Program

ICPT 2017
International Conference on Planarization/CMP Technology
October, 11 – 13, 2017, Leuven, Belgium

Fraunhofer

www.icpt2017.org
CMP (chemical mechanical planarization), as one of the most important processes in the semiconductor manufacturing, has been developed and improved continuously year after year. It has built a certain position in related industries, and is expanding in its applied area. From the user’s point of view, technical demand is becoming higher and higher, and additional applications beyond the semiconductor area are increasing.

ICPT (International Conference on Planarization/CMP Technology), is a magnificent opportunity to have discussions on CMP technologies, including FEOL and BEOL CMP, Fundamentals of CMP, Polishing Processes, Consumables, Equipment, 3D/TSV, Metrology, Cleaning, Defect Control, Process Control, etc. The conference provides a place where every relevant researcher and engineer can get together to discuss openly and exchange information widely.

**Gerfried Zwicker and Patrick Ong**  
Conference Chairs

**Ronald Schnabel**  
Conference Organizer
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Committees

Conference Chairs

Patrick Ong, IMEC, Leuven, Belgium
Gerfried Zwicker, Fraunhofer Institute for Silicon Technology ISIT, Itzehoe, Germany

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Xinping Qu, Fudan University

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Yasuhisa Sano, Osaka University

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Tae-Sung Kim, Sungkyunkwan University
Eung-Rim Hwang, SK Hynix Semiconductor
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Yongsun Ko, Samsung Electronics

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KC Wu, Cabot Microelectronics
Tengchun Tsai, TSMC
Daniel Fang, National Taiwan University of Science and Technology
Jerry Hsu, National Taiwan University of Science and Technology

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Mahadevaiyer Krishnan, IBM
Don Frye, Entegris
Andrew Carswell, Micron

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Knut Gottfried, Fraunhofer Institute for Electronic Nano Systems ENAS, Chemnitz, Germany
Eric Jacquinot, Merck Performance Materials, Trosly-Breuil, France
Patrick Ong, IMEC, Leuven, Belgium
Cedric Perrot, STMicroelectronics, Crolles, France
Ronald Schnabel, VDE/VDI-GMM, Frankfurt am Main, Germany
Gerfried Zwicker, Fraunhofer Institute for Silicon Technology ISIT, Itzehoe, Germany

Organizer

VDE/VDI-Society Microelectronics, Microsystems- and Precision Engineering (GMM)
Dr. Ronald Schnabel
Stresemannallee 15
D-60596 Frankfurt am Main, Germany

Phone: 0049 69-6308 330
Fax: 0049 69 6308 9828
E-Mail: gmm@vde.com
Tuesday, October 10, 2017

15:00 - 18:00 Registration

Wednesday, October 11, 2017

08:00 - 08:10 Opening Remarks

08:10 - 08:40 Keynote
Chair: Robert L. Rhoades (Entrepix, Inc., USA)
Microsensors from Bosch – Invented for Life
Franz Laermer (Robert Bosch GmbH, Germany)

08:40 - 10:00

Session A: CMP Fundamentals

Chairs: Jin-Goo Park (Hanyang University, Korea); Weili Liu (Shanghai Xinanna Electronic Technology, P.R. China)

08:40 Electrochemical study of SiGe in different alkaline chemical formulations
Baoguo Zhang (Hebei University of Technology, P.R. China)

09:00 Modified Kinematic Model for Predicting Contact Points of Conditioner in CMP
Jihye Choi, Kim Eung Chul, Cheolmin Shin, Yinhua Jin, Taesung Kim (Sungkyunkwan University, Korea)

09:20 In situ imaging of local corrosion cells on copper fine wires in solutions
Chikako Takatoh (EBARA Corporation, Japan); Takeshi Fukuma (Kanazawa University, Japan)

09:40 Novel Method for Ultra Rapid Determination of the Lubrication Mechanisms in Tungsten, Copper, STI and ILD CMP
Ruochen Han, Ara Philipossian, Matthew Bahr, Yasa Sampurno (University of Arizona, USA)

10:00 - 10:25 Morning Break

10:25 - 12:10

Session B: BEOL

Chairs: Kazumi Sugai (Fujimi Inc., Japan); Tae-Sung Kim (Sungkyunkwan University, Korea)

10:25 Study on effect of different complexing agents and inhibitors on Co corrosion in H2O2 based alkaline solution by EQCM (Invited)
Xin-Ping Qu (Fudan University, P.R. China)

10:50 CMP process development for radiation detector fabrication
Knut Gottfried, Ina Schubert (Fraunhofer ENAS, Germany); Klaus-Dieter Preuß, Martin Feltz, Tobias Wittig (CiS Forschungsinstitut für Mikrosensorik GmbH, Germany)

11:10 Theoretical study of Mass Transfer Rate on Chemical Mechanical Planarization
Yuling Liu (Hebei University of Technology, P.R. China)

11:30 Effect of Guanidine Sulfate on the CMP of Ru in H2O2 Based Slurry
Xin-Ping Qu (Fudan University, P.R. China)

11:50 Effect of deposition methods on material removal rate during nickel CMP
Yanni Wang, Lieve Teugels, Kevin Vandersmissen, Stefan De Gendt (IMEC, Belgium); Sitaraman Krishnan (Clarkson University, USA); Herbert Struyf (IMEC, Belgium)

12:10 - 13:30 Lunch Break
13:30 - 15:10

Session C: Defects

Chairs: Xinchun Lu (Tsinghua University, P.R. China); Don Frye (Entegris, USA)

13:30

**Novel Cleaning Method after Poly-silicon CMP using Surfactant Buffing Process**
Gippeum Jeong (Hanyang, Korea)

13:50

**Study on Fullereneol as the Additive to Remove BTA Film Remaining on Copper Surface in Chemical Mechanical Polishing Process**
Yueh Hsun Tsai, Keisuke Suzuki (Kyushu Institute of Technology, Japan); Arthur Chen (National Taiwan University of Science and Technology, Taiwan); Panart Khajornrungruang (Kyushu Institute of Technology, Japan)

14:10

**Density Evaluation of Sub-100 nm Particles by Using Ellipsometry**
Eiichi Kondoh, Katsuya Suzuki (University of Yamanashi, Japan); Satmoni Hamada, Shohei Shima, Hirokuni Hiyama (Ebara Corporation, Japan)

14:30

**Measurement of Removal Force in DI-Water for Fine Particles with Sub-Nano-Newton Resolution**
Shohei Shima (Ebara Corporation, Japan)

14:50

**BEOl post CMP cleaning challenges for 22 nm FD-SOI and beyond**
Johannes Koch, Stephan Rehshuh, Lukas Gerlich, Abitha Dhavamani, Philipp Steinke, Robert Krause, Johannes Naue (Fraunhofer IPMS, Germany); Sascha Bott, Boris Vasilyev, Dirk Breuer, Robert Seidel, Axel Preusse (Globalfoundries Module One LLC Co. KG, Germany); Johann Wolfgang Bartha (Dresden University of Technology, Germany); Benjamin Uhlig (Fraunhofer IPMS, Germany)

15:10 - 15:40  **Afternoon Break**

15:40 - 17:25

Session D: Equipment, CMP Fundamentals

Chairs: Willie Pai (Kinik Company, Taiwan); Baoguo Zhang (Hebei University of Technology, P.R. China)

15:40

**In-line Atomic Resolution Local Nanotopography Variation Metrology for CMP Process (Invited)**
Tae-Gon Kim, Nancy Heylen, Soon-Wook Kim, Tom Vandeweyer (Imec, Belgium); Ah-Jin Jo, Ju Suk Lee, Byoung-Woon Ahn, Sang-Joon Cho, Sang-il Park (Park Systems, Korea); Bernd Irmer, Sebastian Schmidt (Nanotools GmbH, Germany)

16:05

**Advanced Optical Particle Sizing for Non-Invasive Slurryanalysis**
Rashid Mavliev (Ipgrip LLC, USA)

16:25

**Novel Method for Nano-Surface Analysis of Cu CMP Chemicals by AFM and Microfluidic Chip System**
Heon-Yul Ryu, Byoung-Jun Cho, Kwang-Min Han (Hanyang University, Korea); Shohei Shima, Satmoni Hamada, Hirokuni Hiyama (Ebara Corporation, Japan); Tae-Gon Kim (Imec, Belgium); Jin-Goo Park (Hanyang University, Korea)

16:45

**Theoretical and experimental approach of swing arm conditioner for prediction of pad profile in CMP**
Hyoungjae Kim, Hanchul Cho (Korea Institute of Industrial Technology, Korea); ChulJin Park (Korea Institute of Industrial Technology & Inje University, Korea); Haedo Jeong (Pusan National University & GnP Technology, Korea); Sungho Shin (KCTECH, Korea)

17:05

**Improvement of Material Removal Efficiency By Optimization of Anisotropic Contact of Pad Asperities**
Norikazu Suzuki, Shing Oshika, Hirotaka Misono (Nagoya University, Japan); Yohei Hashimoto (Kanazawa University, Japan); Hozumi Yasuda, Yoshihiro Mochizuki (Ebara Corporation, Japan)
17:25 - 19:00

Poster Session 1

P1.1 Inline refractive index replaces auto-titration in qualifying H2O2 concentration in cmp of tungsten
Marcus Kavaljer (K-Patents Oy, Finland); Karl Urquhart (Diversified Fluid Solutions, USA); Robert Johnston (Yarbrough Solutions Worldwide, USA)

P1.2 Characterization of incoming PVA brush by an ultrasonication break-in process
Jung-Hwan Lee, Hae-Jung Pyun (Hanyang University, Korea); Muthukrishnan Purushothaman (Hanyang University ERICA, Korea); Nagarjuna Reddy Paluvai, Byoung-Jun Cho, Kwang-Min Han (Hanyang University, Korea); Shohei Shima, Satmoni Hamada, Hirokuni Hiyama (Ebara Corporation, Japan); Jin-Goo Park (Hanyang University, Korea)

P1.3 Influence of Slurry Pot Life on the Removal Rate of Dielectrics and Metals
Thakur Raunija (Semi-Conductor Laboratory, India)

P1.4 Novel Copper Barrier Slurry for Advanced Cu CMP Process
Lucas Chao (United Semiconductor Xiamen, Taiwan); Steve Hung (Dow Electronic Materials, Taiwan); Tommy Huang (United Semiconductor Xiamen, Taiwan); Julia Chou (Dow Electronic Materials, Taiwan); William Yang (United Semiconductor Xiamen, Taiwan); Michael Luo (Dow Electronic Materials, Taiwan); Daphne Chu (Dow Electronic Materials, Taiwan); Roy Liu (Dow Electronic Materials, Taiwan); JK Lin (Dow Chemical Company, Taiwan); Wendy Kuo (Dow Electronic Materials, Taiwan)

P1.5 Study of Post Chemical Mechanical Polishing Cleaning to Remove Particles through Hot De-ionized water
Hyun su Lim (Sungkyunkwan University & Samsung Electronics, Korea); Taesung Kim (Sungkyunkwan University, Korea)

P1.6 The Behavior of BTA in the Alkaline Slurry during the Removal of Heterogeneous Microstructure in the Backside CMP of TSV wafers
BingQuan Wang, Yuhong Liu, Xinchun Lu (Tsinghua University, P.R. China)

P1.7 Study on Hydrodynamic Pressure Distribution in Chemical Mechanical Polishing
Kim Eung Chul (Sungkyunkwan University, Korea)

P1.8 Control of Silica Particle Deposition for Fabrication of Post CMP Cleaning Ability Evaluation Wafer
Younsun Cho (Sungkyunkwan University, Korea)

P1.9 Surface flatness and roughness synchronized control in CMP process of silicon mirror
Bocheng Jiang, Dewen Zhao, Xinchun Lu (Tsinghua University, P.R. China)

P1.10 Evaluation of Competitive Reaction of Various Cu CMP Slurry Components
Kwang-Min Han, Byoung-Jun Cho, Jung-Hwan Lee, Heon-Yul Ryu (Hanyang University, Korea); Shohei Shima, Satmoni Hamada, Hirokuni Hiyama (Ebara Corporation, Japan); Jin-Goo Park (Hanyang University, Korea)

P1.11 The effect of amino acid containing chain and rigid ring structure and on removal rate (RR)
Hanna Sun, Ye-Chan Kim, In-Kyung Park, Jae-Do Nam (Sungkyunkwan University, Korea)
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<td>Development of Novel Cleaning Solution for Post Chemical Mechanical Planarization Silicon Wafer</td>
<td>Junghwan Song (Sungkyunkwan University, Korea); Na Han, Kihong Park, Sokho Yi (LT-CAM, Korea); Taesung Kim (Sungkyunkwan University, Korea)</td>
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<td>P1.13</td>
<td>Innovative CMP Solution for Advanced STI Process</td>
<td>Ji Gang Pan (United Semiconductor Xiamen, Taiwan); Steve Hung (Dow Electronic Materials, Taiwan); Qiao Feng Zhang (United Semiconductor Xiamen, Taiwan); Chen Lu (Dow Electronic Materials, Taiwan); Yi Cao (United Semiconductor Xiamen, Taiwan); Bainian Qian (Dow Electronic Materials, Taiwan); Fu Lin Hu (United Semiconductor Xiamen, Taiwan); Daphne Chu, Elton Su (Dow Electronic Materials, Taiwan); William Yang (United Semiconductor Xiamen, Taiwan); JK Lin (Dow Electronic Materials, Taiwan)</td>
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<td>Pad Conditioning for Poromeric Materials</td>
<td>Andrew Lawing (Kinik North America &amp; Kinik Company, USA)</td>
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<td>Development of Advanced CMP Process for the Minimization of Hydrophobic Interaction based on the Surface Treatment Technology</td>
<td>Hyuk-Min Kim, Jee-Hwan Heo, Jung-Eun Kang, Seungho Park, Il-Young Yoon, Bo Un Yoon, Seok-Woo Nam (Samsung Electronics Co., Ltd., Korea)</td>
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<td>P1.16</td>
<td>Effects of slurry abrasives on dry film CMP</td>
<td>Minjong Yuh (Pusan National University &amp; G&amp;P Technology Inc., Korea); Soocheon Jang (Pusan National University, Korea); Hyoungjae Kim (Korea Institute of Industrial Technology, Korea); Haedo Jeong (Pusan National University &amp; GnP Technology, Korea)</td>
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<td>W CMP Tiny Particle Reduction Solution</td>
<td>Kun Li (Hwatsing Technology, P.R. China); Xinchun Lu, Tongqing Wang (Tsinghua University, P.R. China); Shumao Zheng (Hwatsing Technology, P.R. China)</td>
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<td>P1.18</td>
<td>Control of Residual SiN Defects during Cap SiN CMP in Advanced Logic Device Development</td>
<td>Jihyeon Han (GlobalFoundries, USA)</td>
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<td>P1.19</td>
<td>The Numerical Investigation of the Effect of Withdrawing Velocity on Marangoni Drying Performance in the Post CMP Cleaning</td>
<td>Changkun Li, Dewen Zhao, Xinchun Lu (Tsinghua University, P.R. China)</td>
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<td>P1.20</td>
<td>New Improvement for 200mm legacy CMP tools for in-situ control of polish uniformity to enable production worthy thick Cu CMP</td>
<td>Ayse Karagoz, Patrick Ong (imec, Belgium); Andrew Cockburn (Applied Material Europe, Belgium); Jamie Leighton (Applied Materials USA, USA)</td>
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<td>P1.21</td>
<td>Exploring Non-Covalent Interactions at the Slurry/Filtration Media Interface Relevant to CMP Filtration Applications</td>
<td>Jason Keleher (Lewis University, USA); Jochen Ruth (Pall Corporation, Germany)</td>
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<td>P1.22</td>
<td>Investigations of Annealing Effect on TSV CMP</td>
<td>Can Rao, Tongqing Wang, Jie Cheng, Yuhong Liu, Xinchun Lu (Tsinghua University, P.R. China)</td>
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<td>P1.23</td>
<td>CMP Process for (110)-Germanium roughness reduction</td>
<td>Marco Lisker, Andreas Krüger, Grzegorz Lupina, Yuji Yamamoto, Andreas Mai (IHP, Germany)</td>
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P1.24 Cu Barrier Metal Slurry for Reducing Defect-Level and Enhancing Removal Performances
Seungchul Hong (SKC co., Ltd. & Suwon-si, Gyeonggi-do, Korea)

P1.25 Observation of the real contact area between PVA brush and surface using polarization plate and evanescent field
Masanao Hanai, Toshiyuki Sanada (Shizuoka University, Japan); Akira Fukunaga, Hirokuni Hiyama (Ebara Corporation, Japan)

P1.26 Highly Efficient Cleaning Formulations for Removing Ceria Slurry Residues in Post-CMP Applications
Paul Bernatis (DuPont EKC Technology); Jhih-Fong Lin, Pei-Yu Tai (DuPont EKC Technology, Taiwan); Yi-Han Lin (DuPont EKC Technology, Taiwan); Chia-Hui Bai, Yi-Hao Tseng (DuPont EKC Technology, Taiwan); Akira Kuroda (DuPont EKC Technology, Japan); Chi Yen (DuPont EKC Technology, Taiwan)

P1.27 CMP Process for Wafer Backside Planarization
Andreas Krüger, Marco Lisker, Andreas Trusch, Andreas Mai (IHP, Germany)

P1.28 Optimization of Cu Corrosion Inhibitor Concentration to Reduce Organic Defects
Byoung-Jun Cho, Hae-Jung Pyun (Hanyang University, Korea); Shohei Shima, Satmoni Hamada, Hirokuni Hiyama (Ebara Corporation, Japan); Jin-Goo Park (Hanyang University, Korea)

P1.29 Dummy Gate Amorphous Silicon CMP Using In-situ Profile CLC Endpoint System for Advanced FinFET
Diana Tsvetanova (Imec, Belgium); Takeshi Iizumi, Ban Ito (EBARA Corporation, Japan); Gael Royere, Fabien Durix (Ebara Precision Machinery Europe GmbH, Germany); Katia Devriendt, Patrick Ong, Herbert Struyf (Imec, Belgium)

19:00 - 21:00
Get-Together in the Jubilee Hall (location of the exhibition)
Thursday, October 12, 2017

08:00 - 08:30 Keynote
Chair: Chris Chern (TSMC, Taiwan)

A view on the Semiconductor Roadmap
An Steegen (IMEC, Belgium)

08:30 - 09:50

Session E: Consumables

Chairs: Norikazu Suzuki (Nagoya University, Japan); Jerry Hsu (National Taiwan University of Science and Technology, Taiwan)

08:30 Study on the mechanisms of Si fine polishing with water-soluble polymer
Yangang He (Hebei University of Technology, P.R. China)

08:50 Consumables compatibility for dielectric planarization on package substrate
Seonho Jeong, Dasol Lee, Hyunjin Kim (Pusan National University, Korea); Haedo Jeong (Pusan National University & GnP Technology, Korea)

09:10 Nano-Scale Scratch Impact on 7nm Device and its Improvement by Predictable CMP Process Conditions
Jichul Yang (GlobalFoundries, USA); Dinesh Penigalapati, Wen Yin Lu, Tai Fong Chao, Alison Snyder and Dinesh Koli (Globalfoundries, USA)

09:30 A Reverse Selectivity Ceria Slurry for Silicon Nitride Removal during CMP
Cheolmin Shin (Sungkyunkwan University, Korea)

09:50 - 10:15 Morning Break

10:15 - 11:55

Session F: CMP alt. tech Process Control

Chairs: Xin-Ping Qu (Fudan University, P.R. China); Haedo Jeong (Pusan National University, Korea)

10:15 Stabilization method of transition metal catalyst for high efficiency catalyst-referred etching (CARE) of silicon carbide
Yuta Nakahira, Ai Isohashi, Daisetsu Toh, Tatusaki Inada, Hideka Kida, Satoshi Matsuyma, Yasuhsa Sano (Osaka University, Japan); Kazuto Yaamauchi (Graduate School of Engineering, Osaka University, Japan)

10:35 Stabilization of removal rate of silica glass on catalyst-referred etching by Cleaning Catalyst surface
Yuta Nakahira (University of Osaka, Japan)

10:55 High-efficiency Planarization of GaN Wafers by Catalyst-Referred Etching Employing Photoelectrochemical Oxidation
Hideka Kida, Ai Isohashi, Tatusaki Inada, Satoshi Matsuyama, Yasuhsa Sano (Osaka University, Japan); Kazuto Yamauchi (Graduate School of Engineering, Osaka University, Japan)

11:15 Thermal, Tribological and Kinetic Ramifications of Ceria Slurry Dilution and Dispense Methods in STI CMP
Ruochen Han, Matthew Bahr and Yasa Sumpuro (University of Arizona, USA); Leonard Borucki (Araca, Inc., USA); Ara Philipossian (University of Arizona, USA)

11:35 STI CMP Endpoint Robustness Improvement through Strubeck Curve Study
Cedric Perrot (ST Microelectronics, France); Renan Bouis CEA/Leti Minatec, France); Nicolas Daventure (AMAT, France); Catherine Euvrard, Viorel Balan (CEA/Leti Minatec, France)

11:55 - 13:15 Lunch Break
13:15 - 14:40

**Session G: Process Control 3D**

**Chairs:** Syuhei Kurokawa (Kyushu University, Japan); Yuchun Wang (Anji Microelectronics, P.R. China)

13:15

**A Quantitative Analysis of Ceria CMP Microscratch for IC Yield Correlation Learning**

Taehoon Lee (Globalfoundries, USA)

13:35

**Device pattern impact on optical endpoint detection by interferometry for STI CMP**

Sophia Bourzgui (Centre Microélectronique de Provence - EMSE & STMicroelectronics, France); Gaëlle Georges (Aix-Marseille Université, CNRS, Centrale Marseille, Institut Fresnel, France); Agnès Roussy (Centre Microélectronique de Provence - EMSE, France); Emilie Faivre (STMicroelectronics, France)

13:55

**Chase of Nanometer Topography in CMP for 3D Integration (Invited)**

Catherine Euvrard (CEA-Leti-MINATEC, France); Viorel Balan (CEA/Leti Minatec, France); Cedric Perrot (ST Microelectronics, France); Sebastien Mermoz (STMicroelectronics, France); Yorrick Exbrayat, Aurelien Seignard (CEA/Leti Minatec, France)

14:20

**Nanotopography control for wafer-to-wafer hybrid bonding by CMP**

Nancy Heylen, Soon-Wook Kim, Tae-Gon Kim, Lan Peng, Philip Nolmans, Herbert Struyf, Andy Miller, Gerald Beyer, Eric Beyne (Imec, Belgium)

14:40 - 14:50

**Introduction of ICPT 2018**

14:50 - 15:15

**Afternoon Break**

15:15 - 17:05

**Poster Session 2**

**P2.1**

Enhancement of reaction rate of Cu film by electrolyte shot

Dasol Lee, Jongwoo Lee, Seonho Jeong, Inho Park (Pusan National University, Korea); Haedo Jeong (Pusan National University & GnP Technology, Korea)

**P2.2**

Corrosion inhibition of Cobalt during post-Chemical Mechanical Planarization Cleaning

Toshiaki Shibata (Mitsubishi Chemical Corporation & 1-1 Shiroishi, Kurosaki, Yahatanishiku, Kitakyushu-shi Fukuoka, Japan)

**P2.3**

Influence of different polishing parameters on sapphire substrate CMP

Xinhuan Niu, Xin Zhao, Da Yin, Jianchao Wang, Chenwei Wang (Hebei University of Technology, P.R. China)

**P2.4**

Effect of Flow Rate and Concentration on Filtration Efficiency of Colloidal Abrasives

Mia Wu (Entegris Singapore Pte. Ltd., Taiwan Science Park Branch, Taiwan)

**P2.5**

Preparation of ordered Mesoporous C/SiO2 Nanocomposite Abrasives and their chemical polishing behavior on fused silicon substrates

Li Xu, Guoshun Pan, Chunli Zu, Guihai Luo (Tsinghua University, P.R. China)

**P2.6**

Study of real time chamber monitoring for the contamination factor on the Post CMP Clean progress

Sangyoon Shin (University of Sungkyunkwan, Korea); Joonho Jang (Samsung Electronics, Korea); Cheolmin Shin, Taesung Kim (Sungkyunkwan University, Korea)
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<td>Evaluation of Polyurethane Pads Properties for Effective Use in Planarization Process</td>
<td>HyunJae Chung (University of Sungkyunkwan, Korea); Cheolmin Shin, Yinhua Jin, Taesung Kim (Sungkyunkwan University, Korea)</td>
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<td>P2.8</td>
<td>Carbon Compound Particle Residue Defect Remove by CMP Post Clean</td>
<td>Chiao-Wei Liu, Shih-Hsi Chen, Shih-Ci Yen, Ming-Hsiang Chen, Ming-Hong Chen (Pow-erchip Technology Corporation, Taiwan)</td>
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<td>P2.9</td>
<td>Effect of colloidal silica particles on subsurface damage of fused silica optics during CMP process</td>
<td>Chunli Zou, Guoshun Pan, Li Xu, Yan Zhou (Tsinghua University, P.R. China)</td>
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<td>Prediction of CMP Performance with Slurry Flow Analysis on the Pad Surface</td>
<td>Seokjun Hong, Younsun Cho, Juhwan Kim, Yinhua Jin, Taesung Kim (Sungkyunkwan University, Korea)</td>
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<td>P2.11</td>
<td>The Effect of Chelating Agent in TMAH Based Post Cu-CMP Cleaning Solution</td>
<td>Seong Sik Jeon (Sungkyunkwan University, Korea); Sanghyuk Jeon, Ahhyeon Lim, Sokho Yi (LTCAM, Korea); Taesung Kim (Sungkyunkwan University, Korea)</td>
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<td>Effect of Al2O3 and SiO2 Abrasives on the CMP of Molybdenum using Different Polishing Parameters</td>
<td>Panagiotis Kalantzis (Katholieke Universiteit Leuven &amp; Imec, Belgium); Lieve Teugels (IMEC, Belgium); Stefan De Gendt (Katholieke Universiteit Leuven, Belgium)</td>
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<td>P2.13</td>
<td>Development of Modularized Electrode in Electro-Kinetic Force Assisted Chemical Mechanical Planarization for Through-Silicon-Via Wafer Planarization</td>
<td>Arthur Chen (National Taiwan University of Science and Technology, Taiwan)</td>
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<td>In-line Real-time Conductivity Technique for Monitoring of Liquid Chemical Concentration during Semiconductor Manufacturing</td>
<td>Jie Hong (SungKyunKwan University, Korea); Atul Kulkarni, Hyeong-U Kim, Taesung Kim (Sungkyunkwan University, Korea)</td>
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<td>A Study of Cu inhibitor removal by alkaline agent in post CMP cleaning process</td>
<td>Baohong Gao, Baimei Tan, Yuling Liu (Hebei University of Technology, P.R. China)</td>
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<td>P2.16</td>
<td>Proposal of Spraying Pure Water Method under the Electric Field and Its Behavior Observation in Cleaning Process of CMP</td>
<td>Masanori Fujimoto, Michio Uneda (Kanazawa Institute of Technology, Japan)</td>
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<td>P2.17</td>
<td>Research on multi-method endpoint detection in chemical mechanical planarization process</td>
<td>Hongkai Li, Xinchun Lu, Jianbin Luo (Tsinghua University, P.R. China)</td>
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<td>P2.18</td>
<td>Study on Defect Control of CMP Process Caused by Deposition Process</td>
<td>Sungbin Lee (University of Sungkyunkwan &amp; Samsung Company, Korea); Sangyoon Shin Shin (Samsung Electronics, Korea); Taesung Kim (Sungkyunkwan University, Korea)</td>
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<td>P2.19</td>
<td>Galvanic corrosion inhibitors for Cu/Ru couple during chemical mechanical polishing of Ru</td>
<td>Jie Cheng, Tongqing Wang, Can Rao, Xinchun Lu (Tsinghua University, P.R. China)</td>
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<td>P2.20</td>
<td>The effect of Non-TMAH post-CMP cleaning chemical on Cu CMP</td>
<td>Jaeseung Im (SK hynix, Korea)</td>
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<td>P2.21</td>
<td>Improvement of Ruthenium Polishing Rate by Addition of Guanidinium Ions</td>
<td>Chenwei Wang (Hebei University of Technology, P.R. China)</td>
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Optimization of WC-Co Composition for CVD Diamond Pad Conditioner
Myeong-Jun Kim (Hanyang University ERICA, Korea); Heon-Yul Ryu (Hanyang University, Korea); Jin-Yong Kim (Hanyang University ERICA, Korea); Jung-Hwan Lee (Hanyang University, Korea); Ji-Woo Kim, Sooji Cho, Dabin Hyun, Hae-geun Jee (SAESOL Diamond Ind, Korea); Jin-Goo Park (Hanyang University, Korea)

Torque measurements generated by a rotating PVA brush without skin layer
Masayoshi Ito, Toshiyuki Sanada (Shizuoka University, Japan); Akira Fukunaga, Hirokuni Hiyama (Ebara Corporation, Japan)

Effect of Mixed Abrasive Slurry during Tungsten CMP Process
Kangchun Lee (Hanyang University, Korea); Jihoon Seo (WCU Department of Energy Engineering, Korea); Jinok Moon (Samsung Electronics Co., Ltd & Hanyang University, Korea); Kijung Kim, Myeongjae Lee, Keungtae You (Hanyang University, Korea)

Chemical Mechanical Polishing of SiC Substrate Using Enhanced Slurry of Nano-Bubbles with Active Gas by Plasma
Shinya Mizuuichi, Michio Uneda (Kanazawa Institute of Technology, Japan); Kazutaka Shibuya, Yoshio Nakamura, Daizo Ichikawa (Fujikoshi Machinery Corp., Japan); Ken-Ichi Ishikawa (Kanazawa Institute of Technology, Japan)

Improvement of Wafer Edge Profile by Controlling a Pad Profile
Seokjoon Kim (System LSI Cleaning/CMP Technology Team, Samsung Electronics Co, Korea); Siyoung Kim (Samsung Electronics Co., Korea); Taesung Kim (Sungkyunkwan University, Korea)

Effect of Corrosion Inhibitor and Non-ionic Surfactant on CMP of Cu/Co Barrier Stack
Liang Jiang (Southwest Jiaotong University, P.R. China)

Minimize Tungsten Plug/Vias Recess By Co-Inhibitor System PCMP W Cleaner
Ching Hsun Chao (EKC Technology, DuPont Electronics and Communications, Taiwan)

Study on the Grit Angle of Single Diamond Dressing on CMP Pads
Arthur Chen (National Taiwan University of Science and Technology, Taiwan)

Study of heterogeneous Fenton-like reaction for tungsten chemical mechanical planarization via CuO immobilized silica nanoparticles
Kijung Kim, Kangchun Lee (Hanyang University, Korea); Jinok Moon (Samsung Electronics Co., Ltd & Hanyang University, Korea); Jihoon Seo (Hanyang University, Korea); Ungyu Paik (WCU Department of Energy Engineering, Korea)

Copper Post-CMP cleaner with post-etch residues removal
Ping Hsu, Cooper Wu, Ruby Chen, Fred Huang (DuPont, Taiwan)
**17:05 - 18:30**

**Session H: CMP Consumables, Defects**

**Chairs:** Yukiteru Matsui (Toshiba Memory Corp, Japan); Bo Un Yoon (Samsung Electronics, Korea)

**17:05**

**Application of Slurry Injection System (SiS) to Advanced Deep-Trench (DT) CMP (Invited)**
Amarnath Jha, Derek Stoll, Wei-Tsu Tseng (Globalfoundries, USA); Jichul Yang (Globalfoundries, USA); Changhong Wu (Globalfoundries, USA); Ara Philipossian (University of Arizona, USA)

**17:30**

**Pad Surface Texture Modulation through Adapted Conditioner and Pad Intrinsic Microstructure**
Ratanak Yim (CEA Grenoble & STMicroelectronics, France); Daniel Scevola (STMicroelectronics, France); Viorel Balan (CEA/Leti Minatec, France); Emmanuel Gourvest (STMicroelectronics, France); Ferdinando Salvatore (Université de Lyon, ENISE, France); Stéphane Valette (Université de Lyon, LTDS, France)

**17:50**

**Chemical Generation Mechanism of Copper Flake Defects on Copper Wafer Surface from CMP Slurry and Post CMP Cleaning Chemistry**
Nagarjuna Reddy Paluvai (Hanyang University, Korea); Muthukrishnan Purushothaman (Hanyang University ERICA, Korea); Byoung-Jun Cho, Jung-Hwan Lee (Hanyang University, Korea); Shohei Shima, Hirokuni Hiyama, Satmoni Hamada (Ebara Corporation, Japan); Jin-Goo Park (Hanyang University, Korea)

**18:10**

**Formation Mechanism of Cu Flake and Ring Scratch in the Advanced Device Manufacturing**
Sung Pyo Jung (Globalfoundries, USA)

**18:30 - 19:00**

**Departure to the Banquet**

**Conference Banquet at the Faculty Club**

Groot Begijnhof 14,
3000 Leuven, Belgium

Phone: +32 016 32 95 00
E-Mail: info@facultyclub.be

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Friday, October 13, 2017

08:00 - 09:45

Session I: Defects and Emerging

Chairs: Michio Uneda (Kanazawa Institute of Technology, Japan); Giovanni Mazzone (Micron, Italy)

08:00

Development of Post InGaAs CMP Cleaning Process for sub 10 nm Device Application
Muthukrishnan Purushothaman, In-Chan Choi, Hyun-Tae Kim (Hanyang University ERICA, Korea); Lieve Teugels (IMEC, Belgium); Tae-Gon Kim (Imec, Belgium); Jin-Goo Park (Hanyang University, Korea)

08:20

Post-CMP Cleaners for Tungsten Advanced Nodes: 10 nm and 7 nm
Ruben Lieten (Entegris Gmbh, Germany); Daniela White, Thomas Parson (Entegris Inc, USA); Shining Jenq (Entegris Inc, Taiwan); Don Frye, Michael White (Entegris Inc, USA); Lieve Teugels, Herbert Struyf (IMEC, Belgium)

08:40

Cherishing Old Knowledge, Acquiring New - Past, Present and Future of CMP Technology (Invited)
Manabu Tsujimura (Ebara Corporation, Japan)

09:05

Effect of slurry additives on selectivity between polymer and Cu in advanced package substrate CMP
Soocheon Jang (Pusan National University, Korea); Minjong Yuh (Pusan National University & G&P Technology Inc., Korea); Haedo Jeong (Pusan National University & GnP Technology, Korea)

09:25

Planarization of SiC wafer using photocatalyst incorporated pad
Yan Zhou, Guoshun Pan, Chunli Zou (Tsinghua University, P.R. China)

09:45 - 10:15

Morning Break

10:15 - 12:00

Session J: CMP Fundamentals

Chairs: Yasuhisa Sano (Osaka University, Japan); Eung-Rim Hwang (SK Hynix Semiconductor, Korea)

10:15

Atomic insights into material removal mechanism in Si and Cu chemical mechanical polishing processes: ReaxFF reactive molecular dynamics simulations (Invited)
Jialin Wen, Tianbao Ma, Xinchun Lu (Tsinghua University, P.R. China); Weiwei Zhang, Adria van Duin (Pennsylvania State University, USA)

10:40

Controllable CMP of Oxide Film by Using Colloidal Ceria Slurry
Syuhei Kurokawa, Takaaki Toyama, Terutake Hayashi (Kyushu University, Japan); Eisaku Suda, Jun Tokuda (Solvay Special Chem Japan, Japan)

11:00

Application of Machine Learning and Neural Networks for Generation of Pre-CMP Profiles of Advanced Deposition Processes for CMP Modeling
Ruben Ghlughazaryan (Mentor Graphics Development Services, Armenia); Jeff Wilson (Mentor, A Siemens Business)

11:20

A study of CMP Edge Profile for Production Wafers
Akira Isobe (ISTL Co., Ltd., Japan)

11:40

Chemo-Mechanical Planarization of Germanium Using Potassium Periodate based Titania Slurries
Apeksha Gupta, Noel Victoria Selvam, Manivannan Ramachandran (National Institute of Technology Raipur, India)

12:00 - 12:10

Student Awards

12:10 - 12:20

Closing Remarks

12:20 - 13:30

Lunch Break

13:30 - 18:00

Afternoon Activities (Optional)
Guided walk + visit of the Inbev Brewery in Leuven on Friday afternoon, October 13

Are you interested in making a first acquaintance with the city of Leuven whilst sneaking in some Belgian beer brewing culture? We will get started with the ‘Discover Leuven’-walk. The tour will include a visit to the Grote Markt Square, a visit to the University colleges and cloth halls. The Grote Markt Square is famous for the Leuven city hall and the Saint Peter’s Church, both masterfully designed in the Brabantine Gothic architectural style by the renowned architect Matheus de Layens. A visit to the Great Beguinage, a UNESCO world Heritage site, will also be a highlight to remember. The walk will end at the InBev brewery. Here is where you will discover the history of Leuven’s crown jewel when it comes to beer: Stella Artois. You will enjoy an interactive guided tour through the brewing hall and an exciting ride along one of the bottling lines. After a vertiginous ride on one of the bottles lines, it is time for the real deal: drafting and tasting from a delicious Stella Artois in the Stella Artois bar above the brewery.

Day: Friday afternoon, 13 October 2017
Time: 15:00 - 18:30, Duration: 3.5 hours
(2 hours guided walk + 1.5 hours visit InBev)
The walk will start at 15:00, at the entrance of the University Hall where a guide from Leuven is going to pick you up.
Minimum number of participants: 15 persons
Maximum number of participants: 60 persons
Price: 25.00 EUR per person

Chocolate workshop on Friday afternoon, October 13

Would you mind spoiling your taste buds with Belgian chocolate? Enjoy the relaxed atmosphere and get focussed on something really creative and challenge yourself to come up with new taste sensations. You will receive guidance about the basic principles of the world of chocolate and then you are immediately going to be set to work. Assemble your own trail mix, pipe your own ganache pralines, make crunchy chocolate rocks and present it all in your very own chocolate bowl which you may take home.

Day: Friday afternoon, 13 October 2017
Time: 14:00 - 16:30, Duration: 2.5 hours
This workshop will start at 14:00, in the Muntstraat 15 (5 minutes’ walk from the conference venue). Mieke Cassiers will be your workshop teacher.
Minimum number of participants: 8 persons
Maximum number of participants: 17 persons
Price: 50.00 EUR per person

VISIT to IMEC on Friday afternoon, October 13

A short bus ride will bring you to imec, which is located at the outskirts of Leuven. imec is the world-leading R&D and innovation hub in nanoelectronics and digital technologies. After a presentation about imec and the wide spectra of its research activities you will have the chance for a guided window tour along the 300mm cleanroom.

After the visit the bus will take you back to the location of the conference.

Day: Friday afternoon, 13 October 2017
Time: 15:00 - 16:30, Duration: 1.5 hours
15:00 - 15:45 General imec presentation
15:45 - 16:30 300mm-window cleanroom visit
At 15:00 a bus will be at your disposal in front of the University Hall. After the visit the bus will take you back to the location of the conference.
Minimum number of participants: 15 persons
Maximum number of participants: 60 persons
Price: 20.00 EUR per person
Excursion to Bruges on Saturday, October 14

Bruges is the capital of the West Flanders province situated in the northwest of Belgium. Bruges is well known for its canals which loop across the town like a string of pearls, creating the well-earned moniker of the ‘Venice of the North’. With its cobblestone paths, brick archways, stone churches and quaint bridges, it is nearly impossible not to get impressed with this wonderful city.

Furthermore, Bruges is the perfect example of a medieval city center, with its bell tower leaning over the wide open market. As the city center is closed off to cars, all the stunning beauty and culture of this unforgettable city can excellently be explored on foot.

We will start the excursion with a guided city walk through the historical city center, walking past the market, the belfry, the beguinages and the lake of love. After the walk you might like to have lunch in the city center. We will then take you on a tour along the picturesque canals. Some leisure time will also allow you to discover the city on your own - you will have enough time to visit a museum or simply enjoy a refreshing drink at a local bar. After the excursion a bus will drive you back to Leuven.

Day: Saturday 14 October 2017
Duration: whole day (08:00 – 19:00)
A bus of Focus Flanders will pick you up in the city centre of Leuven. The bus will leave at 08:00 in the morning.
Minimum number of participants: 25 persons
Maximum number of participants: 45 persons
Price: 110.00 EUR, including bus transfer, guided walk, lunch and boat ride

ICPT 2017 Secretariat

For detailed Information please contact:
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Fax: +49 69 6308-9828
E-Mail: gmm@vde.com
During the conference:
Phone: +49 171 4695 118

Conference Venue

The ICPT 2017 Conference will take place in the University Halls of the University of Leuven. This venue can easily be reached by public and private transport.

Katholieke Universiteit Leuven
University of Leuven, University Halls
Naamsestraat 22, 3000 Leuven, Belgium

Conference Hours

Wednesday, October 11, 2017 08:00 to 20:00
Thursday, October 12, 2017 08:00 to 18:30
Friday, October 13, 2017 08:00 to 13:30

Registration Hours

Tuesday, October 10, 2017 15:00 to 18:00
Wednesday, October 11, 2017 07:00 to 18:00
Thursday, October 12, 2017 07:30 to 18:00
Friday, October 13, 2017 07:30 to 14:00
General Information

Exhibition

The Tabletop Exhibition will take place on October 11-13, 2017, as part of the 2017 International Conference on Planarization/CMP Technology. The exhibit will be shown parallel to the coffee breaks and poster presentations, providing many opportunities for discussions among the 250+ expected attendees.

Conference Fees

(all prices are subject to additional 21% VAT)

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<th>until Sept. 13, 2017</th>
<th>after Sept. 13, 2017</th>
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<tr>
<td>Full rate</td>
<td>€ 450.00</td>
<td>€ 550.00</td>
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<td>Committee members</td>
<td>€ 300.00</td>
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<tr>
<td>Students*</td>
<td>€ 300.00</td>
<td>€ 300.00</td>
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</table>

* A photocopy of the student card must be included.

The conference fee includes admission to all sessions as well as to the daily coffee-breaks and lunches, one copy of the proceedings and the conference dinner.

Cancellation

In case of cancellation, provided that VDE-Conference Services has received written notice about it before September 13, 2017, the registration fee will be fully refunded less a handling fee of € 80.00. After September 13, 2017, no refund will be made. Proceedings will then be sent to the registrant after the conference.

Proceedings

All papers accepted for presentation at the conference will be published as conference proceedings. The proceedings will be handed on-site to all delegates attending the event. They will also be published by the IEEE digital library.

List of Exhibitors

The following companies have registered as exhibitors:

- Accretech
- Bruker
- Ebara
- K-Patents
- Levitronix
- Revasum
- Versum Materials
- SPS Semiconductors
The IPCT 2017 Organizing Committee would like to express its sincere appreciation to the following companies for their support:

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