

Thursday, March 15th 2012

9.00 Welcome –Didier Louis, Chairman

Session 1: Plasma Etching for CMOS

**09.20 Efraín Altamirano-Sánchez, Vasile Paraschiv and Werner Boullart -
*Invited***

IMEC, Kapeldreef 75, 3001 Leuven, Belgium

FEOL etch challenges, from planar Metal Gates towards FinFET devices

10.00 A. P. Milenin^a, R. Athimulam^a, M. Demand^a, and B. Coenegrachts^b

^aIMEC, Kapeldreef 75, 3001 Heverlee, Belgium

^bLam Research Corp., Kapeldreef 75, B-3001 Leuven, Belgium

Fluorocarbon-based passivation in STI plasma etching

10.20 G. Kokkoris, V. Constantoudis and E. Gogolides

Institute of Microelectronics NCSR Demokritos, Aghia Paraskevi, Attiki, Greece, 15310

**3D modeling of Line Edge Roughness transfer from the resist to the
underlying substrate: The effect of resist roughness**

10.40 Coffee break

11.20 P. Bodart^a, G. Cunge^a, C. Petit-Etienne^a, M. Darnon^a, M. Haass^a, S. Banna^b,
O.Joubert^a and T.Lill^b

^aCNRS-LTM, 17 rue des Martyrs, 38054 Grenoble Cedex, France

^bApplied Materials, 974E Arques Ave. Sunnyvale, CA, 95085, USA

**SiCl₄/Cl₂ plasmas: a new chemistry to etch high-k material selectively to Si-
based alloys**

11.40 J.-F. de Marneffe^a, R. Ljazouli^b, L. Souriau^a, L. Zhang^a, C. Wilson^a and M.
R. Baklanov^a

^aIMEC v.z.w., Kapeldreef 75, Leuven, B-3001, Belgium

^bPolytech'Orleans, rue de Blois 12, Orleans cedex2, 45067, France

**Study of damage caused by non-reactive Ar plasma on an organic low-k
material**

12.00 Lunch break

Session 2: New Processes and New Materials

13.20 Marc Segers, Gilles Baujon, Julien Richard, Vincent Girault and Emmanuel Guidotti - Invited

Nanoplas, Centre Scientifique d'Orsay - Bâtiment 503, Orsay, 91401, France

High Density Radical Flux applications for MEMS, LEDs and 3D-IC

14.00 T. Chevolleau^a, G. Cunge^a, X. Chevalier^{b,c}, R. Tiron^b, M. Darnon^a, C. Navarro^d and S. Magnet^d

^a *LTM-CNRS, CEA-Leti, 17 Rue des Martyrs, 38054 Grenoble cedex, France*

^b *CEA-Leti, MINATEC, 17 Rue des Martyrs, 38054 Grenoble, cedex 9, France*

^c *LCPO-UMR 5629 Université Bordeaux I-CNRS-Institut Polytechnique de Bordeaux, Bâtiment 8, Avenue des Facultés – 33405 Talence cedex - France*

^d *ARKEMA FRANCE, Route Nationale 117, BP34- 64170 Lacq, France*

Self assembly patterning using block copolymer for advanced CMOS technology

14.20 G. Mannaert, V. Paraschiv, B. De Jaeger, M. Van Hove, M. Demand, S. Decoutere and W. Boullart

IMEC v.z.w., Kapeldreef 75, Leuven, B-3001, Belgium

Development of (Al)GaN recess etch for E-mode POWER HEMTs

14.40 A. Tavernier^a, L. Favennec^a, T. Chevolleau^b and V. Jousseume^c

^a *STMICROELECTRONICS, 850 rue Jean Monnet, 38926 Crolles, France*

^b *LTM-CNRS/UJF (CEA, Leti, MINATEC), 17 Rue des Martyrs, 38054 Grenoble Cedex 09, France*

^c *CEA-Leti, Minatec campus, 17 rue des Martyrs, 38054 Grenoble Cedex 09, France*

Innovative gap-fill strategy for 28 nm shallow trench isolation using etch-back process

Session 3: Plasma Induced Damage

15.00 Francesca Iacopi^{a,b}, Sven Stauss^a, Kazuo Terashima^a and Mikhail R. Baklanov^c – Invited

^a *Dept. of Advanced Materials Science, Graduate School of Frontier Sciences, The University of Tokyo, 5-1-5 Kashiwanoha, Kashiwa-shi, Chiba 277-8561, Japan*

^b *presently at the Queensland Micro and Nanotechnology Centre, Griffith University, 4111 Nathan, QLD, Australia,*

^c *Inter-university Microelectronics Center, IMEC, Kapeldreef 75, 3001 Leuven, Belgium*

Cryogenic approaches to low-damage patterning of porous low-k films

15.40 K. Eriguchi, Y. Nakakubo, A. Matsuda, Y. Takao and K. Ono

Graduate School of Engineering, Kyoto University Yoshida-Honmachi, Sakyo-ku, Kyoto 606-8501, Japan

Unified Model-Prediction Framework for MOSFET Performance Degradation by Plasma-Induced Si Damage and its Application to Process Parameter Optimization

16.00 A. Matsuda, Y. Nakakubo, Y. Takao, K. Eriguchi and K. Ono
Kyoto University, Yoshida-Honmachi, Sakyo-ku, Kyoto, 606-8501, Japan
Optical Characterization of Plasma-Induced Si Damage by Ar and Cl₂ Inductively Coupled Plasmas

16.20 A. M. Myers^a, K. J. Singh^a, M. J. van Veenhuizen^a and C. K. Man^b
^a*Intel Corporation, 2501 NW 229th Ave, Hillsboro, OR 97124*
^b*LAM Research Corporation, 4650 Cushing Parkway Fremont, CA 94538*
Mechanistic Understanding of Line Undulation as a Function of Ash-induced Structural Changes in a Porous Carbon-doped-Oxide Dielectric

Poster Session

16.40 Poster session

1. M. S. B. Castro^a and S. Barnola^b
^a*Centro Tecnológico do Exército, Avenida das Americas 28705, Rio de Janeiro, 23020-470, Brazil*
^b*Laboratoire d'Electronique et de Technologies de l'Information, 17 rue des Martyrs, Grenoble, 38054, France*
Selective anisotropic plasma etching of Ge on Si
2. S. Yanovich^a, M. Baklanov^b, O. Gushchin^a, E. Gornev^a and A. Danila^a
^a*MERI JSC, 12/1 1st Zapadny Proezd, Zelenograd, Moscow, 124460, Russia*
^b*IMEC, Kapeldreef 75, Leuven, B-3001, Belgium*
Application of fully fluorinated cyclic saturated hydrocarbons for highly selective nanoscale silicon dioxide reactive ion etching
3. S. Yanovich^a, M. Baklanov^b, S. Orlov^a, O. Gushchin^a, N. Zaitsev^a, P. Ignatov^a and R. Yafarov^c
^a*MERI JSC, 12/1 1st Zapadny Proezd, Zelenograd, Moscow, 124460, Russia*
^b*IMEC, Kapeldreef 75, Leuven, B-3001, Belgium*
^c*RAS, Kotel'nikov Institute of Radio Engineering and Electronics, Saratov, Russia*
Maskless Fabrication of High Density Silicon Nano-Pin Structures With Carbon Nano Clusters Acting as Mask for Subsequent Microwave Silicon Etching.
4. A. Zeniou, A. Smyrnakis and E. Gogolides
Institute of Microelectronics, NCSR "Demokritos", Aghia Paraskevi 15310
High-aspect-ratio Si nanowire fabrication using Colloidal self- assembly and fluorine-based plasma etching
5. E. Danilkin, A. Polyakov, O. P. Gutshin, A. Chamov, V. Hanin, E. Smirnov and G. Y. Krasnikov
MIKRON JSC, 12/1 Pervyi Zapadny Proezd, Zelenograd, 124460 Moscow, Russia
Etching of deep trenches in Si for non-planar power MOSFETs using HBr/O₂/SF₆ plasma
6. D. Belharet^{a,b}, P. F. Calmon^{a,b}, P. Dubreuil^{a,b}, J. Tasselli^{a,b} and H. Granier^{a,b}
^a*CNRS ; LAAS ; 7 avenue du colonel Roche, F-31077 Toulouse, France*
^b*Université de Toulouse ; UPS, INSA, INP, ISAE ; UT1, UTM, LAAS ; F-31077 Toulouse, France*
Plasma etching of multilevel silicon structures by deep reactive ion etching process

7. V. Lukichev, V. Kalnov, I. Amirov, E. Zhikharev, K. Rudenko and A. Orlikovsky
Institute of Physics and Technology RAS, 36/1 Nakhimovskii av., Moscow, 117218, Russia
Aperture effect as a tool for fabrication 3-D photonic crystals
8. G. Y. Krasnikov^a, A. S. Valeev^a, V. A. Vasiljev^{b*}, K. A. Vorotilov^b, P. I. Kuznetsov^a, D. S. Seregin^b and E. V. Danilkin^a
^a *JSC MIKRON, 12/1 1-y Zapadny Proezd, Zelenograd, Moscow, 124460 Russia*
^b *MIREA, 78, Vernadsky Avenue, Moscow, 119454, Russia*
Formation conductors with porous ultra Low-K dielectric for multilevel metallization VLSI
9. K. S. Min^a, C. K. Kim^a, J. K. Kim^{a,b} and G. Y. Yeom^a
^a *Department of Advanced Materials Science and Engineering, Sungkyunkwan University, Suwon, Kyunggi-do, 440-746, South Korea,*
^b *Process Technology Team, Semiconductor R&D Center Samsung Electronics Co., Ltd., South Korea*
A Low Plasma-Induced Damaged Neutral Beam Etching for Metal Gate in Sub-32nm Metal Gate/High-k Dielectric CMOSFETs
10. I. V. Schweigert and A. L. Aleksandrov
Institute of Theoretical and Applied Mechanics SB RAS, 630090 Novosibirsk, Russia
Effect of nanoparticles on rf discharge afterglow
11. N. Škoro and E. Gogolides
Institute of Microelectronics, NCSR Demokritos, Aghia Paraskevi, Attiki 15310, Greece
Characterization of Hydrogen-based Plasmas for Cleaning of Organic Contamination from EUV Optics
12. J. K. Kim^{a,c}, S. S. Jeong^a, S. W. Nam^a, K. S. Min^c, C. K. Kim^c, B. S. Kim^b and G. Y. Yeom^c
^a *Process Technology Team, Semiconductor R&D Center Samsung Electronics Co., Ltd., 445-701, South Korea*
^b *Department of Information and Communication Engineering, Sungkyunkwan University, Suwon, Gyeonggi-do, 440-746, South Korea*
^c *Department of Advanced Materials Science and Engineering, Sungkyunkwan University, Suwon, Gyeonggi-do, 440-746, South Korea*
A study on the etching characteristics of organic layer in oxygen plasma with carbonyl sulfide
13. M. F. Pistoni, S. Paolillo and I. Venegoni
STMicroelectronics, Competence Centre – Technology R&D Agrate Brianza (MB) – Italy
Contact Module Definition for 110 nm Technology Node on BCD Platforms
14. M. F. Pistoni, P. Bernardinello and S. Colombo
STMicroelectronics, Competence Centre – Technology R&D Agrate Brianza (MB) – Italy
Active Area Definition for 80 nm Embedded Devices with Phase Change Memory and Logic

19.00 End of day

Friday, March 16th 2012

Session 4: Plasma Fundamentals

08.40 **Alex Paterson, John Holland, Keren Kanarik, Gowri Pamarthy, Jun Belen and Chris Lee - *Invited***

Lam Research Corporation, 4650 Cushing Parkway, Fremont, CA, 94538, USA

High-Definition Etching Approaches

09.20 J.-P. Booth, P. Chabert, Y. Azamoum and N. Sirse

LPP-CNRS, Ecole Polytechnique, 91128 Palaiseau, France

Chlorine atom and molecule dynamics in an inductively coupled plasma in pure Cl₂

09.40 S; Tinck^a, A. Bogaerts^a and W. Boullart^b

^a *University of Antwerp, Universiteitsplein 1, 2610 Wilrijk, Belgium*

^b *IMEC, Kapeldreef 75, 3100 Leuven, Belgium*

Computer simulations of SiCl₄/O₂ ICP Discharges used for Coatings Deposition or mask damage recovery

10.00 S. Lopez-Lopez^a, J. J. Munro^b, A. I. Williams^a and J. Tennyson^a

^a *Department of Physics and Astronomy, University College London, Gower St., London WC1E 6BT, UK*

^b *Quantemol Ltd.*

Simulations of SF₆ Plasma Etching in the GEC Reference Cell

10.20 Coffee break

Session 5: Plasma Surface Interactions

11.00 **Hiroshi Yamamoto, Kohei Asano, Makoto Sekine, Kenji Ishikawa, Keigo Takeda, Hiroki Kondo and Masaru Hori – *Invited***

Graduate School of Engineering, Nagoya University, Nagoya 464-8603 Japan

***In-situ* Analysis of Plasma-Induced Modification of Porous SiOCH film**

11.40 M. Brihoum, K. Mengueli, G. Cunge, E. Pargon and O. Joubert

LTM CNRS, 17 avenue des Martyrs, Grenoble, 38054, France

Impact of HBr pulsed plasma cure on 193 nm resist LWR reduction and etch resistance improvement

12.00 S. Zhao and A. Bogaerts

Research group PLASMANT, University of Antwerp, Universiteitsplein 1, Antwerp-Wilrijk, B-2610, Belgium

Influence of etching products on the bulk plasma and the etching characteristics in a CF₄/Ar inductively coupled plasma

12.20 M. Haass^a, M. Darnon^a, E. Pargon^a, C. Petit-Etienne^a, L. Vallier^a, P. Bodart^a, G. Cunge^a, S. Banna^b, T. Lill^b and O. Joubert^a

^aLTM-CNRS, 17 rue des Martyrs, 38054 Grenoble Cedex, France

^bApplied Materials, Inc., 974E Arques Ave. Sunnyvale, CA, 95085, USA

Analysis of Passivation Layer Composition and Thickness on Silicon Patterns Etched by Synchronously Pulsed Plasmas

12.40 *Lunch break*

Session 6: Memories

14.00 **Kenneth MacKay^a, Jérémy Pereira^a, Michael Darques^b, Erwine Pargon^b, Erwan Gapihan^a and Olivier Joubert^b - invited**

^aCrocus Technology, 4 place Robert Schuman, BP1510, 38025 Grenoble Cedex 1, France

^bLTM-UMR 5129 CNRS, 17 avenue des martyrs, 38054 Grenoble Cedex 9 France.

Process challenges of MRAM technology integration

14.40 E. Vecchio, G. S. Kar, B. Govoreanu, M. Jurczak, W. Boullart and V. Paraschiv
IMEC, Kapeldreef 75, 3001 Leuven, Belgium

Patterning of Hf/HfO_x Resistive RAM down to 20-nm CD

15.00 B. Salhi^a, T. Chevolleau^a, C. Vizioz^b, C. Jahan^b, S. Maitrejean^b, C. Vallée^a, T. Baron^a and O. Joubert^a

^aLTM – CNRS/UJF (CEA, Leti, MINATEC), 17, rue des martyrs, 38054 Grenoble Cedex, France,

^bCEA-Leti, MINATEC, 17 rue des martyrs, 38054 Grenoble Cedex, France

Patterning of Ge_xSb_yTe_z for Non volatile Phase-Change Memory Applications

15.20 *Closing remarks*