

SISC 2008

**39th IEEE
Semiconductor Interface
Specialists Conference**

December 11-13, 2008
Catamaran Resort Hotel, San Diego, CA
www.ieeesisc.org



Executive Committee

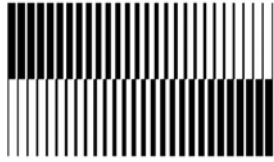
| <u>General Chair</u> | <u>Technical Chair</u> | <u>Arrangements</u> | <u>Ex-Officio</u> |
|--|---|---|---|
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|---|--|
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| G. Reimbold , LETI <i>Grenoble, FRANCE</i> | C. Young , SEMATECH <i>Austin, TX</i> |

*This meeting is sponsored by the IEEE Electron Devices Society
and endorsed by the Materials Research Society*



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SISC Ed Nicollian Award for Best Student Paper

In 1995, the SISC began presenting an award for the best student presentation, in honor of Professor E.H. Nicollian, University of North Carolina at Charlotte. Professor Nicollian was a pioneer in the exploration of the metal-oxide-semiconductor system, particularly in the area of electrical measurements. His efforts were fundamental in establishing the SISC in its early years, and he served as its technical program chair in 1982. With John Brews, he wrote the definitive book, “MOS Physics and Technology,” published by Wiley Interscience.

The *SISC Ed Nicollian Award for Best Student Paper* is presented to the lead student author or either an oral or poster presentation. The winner is chosen by members of the technical program committee at the end of the SISC. The award consists of a plaque, an honorarium, and a permanent mention on the conference web site.

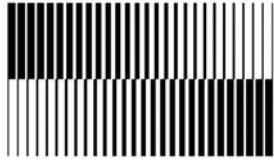
The winner of the 2007 SISC Ed Nicollian Award for Best Student Paper

Stanislav Markov

University of Glasgow

“Band-gap and permittivity change at high-k gate stack interfaces — device perspective”

with S. Roy, C. Fiegna, E. Sangiorgi, and A. Asenov



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New in 2008: Wednesday evening Tutorial

New at SISC 2008, the Wednesday (Dec 10) evening Tutorial aims to give a good foundation in one topic frequently covered at the conference. The Tutorial is free for all SISC registered attendees.

Prof. Guido Groeseneken, IMEC & KU Leuven, Belgium

“Introduction to Charge Pumping and Its Applications”

Charge pumping is one of the most sensitive techniques to characterize the semiconductor-dielectric interface of MOSFET-based devices, and has been used in a lot of investigations in the last 20 years. In this tutorial, which is targeting both novices as well as experts in the field, we will start from the very basic theory of charge pumping, and discuss the more refined models which have been proposed. We will also give examples of the applications of charge pumping in the field of transistor and memory degradation, energy distribution determination, etc. We will illustrate how the technique is influenced by scaling the oxide thickness, and how it can be adapted to cope with the related problems. Finally we will also demonstrate how it can be adapted to get information about high k properties in advanced CMOS technologies.



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Conference Agenda Overview

Wednesday, December 10, 2008

| | |
|------------------------------------|--------------------------|
| Registration | 6:00 PM – 9:00 PM |
| Hospitality Room | 7:00 PM – Midnight |
| NEW! Evening Tutorial | 8:00 PM – 9:30 PM |

Thursday, December 11, 2008

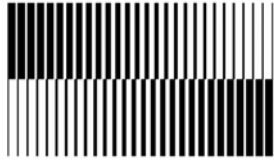
| | |
|--|---------------------|
| Registration | 8:00 AM – 5:00 PM |
| Session 1 – Advanced High-k Stacks I | 8:00 AM – 9:10 AM |
| Poster Session 1 – Adv. High-k Stacks and High-Mob. Substrates | 9:15 AM – 9:45 AM |
| Session 2 – Non-Volatile Memories | 10:15 AM – 11:15 AM |
| Poster Session 2 – Non-Volatile Memories and SiO ₂ | 11:20 AM – 11:41 AM |
| Session 3 – Reliability and Interface Defects I | 1:30 PM – 2:30 PM |
| Poster Session 3 – Reliability and Interface Defects | 2:35 PM – 2:59 PM |
| Session 4 – Reliability and Interface Defects II | 3:30 PM – 5:10 PM |
| Poster Session 4 – High-Mobility Substrates | 5:15 PM – 5:33 PM |
| Poster Reception | 7:00 PM – 10:00 PM |
| Hospitality Room | 9:00 PM – Midnight |

Friday, December 12, 2008

| | |
|--|---------------------|
| Registration | 8:30 AM – Noon |
| Session 5 – High-Mobility Substrates I | 8:30 AM – 10:30 AM |
| Session 6 – High-Mobility Substrates II | 11:00 AM – 12:40 PM |
| Technical Committee / Invited Speaker Luncheon | 12:40 PM – 2:00 PM |
| Optional Rump Sessions | 3:00 PM – 5:30 PM |
| Conference Banquet and Limerick Contest | 7:00 PM – 10:00 PM |
| Hospitality Room | 10:00 PM – Midnight |

Saturday, December 13, 2008

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|---|---------------------|
| Session 7 – Theory | 8:30 AM – 10:10 AM |
| Session 8 – Advanced High-k Stacks II | 10:40 AM – 12:25 PM |



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Conference Program

Session 1 – Advanced High-k Stacks I

Thursday, December 11, 2008

Session Chair: B. Kaczer

- 8:00 AM Welcome and opening remarks
- 8:15 AM 1.1 *Invited* - **High-k/Metal Gate Technology: An Ode to Materials Research and Innovation**, V. Narayanan, *IBM T.J. Watson Research Center*
- 8:50 AM 1.2 - **Metal Gate/High-K Capacitors on Germanium: Role of the Ultrathin Si Passivation Layer**, H. Grampeix¹, C. Le Royer¹, A. Bastard¹, Y. Campidelli², J.-P. Colonna¹, J.-M. Hartmann¹, V. Loup¹, F. Martin¹, E. Martinez¹, K. Romanjek¹, C. Tabone¹, M. Vinet¹, K. Yckache¹, ¹*CEA-LETI, France*, ²*STMicroelectronics, France*

Poster Session 1 – Advanced High-k Stacks and High Mobility Substrates

Thursday, December 11, 2008

Session Chair: G. Reimbold

- 9:15 AM P.1 - **Impact of incorporated Al on the TiN/HfO₂ interface effective work function**, K. Xiong¹, J. Robertson², G. Pourtois³, J. Petry⁴, M. Mueller⁴, K. Cho¹, ¹*University of Texas at Dallas*, ²*Cambridge University*, ³*IMEC*, ⁴*NXP-TSMC Research Center*
- 9:18 AM P.2 - **Stability of TiN / Al₂O₃ / HfO₂ / Si Structures by Photoemission Spectroscopy**, J. Choung¹, H. Jeon^{1,3}, J.E. (Jack) Rowe¹, K. Choi², R.J. Nemanich^{1,4}, ¹*North Carolina State University*, ²*SEMATECH*, ³*Hanyang University, Korea*, ⁴*Arizona State University*
- 9:21 AM P.3 - **Quest for an Optimal Gadolinium Silicate Gate Dielectric Stack**, I.Z. Mitrovic¹, M. Werner¹, W.M. Davey¹, S. Hall¹, P.R. Chalker¹, H.D.B. Gottlob², M.C. Lemme², O. Engstrom³, K. Cherkaoui⁴, P.K. Hurley⁴, ¹*University of Liverpool, UK*, ²*AMO GmbH, Germany*, ³*Chalmers University of Technology, Sweden*, ⁴*University College Cork, Ireland*
- 9:24 AM P.4 - **High-k/Germanium Gate Stacks with GeO_xN_y Interfacial Layer: EOT Scaling**, Y. Oshima^{1,2}, P.C. McIntyre¹, ¹*Stanford University*, ²*Tokyo Electron, Japan*
- 9:27 AM P.5 - **Density-functional theory molecular dynamics simulations of atomic scale intermixing at the amorphous Al₂O₃/semiconductor interfaces**, E.A. Chagarov, A.C. Kummel, *UC San Diego*

- 9:30 AM P.6 - **Rare-earth based alternative gate-dielectrics for future integration in MOSFETs**, J.M.J. Lopes, M. Roeckerath, E. Durgun Ozben, R. Luptak, J. Schubert, S. Mantl, *Research Center Juelich, Germany*
- 9:33 AM P.7 - **Impact of Cation Composition and Surface Orientation on Electrical Properties of ALD-Al₂O₃/III-V Interfaces**, T. Yasuda¹, N. Miyata¹, H. Ishii¹, T. Itatani¹, O. Ichikawa², N. Fukuhara², M. Hata², A. Ohtake³, T. Haimoto⁴, T. Hoshii⁴, M. Takenaka⁴, S. Takagi⁴, ¹*National Institute of Advanced Industrial Science and Technology (AIST), Japan*, ²*Sumitomo Chemical, Japan*, ³*National Institute for Materials Science (NIMS), Japan*, ⁴*The University of Tokyo, Japan*
- 9:36 AM P.8 - **Wet chemical etching and pre-ALD thermal annealing of In_{0.53}Ga_{0.47}As(001) for ALD of Al₂O₃ gate insulators**, B. Shin, P.C. McIntyre, *Stanford University*
- 9:39 AM P.9 - **The effects of silicon interface passivation layer thickness on device characteristics of InP enhancement-mode nMOSFETs with HfO₂ gate oxide**, F. Zhu, H. Zhao, H.S. Kim, I. Ok, J.H. Yum, J.C. Lee, *University of Texas at Austin*
- 9:42 AM P.10 - **A high performance enhancement-mode In_{0.53}Ga_{0.47}As nMOSFET with directly sputtered HfO₂ gate oxide**, F. Zhu, H. Zhao, H.S. Kim, I. Ok, J.H. Yum, J.C. Lee, *University of Texas at Austin*
- 9:45 AM Break

Session 2 – Non-Volatile Memories

Thursday, December 11, 2008

Session Chair: D. Ielmini

- 10:15 AM Opening remarks
- 10:20 AM 2.1 *Invited* - **High k Dielectrics for Next Generations Non Volatile Memories**, M. Alessandri¹, R. Piagge¹, A. Del Vitto¹, A. Sebastiani¹, C. Scozzari¹, C. Wiemer², L. Lamagna², G. Ghidini¹, M. Fanciulli^{2,3}, ¹*Numonyx, Italy*, ²*Laboratorio Nazionale MDM, CNR INFM, Italy*, ³*Università degli Studi Milano-Bicocca, Italy*
- 10:55 AM 2.2 - **Superior Write/Erase performance thanks to Alumina as top dielectric in planar and SOI 3D TANOS FinFlash**, L. Perniola, E. Nowak, M. Bocquet, C. Jahan, R. Kies, B. De Salvo, G. Reimbold, F. Boulanger, *CEA-LETI, France*

Poster Session 2 - Non-Volatile Memories and SiO₂

Thursday, December 11, 2008

Session Chair: H. Hwang

- 11:20 AM P.11 - **Resistive Switching of Copper-doped Carbon film for Non-volatile Memory Applications**, H. Choi, M. Pyun, D. Lee, J. Lee, M. Hasan, R. Dong, D.-J. Sung, J. Park, J. Yoon, T.-W. Kim, T. Lee, H. Hwang, *Gwangju Institute of Science and Technology, Korea*
- 11:23 AM P.12 - **Device Performance of HfON charge trap layer NAND Flash Memory**, T. Lee, S.K. Banerjee, *University of Texas at Austin*
- 11:26 AM P.13 - **Electron Mobility in SONOS Nonvolatile Semiconductor Memory (NVSM) Devices**, G. Wang, J. Goldman, X. Zhang, N.C. Eichenlaub, L.S. Liyanage, M.H. White, *Lehigh University*

- 11:29 AM P.14 - **Charge Trapping Memory Stack with Aluminum Oxide as the Tunnel Barrier**, J.F. Yang^{1,2}, X.W. (Sharon) Wang¹, Y.L. Yang¹, T.P. Ma¹, ¹*Yale University*, ²*Peking University, China*
- 11:32 AM P.15 - **Improved Electrical Properties of Ge₃N₄/Ge Interfaces by Fluorine Ion Implantation**, K. Kutsuki, G. Okamoto, T. Hosoi, T. Shimura, H. Watanabe, *Osaka University, Japan*
- 11:35 AM P.16 - **Improvement of MIS interfacial properties by direct nitridation of InP surfaces**, T. Haimoto, T. Hoshii, M. Takenaka, S. Takagi, *University of Tokyo, Japan*
- 11:38 AM P.17 - **Correlation between Phonon-Energy-Coupling Enhancement and the Energy-Band-Structure Change of the SiO₂/Si System**, Z. Chen, P. Ong, *University of Kentucky*
- 11:41 AM Adjourn for lunch

Session 3 – Reliability and Interface Defects I

Thursday, December 11, 2008

Session Chair: T. Gustafsson

- 1:30 PM Opening remarks
- 1:35 PM 3.1 *Invited* - **Reliability Mechanisms in High-K & Metal-Gate Transistor Technology**, S. Pae, J. Hicks, J. Jopling, J. Maiz, C. Prasad, M. Hattendorf, J. Wiedemer, *Intel Corporation*
- 2:10 PM 3.2 - **Impact of La Incorporation on the Breakdown Characteristics of Hf-Based Gate Stacks**, C.D. Young, G. Bersuker, J. Huang, D. Heh, C.Y. Kang, P. Sivasubramani, H.K. Park, P. Kirsch, H.-H. Tseng, *SEMATECH*

Poster Session 3 - Reliability and Interface Defects

Thursday, December 11, 2008

Session Chair: M. Takayanagi

- 2:35 PM P.18 - **Observation of a positive charge related defect in functional HfO₂ layers on (100)Si by electron spin resonance: the oxygen vacancy?**, A. Stesmans, V.V. Afanas'ev, *Katholieke Universiteit Leuven, Belgium*
- 2:38 PM P.19 - **Impact of Interface States on Mobility and Threshold Voltage of Si-passivated Ge MOSFETs**, K. Martens^{1,2}, F. Leys¹, J. Mitard¹, B. De Jaeger¹, M. Caymax¹, M. Meuris¹, B. Kaczer¹, G. Groeseneken^{1,2}, H. Maes^{1,2}, *IMEC, Belgium*, ¹*Katholieke Universiteit Leuven, Belgium*
- 2:41 PM P.20 - **Trap generation in MOSFETs with HfO₂ gate dielectric subjected to constant voltage and channel-hot-carrier stresses**, C.-C. Lu, K.-S. Chang-Liao, S.-C. Chang, Y.-F. Cheng, T.-K. Wang, *National Tsing Hua University, Taiwan*
- 2:44 PM P.21 - **Channel length dependence of NBTI: increased generation of deep-level hole traps at the source/drain extension regions**, T.J.J. Ho^{1,2}, D.S. Ang¹, Z.Q. Teo^{1,2}, C.M. Ng², ¹*Nanyang Technological University, Singapore*, ²*Chartered Semiconductor Manufacturing Ltd., Singapore*
- 2:47 PM P.22 - **Capture/Emission Process of Carriers in Interface Traps Observed in the Transient Charge-Pumping Characteristics of MOSFETs**, T. Tsuchiya¹, K. Yoshida¹, M. Sakuraba², J. Murota², ¹*Shimane University, Japan*, ²*Tohoku University, Japan*

- 2:50 PM P.23 - **Characterization of electrically active defects in hafnium-based MOS transistors**, W. Hourani, L. Militaru, *Universite de Lyon, France*
- 2:53 PM P.24 - **Stress-Induces Trap Generation in NMOSFETs with Various Combinations of IL and HfO₂ thicknesses and its impact on Low Frequency Noise**, K.T. Lee¹, C.Y. Kang², H.S. Choi¹, S.H. Hong¹, G.B. Choi¹, J.C. Kim¹, S.H. Song¹, R.H. Baek¹, M.S. Park¹, H.C. Sagong¹, B.H. Lee², G. Bersuker², H.-H. Tseng², R. Jammy², Y.H. Jeong¹, ¹*Pohang University of Science and Technology (POSTECH), Korea*, ²*SEMATECH*
- 2:56 PM P.25 - **How far can we analyze oxide traps spatially with charge injection techniques?**, M. Cho¹, R. Degraeve¹, P. Roussel¹, M.B. Zahid¹, B. Govoreanu¹, B. Kaczer¹, J.V. Houdt¹, G. Groeseneken², ¹*IMEC, Belgium*, ²*Katholieke Universiteit Leuven, Belgium*
- 2:59 PM Break

Session 4 – Reliability and Interface Defects II

Thursday, December 11, 2008

Session Chair: R. Nemanich

- 3:30 PM Opening remarks
- 3:35 PM 4.1 *Invited* - **Physical Origin of V_{TH} Instability in High-k MOSFETs**, A. Toriumi, *University of Tokyo, Japan*
- 4:10 PM 4.2 - **Importance of Minority Carrier Response in Accurate Characterization of Ge MIS Interface Traps**, N. Taoka¹, T. Yamamoto¹, M. Harada¹, Y. Yamashita¹, N. Sugiyama¹, S. Takagi^{1,2}, ¹*MIRAI, Japan*, ²*University of Tokyo, Japan*
- 4:30 PM 4.3 - **Scaling between nitrogen content and carrier trap densities at the SiO₂/SiC interface**, J. Rozen¹, J.R. Williams², L.C. Feldman^{1,3}, ¹*Vanderbilt University*, ²*Auburn University*, ³*Rutgers University*
- 4:50 PM 4.4 - **Ge Pb-type interface defect in (100)Si_{1-x}Ge_x/SiO₂/Si heterostructures revealed by electron spin resonance**, A. Stesmans, P. Somers, V.V. Afanas'ev, *Katholieke Universiteit Leuven, Belgium*

Poster Session 4 – High-Mobility Substrates

Thursday, December 11, 2008

Session Chair: H. Watanabe

- 5:15 PM P.26 - **Surface states, interface traps, and Fermi level pinning correlation to the interface oxidation states of Ga**, C.L. Hinkle¹, A.M. Sonnet¹, M. Milojevic¹, F.S. Aguirre-Tostado¹, J. Kim¹, R.M. Wallace¹, B. Brennan², G.J. Hughes², E.M. Vogel¹, ¹*University of Texas at Dallas*, ²*Dublin City University, Ireland*
- 5:18 PM P.27 - **CV Studies on ALD Al₂O₃/InGaAs MOSCAPs and MOSFETs**, M. Xu, Y. Xuan, Y.Q. Wu, T. Shen, P.D. Ye, *Purdue University*
- 5:21 PM P.28 - **ALD Al₂O₃ based MOSFETs on undoped and p-type In_{0.53}Ga_{0.47}As substrates**, H. Zhao, D. Shahrjerdi, F. Zhu, H.S. Kim, J. Yum, S.K. Banerjee, J.C. Lee, *University of Texas at Austin*
- 5:24 PM P.29 - **Temperature dependent capacitance-voltage and conductance-voltage characterisation of the HfO₂ / In_xGa_{1-x}As interface: The influence of In% concentration and low temperature forming gas annealing**, E. O'Connor¹, R.D. Long¹, S. Monaghan¹, G. Brammertz², K. Cherkaoui¹, A. O'Mahony¹, I.M. Povey¹, M.E. Pemble¹, M.M. Heyns²,

V.V. Afanas'ev³, P.K. Hurley¹, ¹University College Cork, Ireland, ²IMEC, Belgium, ³Katholieke Universiteit Leuven, Belgium

- 5:27 PM P.30 - **Inversion behavior on n and p type ALD-Al₂O₃/In_{0.53}Ga_{0.47}As MOS capacitors**, H.-C. Lin¹, W.-E. Wang², G. Brammertz¹, M. Meuris¹, M. Heyns¹, ¹IMEC, Belgium, ²Intel Corporation
- 5:30 PM P.31 - **Fabrication and Electrical Characterisation of Pt/Al₂O₃/In_{0.53}Ga_{0.47}As/InP Metal Oxide Semiconductor Capacitors**, R.D. Long^{1,2}, P.K. Hurley¹, B. Shin², P.C. McIntyre², ¹University College Cork, Ireland, ²Stanford University
- 5:33 PM Adjourn
- 7:00 PM **Poster Reception**

Session 5 - High-Mobility Substrates I

Friday, December 12, 2008

Session Chair: J. Robertson

- 8:30 AM Morning announcements
- 8:35 AM 5.1 *Invited* - **Enabling Green Transistors with Narrow Bandgap Compound Semiconductors**, S. Datta, *Penn State University*
- 9:10 AM 5.2 - **ALD Al₂O₃/GaAs MOSFETs on Si Substrates using Aspect Ratio Trapping Technique**, Y.Q. Wu¹, M. Xu¹, P.D. Ye¹, Z. Cheng², J. Li², J.S. Park², J. Hydrick², J. Bai², M. Carroll², J.G. Fiorenza², A. Lochtefeld², ¹Purdue University, ²Amberwave Systems Corporation
- 9:30 AM 5.3 - **Performance Enhancement of n-Channel Inversion Type In_xGa_{1-x}As MOSFET by Effective Surface Passivation Using Ex-Situ Deposited Thin Amorphous Si Layer**, A.M. Sonnet, C.L. Hinkle, M.N. Jivani, J. Kim, R.A. Chapman, R.M. Wallace, E.M. Vogel, *University of Texas at Dallas*
- 9:50 AM 5.4 - **Fermi-level pinning or unpinning on ALD Al₂O₃/GaAs interface: a metal work function study**, M. Xu, Y.Q. Wu, P.D. Ye, *Purdue University*
- 10:10 AM 5.5 - **Ultra-Short Pulsed I-V Characterization of GaAs Field-Effect Transistors with Al₂O₃ Gate Dielectric**, M.E. Ramon¹, D. Shahrjerdi¹, C.D. Young², D.I. Garcia-Gutierrez³, T. Akyol¹, S.K. Banerjee¹, ¹University of Texas at Austin, ²SEMATECH, ³ATDF-SVTC
- 10:30 AM Break

Session 6 - High-Mobility Substrates II

Friday, December 12, 2008

Session Chair: C. Young

- 11:00 AM Opening remarks
- 11:05 AM 6.1 *Invited* - **Interface Studies of Metal Oxide Gate Insulators on Ge and III-V Substrates**, P.C. McIntyre¹, Y. Oshima^{1,2}, E. Kim¹, E.A. Chagarov³, J. Cagnon⁴, K.C. Saraswat¹, S. Stemmer⁴, A.C. Kummel³, ¹Stanford University, ²Tokyo Electron, Japan, ³UC San Diego, ⁴UC Santa Barbara

- 11:40 AM 6.2 - **In-situ XPS investigation of the “clean-up” effect through half-cycle ALD reactions on III-V substrates**, M. Milojevic¹, B. Brennan², F.S. Aguirre-Tostado¹, C.L. Hinkle¹, H.C. Kim¹, B. Lee¹, G.J. Hughes², E.M. Vogel¹, J. Kim¹, R.M. Wallace¹,
¹University of Texas at Dallas, ²Dublin City University, Ireland
- 12:00 AM 6.3 - **Energy barriers at interfaces of (100)GaAs with atomic-layer deposited Al₂O₃ and HfO₂**, V.V. Afanas'ev¹, M. Badylevich¹, A. Stesmans¹, G. Brammertz², A. Delabie², S. Sionke², A. O'Mahony³, E. O'Connor³, R. Long³, I.M. Povey³, M.E. Pemble³, P.K. Hurley³,
¹Katholieke Universiteit Leuven, Belgium, ²IMEC, Belgium, ³University College Cork, Ireland
- 12:20 AM 6.4 - **Surface Orientation Dependence of Interface Properties of GeO₂/Ge MOS Structures Fabricated by Thermal Oxidation**, T. Sasada, Y. Nakakita, M. Takenaka, S. Takagi, *University of Tokyo, Japan*
- 12:40 PM Adjourn for lunch ; Technical Committee / Invited Speaker Luncheon
- 3:00 PM **Optional Rump Sessions – Topics TBD**
- 7:00 PM **Conference Banquet and Limerick Contest**

Session 7 - Theory

Saturday, December 13, 2008

Session Chair: M. Fischetti

- 8:30 AM Morning Announcements
- 8:35 AM 7.1 *Invited* - **Functional Oxide Heterostructures**, A. Demkov, *University of Texas at Austin*
- 9:10 AM 7.2 - **Ge dangling bonds at the (100)Ge/GeO₂ interface and the viscoelastic properties of GeO₂**, M. Houssa^{1,2}, G. Pourtois¹, A. Stesmans², V.V. Afanas'ev², M. Meuris¹, M.M. Heyns¹, *¹IMEC, Belgium, ²Katholieke Universiteit Leuven, Belgium*
- 9:30 AM 7.3 - **First-principles simulations of the oxidation of the GaAs(001)-β(2x4) surface**, M. Scarrozza^{1,2}, G. Pourtois¹, M. Houssa^{1,2}, A. Stesmans², M. Meuris¹, M.M. Heyns^{1,2}, *¹IMEC, Belgium, ²Katholieke Universiteit Leuven, Belgium*
- 9:50 AM 7.4 - **Passivation of Oxygen Vacancy States in HfO₂ by La or Al addition**, D. Liu, J. Robertson, *Cambridge University, UK*
- 10:10 AM Break

Session 8 – Advanced High-k Stacks II

Saturday, December 13, 2008

Session Chair: K. Shiraishi

- 10:40 AM Opening remarks
- 10:45 AM 8.1 - **TiO₂-based higher-k gate stacks: Understanding and mitigating oxygen migration**, M.M. Frank¹, S. Kim^{1,2}, J. Bruley¹, S.L. Brown¹, S.M. Rossnagel¹, M. Copel¹, V. Narayanan¹, *¹IBM T.J. Watson Research Center, ²Stanford University*
- 11:05 AM 8.2 - **Investigation of V_{FB} modulation on TaN gate / high-K dielectric stack by LaO capping layer approaches for NMOS application: role of La diffusion and La-Si**

reaction, B. Lee, D.J. Lichtenwalner, S.R. Novak, V. Misra, *North Carolina State University*

11:25 AM 8.3 - **Formation of Advanced HfLaSiO/SiO₂ Gate Dielectrics Utilizing PVD-based in-situ Fabrication Method**, T. Hosoi, Y. Oku, H. Arimura, M. Saeki, N. Kitano, T. Shimura, H. Watanabe, *Osaka University, Japan*

11:45 AM 8.4 - **Modulating Work Function for pFET with AVD Ru-based & TaN-based Gate Electrodes**, C. Choi¹, T. Ando², Z. Karim³, S. Ramanathan³, V. Narayanan¹, ¹*IBM T.J. Watson Research Center*, ²*IBM Tokyo Research Laboratory, Japan*, ³*AIXTRON*

12:05 PM 8.5 - **Analysis of Electron Mobility in HfO₂/TiN Gate MOSFETs: The Influence of HfO₂ Thickness, Temperature and Oxide Charge**, M.A. Negara¹, K. Cherkaoui¹, C.D. Young², P. Majhi², W. Tsai³, D. Bauza⁴, G. Ghibaudo⁴, P.K. Hurley¹, ¹*University College Cork, Ireland*, ²*SEMATECH*, ³*Intel Corporation*, ⁴*IMEP, France*

12:25 PM Closing Remarks