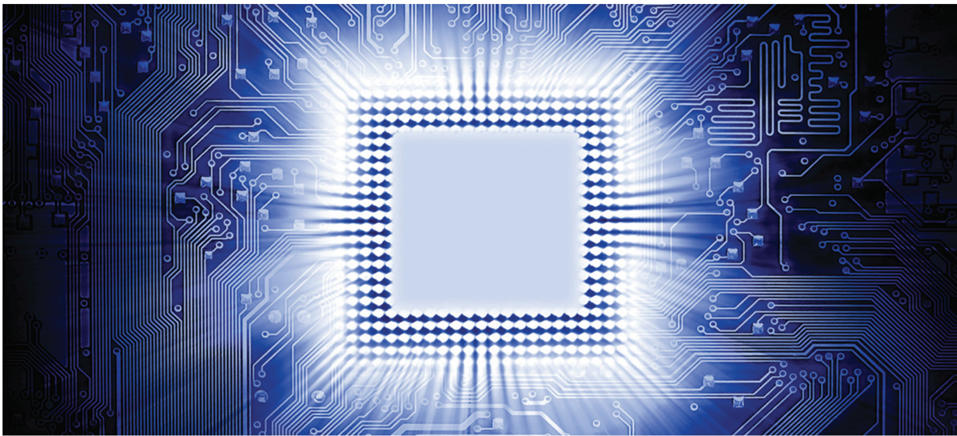
SPIE Lithography Asia Taiwan

Technical Program

Conference and Exhibition: 18–19 November 2009
Sheraton Taipei Hotel
Taipei, Taiwan



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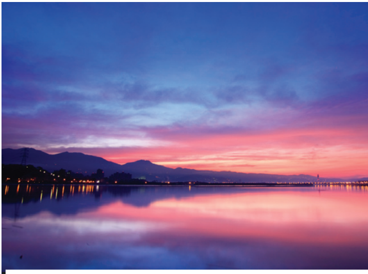

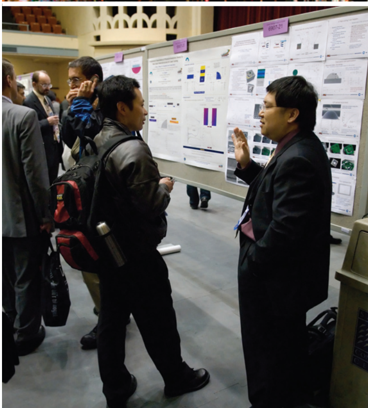

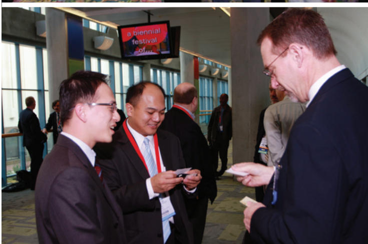

SPIE Lithography Asia Taiwan

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A special thank you to the following sponsoring companies.

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Kuen-Yu Tsai, National Taiwan Univ. (Taiwan)

Geert Vandenberghe, IMEC (Belgium)

Dong-Gyu Yim, Hynix Semiconductor Inc. (Korea, Republic of)

Gary Guohong Zhang, The Dow Chemical Co. (USA)

Welcome to SPIE Lithography Asia—Taiwan 2009

It is our great pleasure to welcome you to the second SPIE Lithography Asia conference, featuring presentations from leading researchers, developers, and innovators. This is your opportunity to hear the latest research and connect with others working at the leading edge of patterning technology for the microelectronics industry.

The semiconductor and FPD industries have expanded globally for several decades, and now a major portion of microelectronics and FPD products are manufactured in Asia. This has brought an increasing segment of R&D for lithography processes and equipment technology to Asia as well. Furthermore, the pace of innovation and development has progressively accelerated in recent years. This conference is intended to stimulate a face-to-face exchange of the latest developments of microlithography techniques used in the current and future electronics manufacturing process.

Conference Chairs

Alek C. Chen
ASML Taiwan Ltd.

Burn Lin
Taiwan Semiconductor Manufacturing Co. Ltd.

Woo-Sung Han
SAMSUNG Electronics Co., Ltd.

Anthony Yen
Taiwan Semiconductor Manufacturing Co. Ltd.

Make Time for the Exhibition!

Coffee/Tea and snacks will be served in the Exhibition Hall during the morning and afternoon breaks.

Exhibition Hours

Room: Longevity

Wednesday 18 November. . . . . .10.00 to 16.00; 17.30 to 19.00
Thursday 19 November. 10.00 to 16.00

Asia plays a key role in manufacturing and R&D for the semiconductor and FPD industries. Exhibiting companies display technology related to all aspects of semiconductor production:

- Lithography—immersion, double patterning, e-beam, EUV, optical/laser, RET
- Metrology, inspection, OPC, and process control
- Resist materials and processing
- Nano-imprint
- Design for Manufacturability/DPI
- IC and chip fabrication

Exhibitors

Gudeng Precision Industrial Co., Ltd.

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New Product: Zeiss Prove pattern registration overlay haze monitoring tool, CDC correction tool.

Taiwan Instrument Company has been established over 60 years and provides semiconductor, material, microscopy, medical, life science and GPS products. Contact: Ms. Jessie Fang, Admin, jessie_fang@ticgroup.com.tw; Mr. Arthur Lee, Director, arthur_lee@ticgroup.com.tw.

Welcome and Poster Reception

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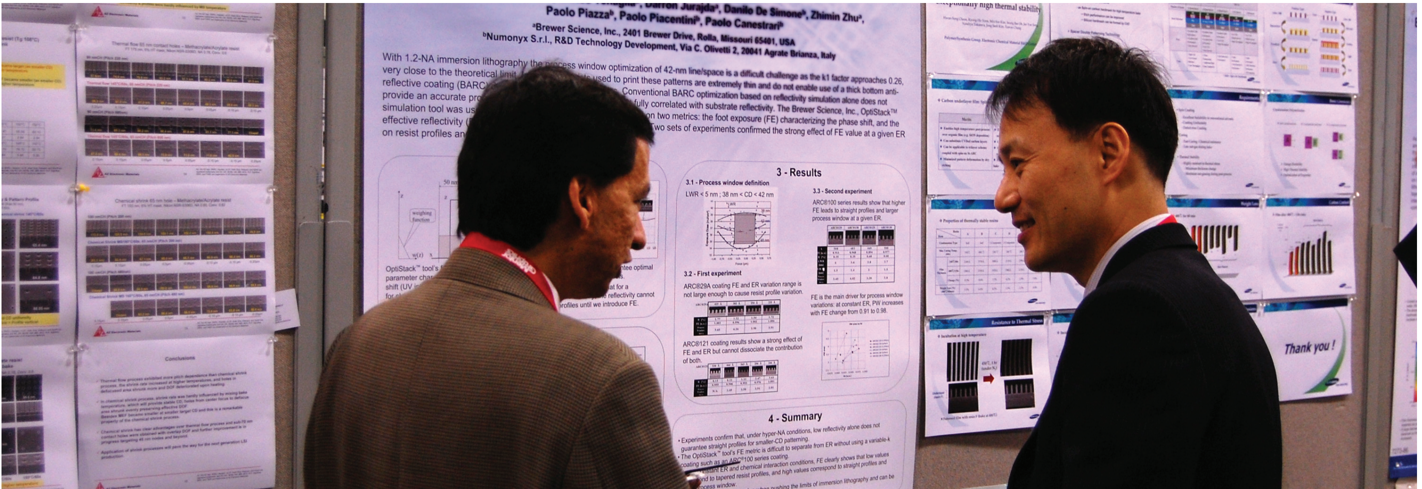

Attend the Reception

Room: Longevity and Happiness

Wednesday 18 November. . . . . 17.30 to 19.00

Symposium attendees and guests are invited to attend a Welcome/ Poster Reception on Wednesday evening. The reception provides an opportunity for attendees to meet colleagues, network, and view poster presentations. Authors of poster papers will be present to answer questions concerning their papers. Conference registration badges are required. Hors d'oeuvres and refreshments will be served. Dress is casual. Guest badge may be purchased during registration hours.

Poster Set Up

Poster presenters must hang their posters between 13.00 and 17.00 on Wednesday 18 November. Poster presentations that are not posted by 17.00 will be considered a "no-show" and their manuscript will not be published. Authors must be present during the Poster Reception 17.30 to 19.00 Wednesday to answer questions and provide in-depth discussion regarding their papers. Presenters must remove their posters immediately after the poster session. Posters not removed will be considered unwanted and will be discarded. SPIE assumes no responsibility for posters left up after the end of the Poster Session.

Best Student Paper Awards Ceremony

Room: Prosperity

Thursday 19 November . . . . 15.10 to 15.30

Awards will be presented for the best papers submitted and presented by students at SPIE Lithography Asia Taiwan.

Gather and help us congratulate the winning student contributions.

These awards are made possible by the generous sponsorships of

Room: Prosperity · Wednesday 18 November · 09.00 to 12.10

09.00 to 09.40

An Outlook on Future Silicon Industry

Kinam Kim, SAMSUNG Electronics Co., Ltd. (Republic of Korea)

Abstract: Since the invention of integrated circuit(IC), the semiconductor industry has grown at an unprecedented pace. This growth has been fueled by an exploding customer demand for products utilizing semiconductor chips. In the past the main semiconductor growth engine was the PC market, since the late 1990s the mobile era has been another growth engine with a vast assortment of now familiar products, such as mobile phones, digital cameras and MP3 music players and so on.

In spite of recent years' global economic recession and the nature of ebb and tide of semiconductor market, especially memory market, it is generally agreed that the semiconductor industry will continue to expand due to continued steady growth of the mobile, digital consumer and entertainment markets.

The advances in silicon technology have been the backbone of tremendous previous growth. And, in fact, it has repeatedly been shown that the number of transistors integrated into silicon chips has indeed doubled every 18 months, which is called Moore's law. Enormous computing power and huge memory capacity which Moore's law brings in actually make modern Internet world possible. As silicon technology enters into nano scale dimension, further improved capabilities of integrated circuits can bring great opportunities to silicon industry by merging with the adjacent related technologies such as health-bio, nano, and robotics and etc. These technologies will be the new growth engines for silicon industry, at the same time silicon technology will also provide many benefits to these industries.

Despite these bright prospects, there is growing concerns about whether silicon technology can continue to keep pace with demand when the silicon technology enters into the "deep nano-scale" dimension. This is because there would be ultimate limits to transistor scaling, and narrowing margins in manufacturing due to ever-increasing fabrication costs tied to technical complexities. Though most experts believe that silicon technology will maintain its leadership beyond 10 nm, however it is certainly true that a number of fundamental and application-specific obstacles will not readily permit to further shrinkage. A common example is the inevitable occurrence of variations due to rough line edges and surfaces when pattern sizes approach atomic scales. It is therefore the primary aim of this paper to investigate various possible paths to overcome these obstacles and ultimately, to continue to grow silicon industry far beyond nanometer regime.

Kinam Kim received Ph.D. degree in electrical engineering from the University of California Los Angeles, CA. in 1994. In 1983 he joined Samsung Electronics Co., Ltd., where he has been involved in the development of various memory technologies (64Kb to 4Giga-bit densities for DRAM, 2Gb to 32Gb and beyond for NAND Flash, and etc.) and the research and development of emerging new memories(FRAM, PRAM, and MRAM) and next generation CMOS image sensor and others. Currently he is an executive vice president and general manager of semiconductor R&D center. He published more than 430 technical papers and applies and holds more than 130 patents related to memory technology. He is an IEEE fellow and a Samsung fellow.

09.40 to 10.20

3D Integration Opportunities, Issues, and Solutions: a Designer's Perspective

Cheng-Wen Wu, Industrial Technology Research Institute (Taiwan)

Abstract: As the development cost of a typical system-on-chip (SOC) using state-of-the-art technology soars, more and more people turn to three-dimensional (3D) integration for possible alternatives that provide better or equal performance with lower cost. Stacking dies using the Through-Silicon-Via (TSV) technology has been considered one of the most promising solutions to extending the life of Moore's law in semiconductor industry, but of course there are problems to be solved before the infrastructure can be set up to support the industry for manufacturing TSV-based 3D integrated devices. In this talk we will discuss the opportunities, design and manufacturing issues, and possible solutions for 3D integrated devices, from a designer's perspective.

Cheng-Wen Wu is the General Director of the SOC Technology Center at ITRI and a Chair Professor at National Tsing Hua University. He received the BSEE degree from National Taiwan University and the MS and PhD degrees in ECE from the University of California, Santa Barbara. Dr. Wu is a Golden Core Member of the IEEE Computer Society as well as a Fellow of the IEEE.

10.20 to 10.50

Tea/Coffee Break

10.50 to 11.30

Rivalry and Complementary of Photon and Electron Beams

Burn J. Lin, Taiwan Semiconductor Manufacturing Co. Ltd. (Taiwan)

Abstract: Not long after the photon beam was used to delineate circuit patterns in resist, e-beam was called for duty due to the concern of photons running out of resolution. The e-beam counterpart of proximity printing, projection printing, and direct writing quickly took shape as early as 1975. The race was on. Optical projection printing, taking advantage of a high degree of parallelism, excelled in throughput and economy for wafer patterning. However, electrons can be quickly deflected to directly write patterns. It took over mask writing. Rivalry turned into complementary for decades.

Recently e-beam has a new opportunity to beat photon beam at its own game of parallelism and eliminate the problems associated with masks altogether. This presentation compares optical and e-beam imaging technically, economically, and historically, pointing to the rewards and challenges for each technology to succeed.

Burn J. Lin is a senior director at TSMC. His teams do R&D on mask fabrication, lithography tooling and processing, as well as RET, OPC, DFM, and NGL. He is the editor-in-chief of the Journal of Micro/nanolithography, MEMS, and MOEMS, a fellow of IEEE and of SPIE, and a member of the US National Academy of Engineering.

11.30 to 12.10

Mask Technology and Timing for IC and LCD Applications

Christopher J. Progler, Photronics, Inc. (United States)

Abstract: An understanding of the complex interaction between mask making processes and component fabrication has taken center stage as mask suppliers confront a wide array of lithography integration scenarios, cost containment initiatives and cycle time demands. This talk will highlight progress and challenges in mask manufacturing for high end IC and LCD applications from current state of the art to future industry needs. We will discuss both common aspects and application specific differences for mask technology used in IC and TFT LCD fabrication with emphasis on how the mask ties into the final application. Finally, consideration for the evolving business model of commercial mask making will be discussed including potential alternatives to the status quo.

Christopher J. Progler is the chief technology officer at Photronics Inc. - a global manufacturer of lithography masks used primarily for integrated circuit and liquid crystal display fabrication. Dr. Progler is a Fellow and previous Board Member for SPIE and 2009-2010 Chair for SPIE Advanced Lithography Symposium. He has published over 100 papers and patents in lithography and serves as Associate Editor for SPIE JM3

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Conference 7520

Wednesday-Thursday 18-19 November 2009 • Proceedings of SPIE Vol. 7520

Conference Chairs: **Alek C. Chen,** ASML Taiwan Ltd. (Taiwan); **Woo-Sung Han,** SAMSUNG Electronics Co., Ltd. (Korea, Republic of); **Burn J. Lin,** Taiwan Semiconductor Manufacturing Co. Ltd. (Taiwan); **Anthony Yen,** Taiwan Semiconductor Manufacturing Co. Ltd. (Taiwan)

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Wednesday 18 November

SESSION 1

Room: Prosperity . . . . .Wed. 09.00 to 12.10

Plenary Session

Session Chairs: **Alek C. Chen,** ASML Taiwan Ltd. (Taiwan);
Woo-Sung Han, SAMSUNG Electronics Co., Ltd. (Korea, Republic of)

Plenary Session sponsored by:

09.00: **An outlook on future silicon industry**, Kinam Kim, SAMSUNG Electronics Co., Ltd. (Korea) . . . . [7520-01]

09.40: **3D integration opportunities, issues, and solutions: a designer's perspective**, Cheng-Wen Wu, Industrial Technology Research Institute (Taiwan) . . . . [7520-02]

Tea/Coffee Break . . . . 10.20 to 10.50

10.50: **Rivalry and complementary of photon and electron beams**, Burn J. Lin, Taiwan Semiconductor Manufacturing Co. Ltd. (Taiwan) . . . . [7520-03]

11.30: **Mask technology and timing for IC and LCD applications**, Christopher J. Progler, Photronics, Inc. (United States) . . . . [7520-04]

Lunch/Exhibition Break . . . . 12.10 to 13.30

Papers available in 2-4 weeks.

Session 2 runs concurrently with session 4.

SESSION 2

Room: Prosperity . . . . Wed. 13.30 to 15.20

EUV Lithography and Emergent Technology I

Session Chairs: **Jack Jeng-Horng Chen,** Taiwan Semiconductor Manufacturing Co. Ltd. (Taiwan); **Ho-Young Kang,** ASML Korea Co., Ltd. (Korea, Republic of)

13.30: **EUV litho status at SELETE** *(Invited Paper)*, Osamu Suga, Semiconductor Leading Edge Technologies, Inc. (Japan) . . . . [7520-05]

14.00: **High power LPP EUV source system development status**, Benjamin S. Lin, Cymer Southeast Asia, Ltd. (Taiwan); Nigel R. Farrar, David Brandt, Cymer Inc. (United States) . . . . [7520-06]

14.20: **EUVL: towards implementation in production**, Hans Meiling, Christian Wagner, ASML Netherlands B.V. (Netherlands); Noreen Harned, ASML Wilton (United States); Alek C. Chen, Peter K. Cheang, ASML Taiwan Ltd. (Taiwan) . . . . [7520-07]

14.40: **Imaging performance of production-worthy multiple-E-beam maskless lithography**, Tun-Ying Fang, Shy-Jay Lin, Jenghorng Chen, Shih-Ming Chang, Faruk Krecinic, Burn J. Lin, Taiwan Semiconductor Manufacturing Co. Ltd. (Taiwan) . . . . [7520-08]

15.00: **Advances in maskless and mask-based optical lithography on plastic flexible substrates**, Ionut Barbu, Marius G. Ivan, Peter Giesen, TNO Science and Industry (Netherlands); Michel J. E. Van de Moosdijk, ASML Netherlands B.V. (Netherlands); Erwin R. Meinders, TNO Science and Industry (Netherlands) . . . . [7520-09]

Tea/Coffee Break . . . . 15.20 to 15.50

SESSION 4

Room: Joyful . . . . Wed. 13.30 to 15.30

Metrology and Process Control I

Session Chairs: **Gary Guohong Zhang,** The Dow Chemical Co. (USA); **Kuen-Yu Tsai,** National Taiwan Univ. (Taiwan)

13.30: **The LER/LWR metrology challenge for advance process control through 3D-AFM and CD-SEM**, Johann Foucher, Pascal Faurie, CEA-LETI (France) . . . . [7520-14]

13.50: **Optimization of overlay correction methods and monitoring scheme for double patterning technology**, Tsann-Bim Chiou, ASML Taiwan Ltd. (Taiwan); Chun-Yen Huang, Chuei-Fu Chue, Nanya Technology Corp. (Taiwan); Juno Lee, Alek C. Chen, ASML Taiwan Ltd. (Taiwan); Chiang-Lin Shih, Nanya Technology Corp. (Taiwan) . . . . [7520-15]

14.10: **Optical critical dimension measurements for patterned media with 10s nm feature size**, Yongdong Liu, Nanometrics Inc. (United States) and Seagate Technology LLC (United States); Milad Tabet, Jiangtao Hu, Nanometrics Inc. (United States); Zhaoning Yu, Wei Hu, Sha Zhu, Justin J. Hwu, Shifu Lee, Seagate Technology LLC (United States) . . . . [7520-16]

14.30: **Ultra-sensitive optical metrology for hard disk DTR and BPM imprints**, Linlin Hu, Jeffrey W. Roberts, Iris Bloomer, n&k Technology, Inc. (United States); Yongdong Liu, Shih-Fu Lee, Seagate Technology (United States). . . . . . [7520-17]

14.50: **After development inspection (ADI) studies of photo resist defectivity of an advanced memory device**, Hyung-Seup Kim, Byoung-Ho Lee, Samsung Electronics Co., Ltd (Korea, Republic of); Hong Xiao, Hermes Microvision, Inc. (United States). . . . . [7520-18]

15.10: **Challenges in development and construction of stand alone inspection, metrology, and calibration tools for EUV lithographic application**, Rupert C. Perera, EUV Technology (United States) . . . . [7520-90]

Tea/Coffee Break . . . . 15.30 to 16.00

Session 3 runs concurrently with session 5.

SESSION 3

Room: Prosperity . . . . Wed. 15.50 to 17.10

Computational Litho: SMO

Session Chairs: **Edmund Lam,** The Univ. of Hong Kong (Hong Kong, China); **Tim Chen,** ASML Taiwan Ltd. (Taiwan)

15.50: **Source-mask selection using computational lithography: further investigation incorporating rigorous resist models**, Mark D. Smith, Sanjay H. Kapasi, Stewart A. Robertson, John J. Biafore, KLA-Tencor Texas (United States) . . . . [7520-11]

16.10: **Feasibility studies of source and mask optimization**, Toshiharu Nakashima, Tomoyuki Matsuyama, Nikon Corp. (Japan) . . . . [7520-12]

16.30: **Source-mask optimization: impact of source and mask complexity on lithography performance**, Stephen D. Hsu, Brion Technologies, Inc. (United States) . . . . [7520-13]

16.50: **Regularization of inverse photomask synthesis to enhance manufacturability**, Ningning Jia, Edmund Y. Lam, The Univ. of Hong Kong (Hong Kong, China); Alfred K. K. Wong, Consultant (United States). . . . . [7520-32]

SESSION 5

Room: Joyful . . . . Wed. 16.00 to 17.20

Resist Material and Processing I

Session Chairs: **Mark Neisser,** AZ Electronic Materials USA Corp. (USA); **Benjamin Szu-Min Lin,** Cymer Southeast Asia, Ltd. (Taiwan)

16.00: **Image reversal trilayer using a positive-tone 193nm resist**, David J. Abdallah, DongKwan Lee, Mark Neisser, Ralph R. Dammel, AZ Electronic Materials USA Corp. (United States). . . . . [7520-19]

16.20: **Resist freeze double patterning on spin-on trilayer materials**, Ramil-Marcelo L. Mercado, Brewer Science, Inc. (United States) . . . . [7520-20]

16.40: **Latest developments in photosensitive DBARCs**, Munirathna Padmanaban, Takanori Kudo, Srinivasan Chakrapani, Alberto Dioses, Edward Ng, Charito Antonio, Deepa Parthasarathy, AZ Electronic Materials USA Corp. (United States); Shinji Miyazaki, Kazuma Yamamoto, Yasushi Akiyama, AZ Electronic Materials K.K. (Japan); Mark Neisser, AZ Electronic Materials USA Corp. (United States) . . . . [7520-21]

17.00: **High Si content anti-reflective coatings and their extension to a UV freeze dual patterning process,** Joseph T. Kennedy, Honeywell Electronic Materials (United States); Thomas I. Wallow, GLOBALFOUNDRIES Inc. (United States); Nikos Bekiaris, SOKUDO USA LLC (United States). . . . . [7520-23]

Poster Session

Poster Set Up
Room: Longevity and Happiness . . . . Wed. 13.00 to 17.00

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Synthesis and imaging study of a series of novel photoactive polymers with diazoketo groups in their side chains, Lu Liu, Yingquan Zou, Beijing Normal Univ. (China) . . . . [7520-22]

Improvement on post-OPC verification efficiency for contact/via coverage check by final CD biasing of metal lines and considering their location on the metal layout, Youngmi Kim, Jae-Young Choi, Jae-Hyun Kang, Kwangseon Choi, Dongbu HiTek Co., Ltd. (Korea, Republic of) . . . . [7520-31]

Metrology accuracy effect on process overlay performance, Byoung-Hoon Lee, Won-Kwang Ma, Sarohan Park, Jin-Soo Kim, Chang-Moon Lim, Hyeong-Soo Kim, Hynix Semiconductor Inc. (Korea, Republic of); Chan-Ho Ryu, ASML Korea Co., Ltd. (Korea, Republic of) . . . . [7520-62]

Hot spot management through design based metrology, Taehyeong Lee, Hynix Semiconductor Inc. (Korea, Republic of) and NanoGeometry Research Inc. (Japan) and Anchor Semiconductor, Inc. (United States); Hyunjo Yang, Jungchan Kim, Areum Jung, Gyun yoo, Donggyu Yim, Sungki Park, Hynix Semiconductor Inc. (Korea, Republic of); Toshiaki Hasebe, Masahiro Yamamoto, NanoGeometry Research Inc. (Japan); Jun Cai, Anchor Semiconductor, Inc. (United States) . . . . [7520-63]

40nm mesh patterning using negative tone development process, Junggun Heo, Jung-Hyung Lee, Cheolkyu Bok, Hyeong-Soo Kim, Sungki Park, Hynix Semiconductor Inc. (Korea, Republic of) . . . . [7520-65]

Immersion and dry lithography monitoring for flash memories (after develop inspection and photo cell monitor) using a darkfield imaging inspector with advanced binning technology, Paolo Parisi, Antonio Mani, KLA-Tencor Italy SRL (Italy); Jennifer E. Kopp, Catherine L. Perry Sullivan, Gavin Simpson, KLA-Tencor Corp. (United States); Maria Renis, Miriam Padovani, C. Severgnini, Paolo Piacentini, Paolo Piazza, Alberto Beccalli, Numonyx Srl (Italy). . . . . [7520-66]

Control of CD errors and hotspots by using a design based verification system, Bong-Seok Choi, Sang-Ho Lee, Young-Seog Kang, Woo-Sung Han, SAMSUNG Electronics Co., Ltd. (Korea, Republic of) . . . . [7520-67]

Bottom-anti-reflective coatings (BARC) for LFLE double patterning process, Rikimaru Sakamoto, Nissan Chemical Industries, Ltd. (Japan) . . . . [7520-68]

Silicon-based molecular resists for ArF lithography, Suk-Koo Hong, Moo-hyun Koh, Eun-Sil Kang, Youlee Jeong, Seoul National Univ. (Korea, Republic of); Hyo-jin Yun, Myung-sun Kim, Se-Kyung Baek, Soo-Kyung Kim, Ji-Yun Ham, Boo-Deuk Kim, Young-ho Kim, Seung-Ki Chae, Samsung Electronics Co., Ltd. (Korea, Republic of); Jun-Kyung Lee, Jae-Woo Lee, Deog-Bae Kim, Jae-Hyun Kim, Dongjin Semichem CO., Ltd. (Korea, Republic of); Young Gyu Kim, Seoul National Univ. (Korea, Republic of) . . . . [7520-69]

Mesh patterning process for 40nm contact hole, Jaeheon Kim, Cheolkyu Bok, Hyeong-Soo Kim, Sungki Park, Hynix Semiconductor Inc. (Korea, Republic of) . . . . [7520-70]

40nm mesh patterning using capping freezing process, Hyunkyung Shim, Junggun Heo, Junghyung Lee, Cheolkyu Bok, Hyungsoo Kim, Sungki Park, Hynix Semiconductor Inc. (Korea, Republic of) . . . . [7520-71]

Welcome and Poster Reception
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Synthesis of ArF photoresist by reversible addition-fragmentation chain transfer (RAFT) polymerization with three methacrylate monomers, Hae-Sung Sohn, Sang-Ho Cha, Won-Ki Lee, Dong-gyun Kim, Jong-Chan Lee, Seoul National Univ. (Korea, Republic of); Hyo-jin Yun, Myung-sun Kim, Se-Kyung Baek, Soo-Kyung Kim, Ji-Yun Ham, Boo-Deuk Kim, Young-ho Kim, Seung-Ki Chae, Samsung Electronics Co., Ltd. (Korea, Republic of); Jun-Kyung Lee, Jae-Woo Lee, Deog-Bae Kim, Jae-Hyun Kim, Dongjin Semichem Co., Ltd. (Korea, Republic of) . . . . [7520-72]

Overlay Improvement by ASML HOWA 5th Alignment Strategy, Richer Yang, Raf Wang, CY Chiang, Wilson Hsu, Todd Shih, Inotera Memories Inc. (Taiwan); Wythe Lin, Chia-Chi Chen, Hao-Hsiang chiu, ASML Taiwan (Taiwan) . . . [7520-73]

Characterize the 65nm through pitch behaviors for scanner parameters by CD SEM and Scatterometry metrologies, Jason J. Shieh, Alek C. Chen, ASML Taiwan Ltd. (Taiwan) . . . . [7520-74]

Litho scenario solutions for FinFET SRAM 22nm node, Shih-En Tseng, Jacques Wang, Shunder Wu, Jay Kou, ASML Taiwan Ltd. (Taiwan); Orion Mouraille, ASML Netherlands B.V. (Netherlands); Reiner M. Jungblut, Tsann-Bim Chiou, ASML Taiwan Ltd. (Taiwan); Jo M. Finders, ASML Netherlands B.V. (Netherlands); Alek C. Chen, ASML Taiwan Ltd. (Taiwan); Mircea V. Dusa, ASML MaskTools Inc. (United States); Stephen D. Hsu, Brion Technologies, Inc. (United States) . . . . [7520-75]

Implementation of new recticle inspection strategy for mask quality control in memory fab, Jackie Cheng, KLA-Tencor Corp. (Taiwan) . . . . [7520-76]

Programmable mask desgin of bendable LCD display, Hung-Liang Huang, National Chiao-Tung University (Taiwan) . . . . [7520-77]

Fabrication of diamond and diamond-like carbon molds for nano-imprinting lithography, Jay Wang-Chieh Yu, Chiao-Yang Cheng, National Cheng Kung Univ. (Taiwan); Yoou-Bin Guo, Toppan CFI (Taiwan) Co., Ltd. (Taiwan); Franklin Chau-Nan Hong, National Cheng Kung Univ. (Taiwan) . . . . [7520-78]

Critical dimension reconstruction of metrology test structures with programmed line edge roughness by scatterometry, Fu-Min Wang, National Taiwan Univ. (Taiwan); Jason J. Shieh, Alek C. Chen, ASML Taiwan Ltd. (Taiwan); Philip C. W. Ng, Yen-Min Lee, Jia-Han Lee, Kuen-Yu Tsai, Chieh-Hsiung Kuan, National Taiwan Univ. (Taiwan) . . . . [7520-79]

Study of OPC accuracy by illumination source types, Kiho Yang, Daejin Park, Jeonkyu Lee, Sangjin Oh, Jinhyuck Jeon, Taejun You, Chanha Park, Donggyu Yim, Sungki Park, Hynix Semiconductor Inc. (Korea, Republic of). . . . . . [7520-80]

Expanding The lithography process window (PW) with CDC technology, Sz-Huei Wang, Yu-Wan Chen, Chung-Ming Kuo, Powerchip Semiconductor Corp. (Taiwan); Erez Graitzer, Guy Ben-Zvi, Avi Cohen, Pixer Technology Ltd. (Israel) . . . . [7520-81]

Fulfilling a comparably optical performance of sub-60nm half-pitch pattern using an optimization of advanced diffractive optical element and mask transmittance, Ming-Hang Yang, Jerry Huang, Chih-Wei Chu, Lan-Hsin Peng, ProMOS Technologies, Inc. (Taiwan) . . . . [7520-82]

Green binary and phase shifting mask, Shyi-Long Shy, Chao-Sin Hong, National Nano Device Labs. (Taiwan); Cheng-San Wu, National Nano Device Labs (Taiwan); Shih-Che Chen, Hung-Yu Wu, National Nano Device Labs. (Taiwan) . . . . [7520-83]

Poster Session continued

Development of high n organic BARC for 193nm immersion photolithography, JoonYeon Cho, Huirong Yao, Jianhui Shan, Salem K. Mullen, Guanyang Lin, Mark Neisser, AZ Electronic Materials USA Corp. (United States) . . . . . . [7520-84]

A novel single-component chemically amplified positive DUV photoresist derived from PHS, Juan Liu, Liyuan Wang, Beijing Normal Univ. (China) . . . . . . [7520-85]

Abbe-PCA-SMO: microlithography simultaneous mask and mask optimization using Abbe-PCA, Charlie C. Chen, National Taiwan Univ. (Taiwan) . . . . . . [7520-86]

Subwavelength plasmonic photonics for photolithography beyond the diffraction limit, Kuan-Ren Chen, National Cheng Kung Univ. (Taiwan) . . . . . . [7520-87]

Heat conduction considering heat loss to photoresist on top of wafer during post exposure bake, Minhee Jung, Sarah Kim, Do Wan Kim, Hye-Keun Oh, Hanyang Univ. (Korea, Republic of) . . . . . . [7520-88]

FAST-LH: a manufacturing-environmental friendly method of lens heating monitoring, Siew Ing Yet, X-FAB Sarawak Sdn. Bhd. (Malaysia) . . . . . . [7520-89]

Preliminary design of a two-dimensional electron beam position monitor system for multiple-electron-beam-direct-write lithography, Sheng-Yung Chen, Ting-Han Pei, Kuen-Yu Tsai, Hoi-Tou Ng, Chi-Hsiang Fan, Chieh-Hsiung Kuan, Yung-Yaw Chen, Jia-Yush Yen, National Taiwan Univ. (Taiwan) . . [7520-91]

Influence on digital photolithography intensity by collimated Gaussian beam, Ningning Luo, Yiqing Gao, Shuai He, Yu-Fang Rao, Nanchang HangKong Univ. (China) . . . . . . [7520-92]

Research on DMD-based gray-scale exposure model, Ningning Luo, Nanchang HangKong Univ. (China) and Nanjing Univ. of Aeronautics and Astronautics (China); Yiqing Gao, Shuai He, Yu Fang Rao, Nanchang HangKong Univ. (China) . . . . . . [7520-93]

Calixarene-based molecular resists containing a PAG functionality for EUV lithography, Hyeonjeong Kim, Tae-Hwan Ha, Seoul National Univ. (Korea, Republic of); Jae Hyun Kim, Samsung Electronics (Korea, Republic of); Young Gyu Kim, Seoul National Univ. (Korea, Republic of) . . . . . . [7520-94]

Improvement of KrF contact layer by inverse lithography technology with assist feature, Sung-Ho Jun, Yeonah Shim, Jaehyun Kang, Jaeyoung Choi, Kwangseon Choi, Jaewon Han, Dongbu HiTek Co., Ltd. (Korea, Republic of) . . . . . . [7520-95]

Generation and characterization of spatially distributed laser produced plasma extreme ultraviolet, Kuang-Po Chang, Industrial Technology Research Institute (Taiwan); Oran Morris, Fergal O'Reilly, Padraig Dunne, Gerard O'Sullivan, Univ. College Dublin (Ireland) . . . . . . [7520-96]

The effect of the laser interference lithography patterns when substrate tilted, Xiaoxia Zhao, Xi'an Institute of Optics and Precision Mechanics (China) . . . . . . [7520-97]

Benefits from run to run CD control by using iODP for sampling rate reduction, Tzu-Ming Liu, Nanya Technology Corp. (Taiwan) . . . . . . [7520-98]

Determination of Gaussian beam and raster scan parameters in electron-beam-direct-write lithography considering device patterning and performance variability, Hoi-Tou Ng, Chun-Hung Liu, Hsing-Hong Chen, Kuen-Yu Tsai, National Taiwan Univ. (Taiwan) . . . . . . [7520-99]

Study of photon-counting detection and imaging, Huiming Qu, Qian Chen, Nanjing Univ. of Science & Technology (China) . . . . . . [7520-100]

Evaluation of 172-nm wavelength as a possible candidate for 22 nm and below, Jee-Hye You, Eun-Jin Kim, Hye-Kuen Oh, Hanyang Univ. (Korea, Republic of) . . . . . . [7520-101]

The effect of UPW quality on photolithography defect, Wah Hoo Ng, Siew Ing Yet, X-FAB Sarawak Sdn. Bhd. (Malaysia) . . . . . . [7520-102]

Controlled acetone vapor environment for the elimination of dry photoresist droplets in spray coating, Laddawan Supadee, Western Digital Co. Ltd. (Thailand) . . . . . . [7520-103]

Relaxation properties of dielectric dipoles of photo resist materials, Hiroki Sasazaki, Akira Kawai, Nagaoka University of Technology (Japan) . . . . [7520-106]

Spontaneous deformation of resist micro pattern due to van der Waals interaction, Akira Kawai, Takashi Yamaji, Nagaoka University of Technology (Japan) . . . . . . [7520-107]

Micro bubble removal from micro pattern structure under alternating electric field, Hiroki Sasazaki, Akira Kawai, Nagaoka University of Technology (Japan) . . . . . . [7520-108]

Computer-Aided-Design of two electrostatic lenses column by mixing dynamic programming and AI technique, Fadhil A. Ali, Basra Univ. (Iraq) . . . . . . [7520-109]

Predictive model based pitch splitting, Pat J. LaCour, Aasutosh D. Dave, Dyiann Chou, Alexander V. Trichkov, Mentor Graphics Corp. (United States) . . . . . . [7520-110]

Design and characterization of 1.10m InGaAs-GaAs VECSEL, Marziyeh Nazari, Islamic Azad University,Varamin-Pishva Branch,Tehran (Iran, Islamic Republic of) . . . . . . [7520-111]

Durability of self-standing resist sheet composed with micro holes, Akihiro Takano, Akira Kawai, Nagaoka University of Technology (Japan) . . . . . [7520-112]

PH control of water flowing in micro structure by local electrical field method, Akihiro Takano, Akira Kawai, Nagaoka University of Technology (Japan) . . . . . . [7520-113]

Micro bubble condensation in micro channel controlled by local electrical field method, Shunsuke Ohata, Akira Kawai, Nagaoka University of Technology (Japan) . . . . . . [7520-114]

In-situ monitoring and control of photoresist parameters during thermal processing in the lithography sequence, Arthur Tay, National Univ. of Singapore (Singapore) . . . . . . [7520-115]

Improving 1D optical proximity effect matching for 45nm node by scatterometry metrology, Dennis Chang, Jason J. Shieh, Reiner M. Jungblut, ASML Taiwan Ltd. (Taiwan); Paul C. Hinnen, Henry J. L. Megens, Koen Schreel, ASML Netherlands B.V. (Netherlands); Alek C. Chen, ASML Taiwan Ltd. (Taiwan) . . . . . . [7520 116]

Novel assist feature design to improve depth of focus in low k1 EUV lithography, Ho-Young Kang, ASML Korea Co., Ltd. (Korea, Republic of) . . . . . . [7520-117]

Performance of our recently delivered EUV resist outgassing and reticle contamination tool model number EUV-RER1314, James H. Underwood, David C. Houser, Aaron T. Latzke, Rupert C. C. Perera, EUV Technology (United States) . . . . . . [7520-118]

Dissolved gas quantification and bubble formation in liquid chemical dispense, Glenn Tom, Wei Liu, ATMI, Inc. (United States) . . . . . . [7520-119]

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Sessions 6-7 runs concurrently with sessions 10-11.

Thursday 19 November

SESSION 6

Room: Prosperity . . . . Thurs. 08.30 to 10.20

EUV Lithography and Emergent Technology II

Session Chairs: **Stephen D. Hsu,** Brion Technologies, Inc. (USA); **Hye-Keun Oh,** Hanyang Univ. (Korea, Republic of)

08.30: **EUV lithography development progress at IMEC** *(Invited Paper)*, Geert Vandenberghe, Eric Hendrickx, Anne-Marie Goethals, Rik M. Jonckheere, Kurt G. Ronse, IMEC (Belgium) . . . . [7520-24]

09.00: **High brightness NGL multiplexed EUV light source for EUV interferometer, metrology and inspection**, Peter Choi, Nano-UV SAS (France) and EPPRA SAS (France); Sergey V. Zakharov, NANO-UV SAS (France) and EPPRA SAS (France) and RRC Kurchatov Institute (Russian Federation); Raul Aliaga-Rossel, Aldrice Bakouboula, NANO-UV SAS (France); Otman Benali, NANO-UV SAS (France) and EPPRA SAS (France); Philippe Bove, Michèle Cau, Grainne Duffy, NANO-UV SAS (France); Blair Lebert, Ouassima Sarroukh, EPPRA SAS (France); Edmund Wyndham, Pontificia Univ. Católica de Chile (Chile); Clement Zaepffel, Vasily S. Zakharov, EPPRA SAS (France) . . . . [7520-25]

09.20: **Chromophore-less photoacid generator for EUV resists**, Subramanya Mayya, Kang Yool, Takahiro Yasue, Seok-Hwan Oh, Seong-Woon Choi, Chan-Hoon Park, SAMSUNG Electronics Co., Ltd. (Korea, Republic of) . . . . . . [7520-26]

09.40: **Utilizing model-based optical proximity correction to compensate for EUV shadowing effects with improved pattern transfer fidelity and process windows**, Philip C. W. Ng, Kuen-Yu Tsai, Yen-Min Lee, Ting-Han Pei, Fu-Min Wang, Jia-Han Li, National Taiwan Univ. (Taiwan); Alek C. Chen, ASML Taiwan Ltd. (Taiwan) . . . . [7520-27]

10.00: **Comparison of simulation and wafer results for shadowing and flare effect on EUV alpha demo tool**, Jae-In Moon, Cheol-Kyun Kim, Byoung-Sub Nam, Donggyu Yim, Hynix Semiconductor Inc. (Korea, Republic of) . . . . [7520-28]

Tea/Coffee Break . . . . 10.20 to 10.50

SESSION 7

Room: Prosperity . . . . Thurs. 10.50 to 12.10

Computational Litho

Session Chairs: **Geert Vandenberghe,** IMEC (Belgium); **Kuen-Yu Tsai,** National Taiwan Univ. (Taiwan)

10.50: **Development of hybrid MRC with new MRC parameter for the aggressive assist feature generation and ILT**, Seongbo Shim, Youngchang Kim, Seonghoon Jang, Heebom Kim, Sukjoo Lee, Seongwoon Choi, Hanku Cho, Chanhoon Park, SAMSUNG Electronics Co., Ltd. (Korea, Republic of) . . [7520-29]

11.10: **Fast converging inverse lithography algorithm incorporating pixel inversion and image gradient descent methods**, Jue-Chin Yu, Peichen Yu, National Chiao Tung Univ. (Taiwan) . . . . [7520-59]

11.30: **Using transmission line theory to calculate equivalent refractive index of EUV mask multilayer structures for efficient scattering simulation by finite-difference time-domain method**, Yen-Min Lee, Jia-Han Li, Philip C. W. Ng, Ting-Han Pei, Fu-Min Wang, Kuen-Yu Tsai, National Taiwan Univ. (Taiwan); Alek C. Chen, ASML Taiwan Ltd. (Taiwan) . . . . [7520-61]

11.50: **Source mask optimization (SMO) at full chip scale using inverse lithography technology (ILT) based on level set methods**, Linyong Pang, Peter Hu, Danping Peng, Dongxue Chen, Thomas Cecil, Lin He, Guangming Xiao, Vikram L. Tolani, Thuc H. Dam, Kiho Baik, Bob E. Gleason, Luminescent Technologies, Inc. (United States). . . . . [7520-10]

Lunch/Exhibition Break . . . . 12.10 to 13.30

SESSION 10

Room: Joyful. . . . . Thurs. 08.30 to 10.10

Metrology and Process Control II

Session Chairs: **Tsann-Bim Chiou,** ASML Taiwan Ltd. (Taiwan); **Benjamin Szu-Min Lin,** Cymer Southeast Asia, Ltd. (Taiwan)

08.30: **In-shot overlay matching without pattern dependency using alignment and overlay metrology marks**, Donghan Lee, Jang-Sun Kim, Kil-Jin Lee, Sang-Ho Lee, Young-Seog Kang, Woo-Sung Han, SAMSUNG Electronics Co., Ltd. (Korea, Republic of). . . . . [7520-43]

08.50: **A sophisticated metrology solution for advanced lithography: addressing the most stringent needs of today as well as future lithography**, Victor Shih, Taiwan Semiconductor Manufacturing Co. Ltd. (Taiwan); Kaustuve Bhattacharyya, ASML Netherlands B.V. (Netherlands); Chih-Ming Ke, Taiwan Semiconductor Manufacturing Co. Ltd. (Taiwan) . . . . [7520-44]

09.10: **Scatterometry Measurement of Asymmetric Gratings**, Jie Li, Yongdong Liu, Silvio Rabello, Zhuan Liu, Jiangtao Hu, Nanometrics Inc. (United States) . . . . [7520-45]

09.30: **Systematic defect management by design aware inspection**, Allen Park, Ellis Chang, KLA-Tencor Corp. (United States) . . . . [7520-46]

09.50: **EUV mask pattern inspection with an advanced electron beam inspection system**, Takeya Shimomura, Dai Nippon Printing Co. America, Inc. (United States); Yuichi Inazuki, Tukasa Abe, Tadahiko Takikawa, Yasutaka Morikawa, Hiroshi Mohri, Naoya Hayashi, Dai Nippon Printing Co., Ltd. (Japan); Fei Wang, Long E. Ma, Yan Zhao, Chiyan Kuan, Hong Xiao, Jack Jau, Hermes Microvision, Inc. (United States) . . . . [7520-47]

Tea/Coffee Break . . . . 10.10 to 10.40

SESSION 11

Room: Joyful. . . . . Thurs. 10.40 to 12.10

Double Patterning and Double Processing

Session Chairs: **Chun-Kuang Chen,** Taiwan Semiconductor Manufacturing Co. Ltd. (Taiwan); **Hye-Keun Oh,** Hanyang Univ. (Korea, Republic of)

10.40: **Implementation of double patterning processes toward 22nm node** *(Invited Paper)*, hidetami yaeasghi, Tokyo Electron LTD (Japan) . . . . [7520-48]

11.10: **Development of silicon glass for etch reverse layer (SiGERL) materials and BARCs for double patterning process**, Yasushi Sakaida, Nissan Chemical Industries, Ltd. (Japan) . . . . [7520-49]

11.30: **Advanced patterning solutions based on double exposure: double patterning and beyond**, Young C. Bae, Yi Liu, Thomas Cardolaccia, Ken Spizuoco, Sheri Ablaza, George Barclay, The Dow Chemical Company (United States) . . . . [7520-50]

11.50: **Litho-freeze-litho-etch (LFLE) enabling dual wafer flow coat/ develop process and freeze CD tuning bake for >200wph immersion ArF photolithography double patterning**, Charles N. Pieczulewski, SOKUDO Co., Ltd. (Japan); Craig A. Rosslee, IMEC (Belgium) and SOKUDO USA, LLC (United States) . . . . [7520-51]

Lunch/Exhibition Break . . . . 12.10 to 13.30

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Sessions 8-9 runs concurrently with sessions 12-13.

SESSION 8

Room: Prosperity . . . . Thurs. 13.30 to 15.10

Optical Lithography and Extension

Session Chairs: **Jun-Cheng Nelson Lai,** Powerchip Semiconductor Corp. (Taiwan); **Stephen D. Hsu,** Brion Technologies, Inc. (USA)

13.30: **Performance of a programmable illuminator for generation of freeform sources on high NA immersion systems**, Melchior Mulder, Andre Engelen, Oscar Noordman, Robert Kazinczi, Gert Streutker, Bert van Drieenhuizen, ASML Netherlands B.V. (Netherlands); Keith Gronlund, Brion Technologies, Inc. (United States); Markus Deguenther, Dirk Juergens, Johannes Eisenmenger, Michael Patra, Andras Major, Carl Zeiss SMT AG (Germany) . . . . [7520-33]

13.50: **Latest results from the Nikon NSR-S620 double patterning immersion scanner**, Kazuhiro Hirano, Yuichi Shibazaki, Masato Hamatani, Jun Ishikawa, Yasuhiro Iriuchijima, Nikon Corp. (Japan) . . . . [7520-34]

14.10: **Focus budget breakdown of 4x nm DRAM process in volume manufacturing**, Jin-Phil Choi, Dong-Woo Kang, Young-Jun Kim, Young-Seog Kang, Woo-Sung Han, SAMSUNG Electronics Co., Ltd. (Korea, Republic of); Hyung-Suk Cho, Tae-Gyun Kim, ASML Korea Co., Ltd. (Korea, Republic of); Kuo-Feng Pao, ASML Taiwan Ltd. (Taiwan); Hans van Hemmen, ASML Netherlands B.V. (Netherlands) . . . . [7520-35]

14.30: **Mueller matrix polarimetry for immersion lithography tools with a polarization monitoring system at the wafer plane**, Hiroshi Nomura, Iwao Higashikawa, Toshiba Corp. Semiconductor Co. (Japan) . . . . [7520-36]

14.50: **Flexible 60-90W ArF light source for double patterning immersion lithography in high volume manufacturing,** Theodore Cacouris, Slava Rokitski, Toshi Ishihara, Rajeskar Rao, Rui Jiang, Mary Haviland, Daniel Brown, Cymer, Inc. (United States) . . . [7520-37]

SESSION 12

Room: Joyful. . . . . Thurs. 13.30 to 15.10

Resist Material and Processing II

Session Chairs: **Gary Guohong Zhang,** The Dow Chemical Co. (USA); **Mark Neisser,** AZ Electronic Materials USA Corp. (USA)

13.30: **Inorganic negative tone resists for 193nm photolithography**, Hassan Ridaoui, Ali Dirani, Fernand Wieder, Olivier Soppera, Ecole Nationale Supérieure de Chimie de Mulhouse (France). . . . . [7520-52]

13.50: **Low temperature plasma enhanced atomic layer deposition (PEALD TM) silicon oxide enables direct spacer defined double patterning (SDDP)**, Julien Beynet, ASM Belgium (Belgium); Andy Miller, Sabrina Locorotondo, Patrick Wong, Marc Demand, Diziana Van Goidsenhoven, IMEC (Belgium); Tae-Ho Yoon, Hyung-Sang Park, ASM Genitech Korea Ltd. (Korea, Republic of); Hessel Sprey, ASM Belgium (Belgium); Mireille Maenhoudt, IMEC (Belgium) . . . . [7520-53]

14.10: **Filtration condition study for enhanced microbridge reduction**, Toru Umeda, Shuichi Tsuzuki, Toru Numaguchi, Fumitake Watanabe, Nihon Pall Ltd. (Japan). . . . . [7520-54]

14.30: **Possible line edge roughness reduction by anisotropic molecular resist**, Hyunsu Kim, In Wook Cho, Hakjin Jang, Mihwa Kang, Seong Wook Kim, Hye-Keun Oh, Hanyang Univ. (Korea, Republic of). . . . . [7520-55]

14.50: **A proven methodology for detecting photo-resist residue and for qualifying photo-resist material by measuring fluorescence using SP2 bare wafer inspection and SURFmonitor,** David Feiler, Sanda Radovanovic, Prasanna Dighe, Arul Kitnan, Gavin Simpson, KLA-Tencor Corp. (United States); Gad Schwager, Alexander Eynis, Diti Enidjer, Numonyx (Israel). . . . . [7520-56]

BEST STUDENT PAPER AWARDS CEREMONY

Room: Prosperity. . . . . Thurs. 15.10 to 15.30

Session Chairs: **Alek C. Chen,** ASML Taiwan Ltd. (Taiwan); **Woo-Sung Han,** SAMSUNG Electronics Co., Ltd. (Korea, Republic of); **Burn J. Lin,** Taiwan Semiconductor Manufacturing Co. Ltd. (Taiwan); **Anthony Yen,** Taiwan Semiconductor Manufacturing Co. Ltd. (Taiwan)

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Tea/Coffee Break . . . . 15.30 to 15.50

SESSION 9

Room: Prosperity . . . . Thurs. 15.50 to 17.30

Optical Lithography: Mask

Session Chairs: **Naoya Hayashi,** Dai Nippon Printing Co., Ltd. (Japan); **Geert Vandenberghe,** IMEC (Belgium)

15.50: **Mask defect specification in the spacer patterning process by using a fail-bit-map analysis**, Seiro Miyoshi, Shinji Yamaguchi, Masato Naka, Takashi Hirano, Hiroyuki Morinaga, Hiromitsu Mashita, Ayumi Kobiki, Hidefumi Mukai, Minori Kajimoto, Takashi Sugihara, Yoshiyuki Horii, Yoshihiro Yanai, Tadahito Fujisawa, Koji Hashimoto, Soichi Inoue, Toshiba Corp. (Japan). . . . . [7520-38]

16.10: **Analyzing electrostatic induced damage risk to reticles with an in-situ e-reticle system**, Richard Y. Tu, Benchmark Technologies (United States); Thomas Sebald, ESTION GmbH & Co. KG (Germany) . . . . [7520-39]

16.30: **In-die actinic metrology on photomasks for low k1 lithography**, Thomas Scheruebl, Dirk Beyer, Ute Buttgereit, Axel Zibold, Carl Zeiss SMS GmbH (Germany) . . . . [7520-40]

16.50: **Revisiting adoption of high-transmission PSM: pros, cons and path forward**, Z. Mark Ma, Steven M. McDonald, Christopher J. Progler, Photronics, Inc. (United States) . . . . [7520-41]

17.10: **Back side photomask haze revisited**, Brian J. Grenon, Grenon Consulting, Inc. (United States); Oleg P. Kishkovich, Entegris, Inc. (United States) . . . . [7520-42]

SESSION 13

Room: Joyful. . . . . Thurs. 15.50 to 17.10

Computational Litho II

Session Chairs: **Ho-Young Kang,** ASML Korea Co., Ltd. (Korea, Republic of); **Tsann-Bim Chiou,** ASML Taiwan Ltd. (Taiwan)

15.50: **Validation of the predictive power of a calibrated physical stochastic resist model**, Stewart A. Robertson, John J. Biafore, Mark D. Smith, KLA-Tencor Texas (United States); Michael T. Reilly, Rohm and Haas Electronic Materials (United States). . . . . [7520-57]

16.10: **Hierarchical mask assignment for double patterning lithography**, Qiao Li, Pradiptya Ghosh, Mentor Graphics Corp. (United States) . . . . [7520-58]

16.30: **Pattern prediction in EUV resists**, John J. Biafore, Mark D. Smith, KLA-Tencor Texas (United States); Thomas I. Wallow, GLOBALFOUNDRIES Inc. (United States); Patrick Nalleau, Lawrence Berkeley National Lab. (United States); Yunfei Deng, GLOBALFOUNDRIES Inc. (United States). . . . . [7520-30]

16.50: **Model-based scanner tuning for process optimization**, Tsung-Chih Chien, Chi-Yuan Shih, Ray-Chun Peng, Heng-Hsin Liu, Yung Cheng Chen, Heng-Jen Lee, John Lin, Keh-Wen Chang, Chen-Ming Wu, W. H. Hung, Tommy Lee, H. C. Wu, Taiwan Semiconductor Manufacturing Co. Ltd. (Taiwan); Xu Xie, Wenjin Shao, Chung-Hsing Chang, Brion Technologies, Inc. (United States); R. Aldana, Brion Technologies (United States); Yu Cao, Ronald J. G. Goossens, Brion Technologies, Inc. (United States); Simon Hsieh, ASML Taiwan Ltd. Taiwan). . . . . [7520-60]

General Information

Exhibition Hours

Room: Longevity

Wednesday 18 November. . . . . .10.00 to 16.00; 17.30 to 19.00

Thursday 19 November. 10.00 to 16.00

Welcome and Poster Reception

Room: Longevity and Happiness

Wednesday 18 November. . . . . 17.30 to 19.00

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Poster Set Up

Poster presenters must hang their posters between 13.00 and 17.00 on Wednesday 18 November. Poster presentations that are not posted by 17.00 will be considered a "no-show" and their manuscript will not be published. Authors must be present during the Poster Reception 17.30 to 19.00 Wednesday to answer questions and provide in-depth discussion regarding their papers. Presenters must remove their posters immediately after the poster session. Posters not removed will be considered unwanted and will be discarded. SPIE assumes no responsibility for posters left up after the end of the Poster Session.

Best Student Paper Awards

Room: Prosperity

Thursday 19 November. 15.10 to 15.30

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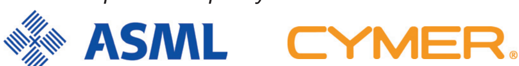

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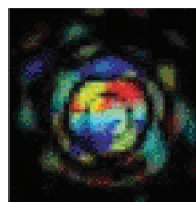
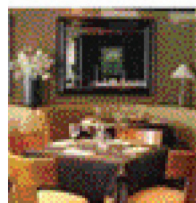
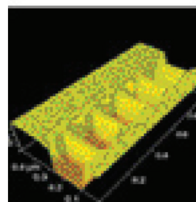
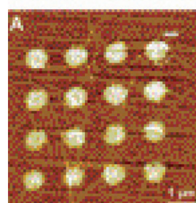

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