices, Circuits, Sensors, and Displays [Invited] (25 min.)
Chuan Wang, Washington University in St. Louis

(11:40-12:05) **A-120** Printable Fabrication of Integrated and Self-powered Sensor System on Flexible Substrates [Invited] (25 min.)
Yuanjing Lin, ○ Zhiyong Fan, The Hong Kong University of Science and Technology

(12:05-12:30) **A-121** Wearable Power Generation Biodevices on Human Skin [Invited] (25 min.)
Takeo Miyake, Waseda University

12:30-13:30 Lunch

＊193 nm Lithography Extension＊

13:30-15:05 Chairpersons: Wang Yueh, Intel and Yasunobu Onishi, The University of Tokyo

(13:30-13:55) **A-122** Novel Fast Etch Rate BARC for ArF Implant Layer Lithography [invited] (25 min.)
Jin Hong Park, You Rim Shin, Hye-Won Lee, and Soo-Jung Leem, Dow Chemical

(13:55-14:20) **A-123** Wafer CD uniformity improvement in negative tone development process [invited] (25 min.)
HaeJin Lim, BongSu Kim, ChangYoung Hong, DuPont Electronics & Imaging

(14:20-14:45) **A-124** Challenges and Progress in Defectivity for Advanced ArF Lithography Process [invited] (25 min.)
Naohiro Tango (1), Kei Yamamoto (1), Michihiro Shirakawa (1), Keiyu O (1), Akiyoshi Goto (2), Mitsuhiro Fujita (3), Yasuharu Shiraishi (3), and Toru Fujimori (1), Electronic Materials Research Laboratories (1), Synthetic Organic Chemistry Laboratories (2), Analysis Technology Center Technology Center (3), FUJIFILM

＊Next Generation Lithography, EB Lithography and Nanotechnology＊

14:45-15:05 Chairpersons: Wang Yueh, Intel and Yasunobu Onishi, The University of Tokyo

(14:45-15:05) **A-125** Improvement of Graphene FET Characteristics by Eliminating Aromatic Rings in Fabrication Resist
Hiroko Nakamura, Reiko Yoshimura, Toshiba

15:05-15:20 Break

＊General Scopes of Photopolymer Science and Technology＊

15:20-16:20 Chairperson: Haruyuki Okamura, Osaka Prefecture University

(15:20-15:40) **A-126** Development and Optimization of UV-Induced Chemical Foaming Process
Podchara Rattanakawin, Kai Yamamura, Kenji Yoshimoto, Masahiro Ohshima, Kyoto University

(15:40-16:00) **A-127** UV LED Curable Hydrogel-Modified Textiles with High Oil-Fouling Resistance
Siti Samahani Suradi, Jamarosliza Jamaluddin, Farahin M Mizi, Universiti Teknologi Malaysia

(16:00-16:20) **A-128** The Effectiveness of UV-LED Curing versus Conventional UV-Mercury Photopolymerisations of Urethane Acrylate Coating
Siti Khairunnisah Ghazali, Fatria Syaimima Syaiful Azim, Nadia Adrus, Universiti Teknologi Malaysia

16:20-18:00 Break

18:00-18:10 **Closing Remarks: at Room B (Room 302)**

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

10:45-12:00 座長： 久留米高等専門学校 津田祐輔、茨城大学 森川 敦司

(10:45-11:10) **B1-01** Photoluminescence Properties of Novel Fluorescent Polyimides based on Excited State Intramolecular Proton Transfer at the End Groups
Tokyo Institute of Technology Naiqiang Liang, Eisuke Fujiwara, Mayuko Nara, Ryohei Ishige, ○Shinji Ando

(11:10-11:35) **B1-02** 固有微細孔性高分子/シリカナノ粒子複合膜のCO2透過性に与える化学修飾の影響
首都大学東京 ○今井 綾乃、三上 寛翔、伊藤 瑛子、田中 学、山登 正文、川上 浩良

(11:35-12:00) **B1-03** カルド構造を有する新規エポキシ樹脂の開発
横浜国立大学 ○所 雄一郎，柳沼 雄大，大山 俊幸

12:00-13:00 昼食休憩

13:00-14:00 座長：東レ 富川真佐夫

基調講演 B1-04 パワーモジュールパッケージング技術のトレンドとポリマー材料への期待
三菱電機 西村 隆

14:00-15:15 座長：岩手大学 大石好行、横浜国立大学 大山俊幸

(14:00-14:25) **B1-05** Trench Wiring Process Applying Electroless Nickel Plating for Fine and High Aspect Ratio Pattern
日立化成 (1)，メルテックス(2) 横地 精吾 (1)，岩下 健一 (1)，吉田 哲也 (1)，小松 雅 (2)，塚原 義人 (2)

(14:25-14:50) **B1-06** スピロピラン骨格を有するフッ素化ポリイミドの光照射よる表面濡れ性の可逆的制御
久留米高専 ○津田 祐輔，山内 元太

(14:50-15:15) **B1-07** 感光性高屈折率シロキサン材料
東レ株式会社電子情報材料研究所 ○日比野 利保、鳴戸 真之、今西 世志美、諏訪 充史

15:15-15:30 休憩

15:30-16:20 座長：東京工業大学 安藤慎治，柿本 雅明

(15:30-15:55) **B1-08** 様々な数のフェニレン基を持つ酸無水物と５つのエーテル連結を持つ芳香族ジアミンからのポリイミドの合成とその性質
茨城大学 梅澤 敦彦、○森川 敦司

(15:55-16:20) **B1-09** 様々な数のフェニレン基を持つ酸無水物とｐ－フェニレンジアミンからの剛直なポリイミドの合成とその性質
茨城大学 細谷 悠佑、○森川 敦司

(16:20-16:45) **B1-10** 低熱膨張係数を有するトリアジン含有芳香族ポリベンゾオキサゾールフィルムの作製と特性
岩手大学 土橋 祐大，塚本 匡，芝﨑 祐二，○大石 好行

(16:45-17:10) **B1-11** 耐熱透明ポリケトン
日立化成 ○松谷 寛，有馬 菜々子，石川 洋平，松永 昌大，岡田 穣

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

10:50-11:50 座長：秋田大学　河村　希典，高分子学会フェロー　長谷川悦雄

(10:50-11:10) **B3-01** 2周波駆動液晶によるハイブリッド配向リバースモード素子のルーバー機能
秋田大学　山口 留美子，牛崎　遼

(11:10-11:30) **B3-02** 配向膜フリーでの低分子液晶の光配向
(1) 兵庫県立大学，(2) 日産化学，(3) 長岡技術科学大学
小寺　晃一 (1)，後藤　耕平 (2)，南　悟志 (2)，佐々木　友之　(3)，　野田　浩平 (3)，小野　浩司 (3)，川月　喜弘 (1)

(11:30-11:50) **B3-03** 光分解ポリイミド膜における液晶配向能とUV感度の改善
(1)日産化学材料科学研究所，(2) 日産化学物質科学研究所，(3) NCK
石井　秀則 (1)，鉄谷　尚士 (2)，名木　達哉 (3)

11:50-13:00 昼食休憩

13:00-13:40 座長：JST　木原尚子，高分子学会フェロー　長谷川悦雄

(13:00-13:40) **基調講演 B3-04**　液晶レンズとその応用
秋田大学　河村　希典

13:40-13:50 休憩

13:50-14:30 座長：高分子学会フェロー　長谷川悦雄，JST　木原尚子

(13:50-14:30) **基調講演 B3-05**　n 型半導体高分子の開発とトランジスタ応用
東京工業大学　道信　剛志

14:30-14:40 休憩

14:40-15:40 座長：東京工業大学　道信　剛志，高分子学会フェロー　長谷川悦雄

(14:40-15:00) **B3-07**　酸化亜鉛/エトキシ化ポリエチレンイミン/リチウムビストリフルオロメタンサルフォニルイミド電子注入層を用いた低電圧駆動する塗布型有機EL素子
山形大学　近安　佑樹，大久　哲，高橋　達弥，千葉　貴之，城戸　淳二

(15:00-15:20) **B3-06** ポリエチレンイミンを用いた逆構造型有機EL素子の電導および発光特性
愛知工業大学　森　竜雄，○青山　悟，清家　善之

(15:20-15:40) **B3-08**　アルコキシ置換ビチオフェンを含むドナー-アクセプター型高分子の合成と物性
広島大学　今榮　一郎，多田　直史，　播磨　裕

15:40-15:50 休憩

15:50-17:10 座長：広島大学　今榮　一郎，　JST　木原尚子

(15:50-16:10) **B3-09** Gradient-Tint Electrochromic Devices with Metallo-Supramolecular Polymer
National Institute for Materials Science　Masayoshi Higuchi, Yukio Fujii

(16:10-16:30) **B3-10**　ビスマス集積発光デンドリマーのスイッチングとクラスター合成
(1) 東京工業大学，(2) JST-ERATO　神戸　徹也 (1,2)，今岡　享稔 (1,2)，
山元　公寿 (1,2)

(16:30-16:50) **B3-11** Ho, Er, Tm, Ybをドープしたβサイトオーダーダブルペロブスカイト型酸化物アップコンバージョン蛍光体
(1) 東海大学，(2) 岡山理科大学，(3) 名古屋大学，(4) 東北大学
粕谷　航平 (1)，佐藤　泰史 (2)，小林　亮 (3)，加藤　英樹 (4)，垣花　眞人 (4)，冨田　恒之 (1)

(16:50-17:10) **B3-12**　Snを含むペロブスカイト太陽電池の高効率化
(1) 九州工業大学，(2) 電気通信大学，(3) 立命館大学，(4) 宮崎大学　濱田　健吾 (1)，廣谷　太佑 (1)，アクマル　カマルディン (1)，西村　滉平 (1)，沈　青(2)，飯久保　智 (1)，峯元　高志 (3)，吉野　賢二 (4)，豊田　太郎 (2)，早瀬　修二 (1)

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

9:30-11:30 座長：埼玉工大　矢嶋龍彦、九州大総理工 林 信哉

(9:30-10:00) **B2-01** プラズマ誘起糖ラジカルを利用した新規高分子プロドラッグの開発
松山大薬 (1), 岐阜薬大 (2), 中部学院大 (3)　山内行玄 (1), 土井直樹 (2), 近藤伸一(2), 笹井泰志 (2), 葛谷昌之 (3)

(10:00-10:30) **B2-02** RF-プラズマCDV法で成膜したSi添加DLC被覆マグネシウム合金ステントの耐食性評価
岡山理大 (1), 日本医療機器技研 (2) 中谷達行 (1), 竹内陽道 (1), 和田晃 (2), 山下修藏 (2)

(10:30-11:00) **B2-03** プラズマエッチバックとリフトオフプロセスによるマイクロリアクターアレイチップの選択的表面改質
ナノ医療イノベーションセンター (1), 東京大 (2)　佐藤秀介 (1,2), 上野真吾 (1,2), 一木隆範 (1,2)

(11:00-11:30) **B2-04** 大気圧プラズマ表面処理を用いた液晶ポリマーの無接着剤ラミネート法の開発
上智大　佐藤公哉, 小駒益弘, 田中邦翁

11:30-13:00 昼食休憩

13:00-14:30 座長：東京大　一木隆範、千葉工大院　井上 泰志

(13:00-13:30) **B2-05** 大気圧プラズマ照射によるマクロファージ様細胞の成長率変化
九州大総理工　ヤオ・イーチー, 林 信哉

(13:30-14:00) **B2-06** タンパク質の吸着汚染抑制を目的としたカーボン薄膜電極の気相処理法に関する比較検討
埼玉工大院 (1), 埼玉工大 (2), 産総研(3)　太田早紀 (1,2), 芝 駿介 (2), 矢嶋龍彦 (2), 鎌田智之 (3), 加藤 大 (3), 丹羽 修 (1,2)

(14:00-14:30) **B2-07** 生体適合性高分子ブラシへの細胞接着におけるプラズマ表面処理の効果
岐阜薬大 (1), 松山大 (2),中部学院大 (3) 笹井泰志 (1), 土井直樹 (1), 山内行玄 (2), 葛谷昌之 (3), 近藤伸一 (1)

14:30-14:45 休憩

14:45-16:45 座長：上智大 小駒益弘,　岡山理大　中谷達行

(14:45-15:15) **B2-08** 中間リング電極を有するエレクトロスプレー堆積装置の動作解析
東京大 (1), ナノ医療イノベーションセンター (2)　桑畑湧太 (1), 竹原宏明 (1,2), 一木隆範 (1,2)

(15:15-15:45) **B2-09** スパッタリング-プラズマCVDハイブリッドプロセスによるLiドープSiO:CH薄膜の作製
千葉工大院 (1), 千葉工大 (2), 関東学院大 (3)　菅野匡宏 (1), 矢崎 衛 (1), 井上泰志 (1,2), 高井 治 (3)

(15:45-16:15) **B2-10** 大気圧プラズマリアクターの放電特性
大阪市大　　呉 準席, 今井創志, 佐々木佑輔、白藤 立

(16:15-16:45) **B2-11** プラズマを利用して構築した高分子ナノフィルムの薬物キャリヤーとしての応用
岐阜薬大 (1), 松山大薬 (2), 中部学院大 (3)　近藤伸一 (1), 笹井泰志 (1), 土井直樹 (1), 山内行玄 (2), 葛谷昌之 (3)

16:45-17:00 休憩

Japanese Symposium: Plasma Photochemistry and Functionalization of Polymer Surface

Japanese Symposium: Resist Removal Technology

日本語シンポジウム：レジスト除去技術

17:00-17:20 座長：大阪市立大学　堀邊　英夫，大阪工業大学　神村　共住

(17:00-17:20) **B4-01** 大気圧プラズマジェットから供給される活性種の流水面上での反応過程～ガスドラッグの効果～（招待講演）

大阪市立大学大学院　白藤　立，呉　準席

Japanese Symposium: Resist Removal Technology

日本語シンポジウム：レジスト除去技術

9:30-10:30 座長：大阪市立大学　堀邊　英夫, 大阪工業大学　神村　共住, 香川高等専門学校　山本雅史

(9:30-9:50) **B4-02** レーザー照射を用いたフォトレジスト材料おける剥離現象の比較（招待講演）
大阪工業大学 (1), 大阪大学 (2), 大阪市立大学 (3)
神村　共住 (1), 西岡　直樹 (1), 梅田　悠史 (1), 島　大地 (1), 船本　祐介 (1), 原田　義之 (1), 吉村　政志 (2), 中村　亮介 (2), 堀邊　英夫 (3)

(9:50-10:10) **B4-03** イリジウム加熱触媒体で生成した水素ラジカルを用いたレジスト除去速度と酸素添加量との関係
香川高専 (1), 静岡大学 (2), 大阪市立大学 (3)
山本　雅史 (1), 城井　智弘 (1), 鹿間　共一 (1), 長岡　史郎 (1), 梅本　宏信 (2), 堀邊　英夫 (3)

(10:10-10:30) **B4-04** Oxidative Decomposition of Organic Compounds by Ozone Microbubbles in Water
Osaka City University
Yuta Koda, Terumi Miyazaki, Eriko Sato, Hideo Horibe

10:30-10:45 休憩

Japanese Symposium: General Scopes of Photopolymer Science and Technology

日本語シンポジウム：一般講演

10:45-12:05 座長：千葉大学　高原　茂、立命館大学　西野　朋季

(10:45-11:05) **B4-05** ジピリジルジスルフィド架橋構造を有するアクリラート光接着剤
東京理科大学　古谷　昌大, 中山　健太郎, 大熊　一輝, 有光　晃二

(11:05-11:25) **B4-06** ジスルフィド交換反応を利用したUV硬化物の収縮解消
東京理科大学　古谷　昌大, 大熊　一輝, 有光　晃二

(11:25-11:45) **B4-07** 光インプリントリソグラフィの利用を目指した異なる金属密度を持つ積層型材のガス透過性評価
(1) 三光合成, (2) 富山県立大学　杉野 直人 (1), 水井 研登 (2), 花畑 誠 (2), 竹井 敏 (2)

(11:45-12:05) **B4-08** 液晶素子を用いたレーザースペックルノイズの低減
東京理科大学　柴瀬　惇志, 古江　広和

12:05-13:05 昼食休憩

次頁に続く

Japanese Symposium: General Scopes of Photopolymer Science and Technology
日本語シンポジウム: 一般講演

13:05-14:45 座長：東京理科大学　有光晃二

(13:05-13:25) **B4-09** セルロース誘導体を用いたカラーフィルムの創製
(1) 東京理科大学大学院, (2) 東京理科大学　府川　将司 (1), 川口　茜 (2), 早田　健一郎 (2), 青木　瑠璃 (2), 古川　真実 (2), 障子　雄介 (1), 鈴木　達也 (1), 古海　誓一 (1,2)

(13:25-13:45) **B4-10** イオノンを用いた人体にやさしい液晶材料の創製
(1) 東京理科大学, (2) 東京理科大学大学院　川口　茜 (1), 青木　瑠璃 (1), 早田　健一郎 (1), 古川　真実 (1), 府川　将司 (2), 障子　雄介 (2), 鈴木　達也 (2), 古海　誓一 (1,2)

(13:45-14:05) **B4-11** エステルとカルバメートを導入したセルロース誘導体のサーモトロピックなコレステリック液晶
(1) 東京理科大学大学院, (2) 東京理科大学　早田　健一郎 (1), 青木　瑠璃 (1), 川口　茜 (1), 古川　真実 (1)、鈴木　達也 (2), 府川　将司 (2), 障子　雄介 (2), 古海　誓一 (1,2)

(14:05-14:25) **B4-12** セルロース誘導体とジアクリレートの混合物によるカラーフィルムの作製
(1) 東京理科大学, (2) 東京理科大学大学院　青木　瑠璃 (1), 府川　将司 (2), 川口　茜 (1), 早田　健一郎 (1), 古川　真実 (1), 障子　雄介 (2), 鈴木　達也 (2), 古海　誓一 (1,2)

(14:25-14:45) **B4-13** CuInS2 半導体ナノ結晶とポリアクリレートを組み合わせた発光フイルムの創製
(1) 東京理科大学, (2) 東京理科大学大学院　古川　真実 (1), 山根　拓也 (2), 宮﨑　達也 (1), 酒井　瞭 (2), 府川　将司 (2), 青木　瑠璃 (1), 川口　茜 (1), 早田　健一郎 (1), 光山　健太 (2), 障子　雄介 (2), 金子　希望 (2), 鈴木　達也 (2), 古海　誓一 (1,2)

14:45-15:00 休憩

15:00-16:20 座長：富山県立大学　竹井 敏、東京理科大学　古海　誓一

(15:00-15:20) **B4-14** 共振原理を用いた撥油評価
(1) 立命館大学理工学部機械工学科, (2) 立命館大学科学技術研究機構 西野朋季 (1), 谷川紘 (2), 関口淳 (2)

(15:20-15:40) **B4-15** 高反射性を有する厚膜感光性遮光材料
東レ　飯塚　英祐, 小林　秀行, 諏訪　充史

(15:40-16:00) **B4-16** ArF(193nm)露光における ArF 化学増幅レジストからのアウトガスの検討
(1) 立命館大学, (2) リソテックジャパン　関口　淳 (1), 南　紘子 (2), 松本　陽子 (2), 西野　朋季 (1)

(16:00-16:20) **B4-17** ブラックマトリクスレジストのリソグラフィ特性の解析
(1) 立命館大学, (2) リソテックジャパン, (3) 容大感光科技股份有限公司 関口　淳 (1), 西野　朋季 (1), 南　紘子 (2), 松本　陽子 (2), Yan Kai (3)

18:00-18:10 **Closing Remarks: at Room B (Room 302)**

Banquet

Banquet will be open at 18:15 on June 26, 2019. Banquet fee is 6,000 JPY on site.

Language & Presentation

English is used for presentations in English Symposia and Panel Symposium, "Nanoimprint Lithography for Next Generation". 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.

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懇親会

6 月 26 日（水）18 時 15 分より　当日参加費 6,000 円

講演言語　国際シンポジウム、国際セッション（一般講演）、著者および講演題目が共に英語で記載されている講演は英語で行い、それ以外の講演は日本語で行います。

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ICPST-36

第３６回
国際フォトポリマーコンファレンス

アドバンスドリソグラフィー、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－

２０１９年6月２４日（月）～２７日（木）
幕張メッセ国際会議場
（JR 海浜幕張駅下車徒歩５分）

主催：　フォトポリマー学会（SPST）
協賛：　フォトポリマー懇話会　日本化学会　高分子学会
後援：　応用物理学会　千葉大学