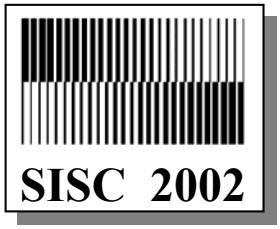


33rd IEEE Semiconductor Interface Specialists Conference

December 5-7, 2002
The Catamaran, San Diego, CA

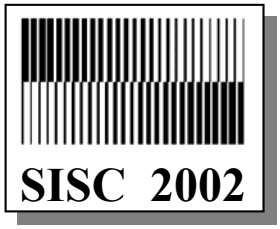
ABSTRACTS

General Chair: Lori Lipkin

Technical Chair: Bob Wallace

Arrangements Chair: Carl-Mikael Zetterling

Past Conference Chair: Kathy Krisch



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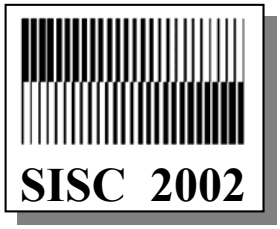
Murray Hill, NJ USA



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SISC Ed Nicollian Award for Best Student Paper

In 1995 the SISC began presenting an award to the best student presentation of the SISC 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 to 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 of 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 and an honorarium sent to the winner after the Conference. To honor the winner, the award is announced at the conference taking place the following year.

The *2001 SISC Ed Nicollian Award for Best Student Paper* was given to **Thomas Kauerauf** of IMEC. The paper was entitled "Low Weibull slope of breakdown distributions in high-k layers." Co-authors are Robin Degraeve, Charlotte Soens, Guido Groeseneken (IMEC), Eduard Cartier (IBM/IMEC).

Those eligible and wishing to be considered for the 2002 SISC Ed Nicollian Award for Best Student Paper should contact the 2002 IEEE SISC Technical Chair immediately.

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SISC 2002

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This meeting is sponsored by the IEEE Electron Device Society.

The SISC also acknowledges support from the National Science Foundation.

Conference Agenda Overview

Wednesday, December 4, 2002
Registration: 18:00-21:00 - Lobby Area
Hospitality Suite: 20:00-23:00

Thursday, December 5, 2002
Tuucan/Macaw Rooms

Registration: 08:00-17:00
Session 1 – High-κ Gate Dielectrics – I: 08:00-10:00
Poster Session I: High-κ Dielectrics: 10:20-10:35
Session 2 – High-κ Dielectrics – II: 10:40-12:15
Poster Session II – High-κ Dielectrics: 14:00-14:12
Session 3 – Issues for Conventional Oxides : 14:15-15:35
Poster Session III: 16:00-16:30
Session 4 – Thin Oxides – Defects: 16:35-17:35
Poster Reception: 19:00 - Rosseau room
Hospitality Suite: 21:00-23:00

Friday, December 6, 2002
Tuucan/Macaw Rooms

Registration: 08:00-17:00
Session 5 –SiC / Wide Bandgap: 08:00- 09:20
Session 6 – Modeling High-κ Interfaces: 09:45 – 11:55
Optional Rump Session: "High-κ dielectrics: Material of the Future?": 14:00 – Hospitality Suite
SISC Banquet and Limerick Contest: 19:00 – Kon Tiki Ballroom
Hospitality Suite: 21:00-23:00

Saturday, December 7, 2002
Tuucan/Macaw Rooms

Session 7 – Issues for High-κ Gate Dielectrics – I: 09:00 – 10:20
Session 8 – Issues for High-κ Gate Dielectrics – II: 10:40 – 11:55

SISC 2002

33rd IEEE Semiconductor Interface Specialists Conference

December 5 –7, 2002
The Catamaran Resort Hotel, San Diego, CA

Session 1 – High-κ Gate Dielectrics - I
Thursday, December 5, 2002

08:00 **Welcome and opening remarks**

08:10 **1.1 *Plenary Talk* – CMOS Scaling and requested new technologies –**
Hiroshi Iwai, *Tokyo Institute of Technology*

09:00 **1.2 - Metal Oxide/Si(001) Interfaces studied with Medium Energy Ion Scattering**
M. Copel, M. C. Reuter, E. Cartier, A. Callegari, S. Guha, E. Gusev, P. Jamison, V. Narayanan, D. Neumayer, *IBM Research Division*

09:20 **1.3 - Effect of nitrogen in boron penetration from p^+ polycrystalline -Si through Hf-silicate films**
M. A. Quevedo-Lopez, M. El-Bouanani, M. J. Kim, B. E. Gnade, and R. M. Wallace *University of North Texas* , M. R. Visokay, A. LiFatou, M.J. Bevan, and L. Colombo, *Texas Instruments*

09:40 **1.4 - Chemical defects at the high-k/silicon Interface: Effect on leakage current**
Gennadi Bersuker, Yudong Kim, Joel Barnett, Peter Zeitzoff, Brendan Foran, Patrick Lysaght,George A. Brown, Robert W. Murto, Howard R. Huff, *International Sematech*

10:00 **BREAK**

Poster Session I: High-κ Dielectrics

10:20 **P-1 - Is it really "mobility degradation" that causes the reduced channel conductance in MOSFETs with high-k gate dielectrics?**
ZJ Luo and TP Ma, *Yale University*
T. Tamagawa, *Jet Process Corporation*

10:23 **P-2 - Effects of ultra-thin Al_2O_3 layer in a Poly-Si/HfO_2/SiO_2 gate stack**
R.J. Carter, S. Kubicek G.S. Lujan, S. DeGendt and M. Heyns, *IMEC*
E. Cartier, A. Kerber, V. Kaushik and P.J. Chen, *IMEC and International Sematech*

10:26 **P-3 - Electrical and physical properties of MOCVD $Hf_xSi_{1-x}O_2$ Films**
M.R. Visokay, J.J. Chambers, A. Shanware, M. J. Bevan, A.L.P. Rotondaro and L. Colombo, *Texas Instruments*
S. Kher, M. Gay and C. Metzner, *Applied Materials*

10:29 **P-4 - Effect of remote charge scattering on scaling of transconductance of MOSFETs with nitrided or high-k gate dielectrics**
Khaled Ahmed, Philip Kraus, Chris Olsen and Faran Nouri, *Applied Materials*

10:32 **P-5 - Investigation of ALCVD™ TiN/Al_2O_3/$HfAlO_x$/Al_2O_3 stack on epitaxial Si and $Si_{0.7}Ge_{0.3}$**
D. Wu, A.-C. Lindgren, S. Persson, P.-E. Hellberg, S.-L. Zhang, M. Östling*, Kungliga Tekniska Högskolan (KTH)*
G. Sjöblom, J. Olsson, H.-O. Blom, *Uppsala University, Uppsala, Sweden*
E. Vainonen-Ahlgren, W.-M. Li, E. Tois, M. Tuominen, *ASM Microchemistry Ltd.*

10:35 **P-6 – Band offsets and thermal stability of Zr oxide and silicate on Si, SiO_2 and Si_3N_4**
C.C. Fulton, G. Lucovsky, R.J. Nemanich, *North Carolina State University*

Session 2 – High-κ Gate Dielectrics - II

10:40 **2.1 – *Invited* - Gate material issues for high-k gate dielectrics**
Tsu-Jae King, *University of California at Berkeley*

11:15 **2.2 - Determination of interface energy band diagram between (100) Si and mixed Al-Hf oxides using Internal Electron Photoemission**
V. V. Afanas'ev and A. Stesmans, *University of Leuven*
W Tsai, *International Sematech and IMEC*

11:35 **2.3 - Thermal decomposition behavior of $HfO_2/SiO_2/Si$ gate stacks**
S. Sayan, E. Garfunkel, T. Nishimura, W.H. Schulte, T. Gustafsson, *Rutgers University*
G.D. Wilk, *Agere Systems*

11:55 **2.4 - Effect of 2nd nearest-neighbors and interface charge on core level shifts in Zr, Hf-silicates**
G.D. Wilk, M.A. Alam and B.W. Busch, *Agere Systems*
R.L. Opila, *University of Delaware*

12:15 **Adjourn for Lunch**

Poster Session II: High-κ Dielectrics

14:00 **P-7 – Stacked structure of hafnium silicate gate dielectrics from UV/ozone oxidation of hafnium silicide and reactive sputtering**
P. Punchaipetch, G. Pant, M. A. Quevedo-Lopez, C. Yao, H. Zhang, M. J. Kim, M. El-Bouanani, R. M. Wallace and B. E. Gnade, *University of North Texas*

14:03 **P-8 – Reaction rate limited oxidation of silicon during post-deposition annealing of high-k's on silicon**
G.N. Parsons, D. Niu, R. Ashcraft, T. Gougousi, *North Carolina State University*

14:06 **P-9 – The structural and electrical properties of ultra-thin HfO_2 and nanolaminates synthesized by atomic layer deposition**
H.-S. Kim, P.C. McIntyre and K.C. Saraswat, *Stanford University*

14:09 **P-10 - Extension of remote plasma nitridation to high-k dielectrics: Al_2O_3 and Zr silicate alloys**
C. L Hinkle, G. Appel, G. Lucovsky and H. Ade, *North Carolina State University*

14:12 **P-11 - Ultra thin SiO_2 and SiON film formation by VUV excitation for interface of high-k gate dielectrics**
S. Aoyama, M. Igeta and H. Shinriki, Tokyo *Electron AT Ltd.*

Session 3 – Issues for Conventional Oxides

14:15 **3.1 – Breakdown transients in ultra-thin gate oxides: Transition in the degradation rate,**
S. Lombardo, *CNR - IMM, Sezione di Catania*
J. H. Stathis, and B. P. Linder, *IBM Research Division*

14:35 **3.2 - Generation of hole traps in oxides under high field stresses**
C.Z.Zhao and J.F.Zhang, *Liverpool John Moores University*
G.Groeseneken and R.Degraeve, *IMEC*

14:55 **3.3 - Physical model for enhanced interface-trap formation at low dose rates**
S. N. Rashkeev, C. R. Cirba, D. M. Fleetwood, R. D. Schrimpf, *Vanderbilt University*
S.C. Witczak, *Sandia National Laboratory*
A. Michez, *CEM2 Universite Montpellier II*
S. T. Pantelides, *Vanderbilt University and Oak Ridge National Laboratory*

15:15 **3.4 - Si/SiO_2 interface roughness studied by Scanning Tunneling Microscopy and its role in the effective mobility of an inversion layer**
J. Yu, L. Liu, J. Lyding, R. Timp, G. Timp, *University of Illinois*
D. Vasileska, S. Goodnick, *Arizona State University*
J. Grazul, D. Muller, T. Sorsch, *Lucent Technologies*
M. Green, C.Y. Kim, K. Evans-Lutterodt, W. Mansfield, *Agere Systems*

15:35 **BREAK**

Poster Session III

16:00 **P-12 – Degradation of inversion layer mobility in 6H-SiC by interface charge**
G.Pennington, S.K. Powell, N.Goldsman and J. M. McGarrity, *Univ. of Maryland*
A. Lelis and C. J. Scozzie, *U.S. Army Research Laboratory*

16:03 **P-13 - A comparison between the 4H-SiC/SiO_2, the 4H-SiC/Si_3N_4 and the 4H-SiC/AlN interfaces with focus on the interface traps near the SiC conduction band edge**
H. Ö. Ólafsson and E. Ö. Sveinbjörnsson, *Chalmers University of Technology*

16:06 **P-14 - On the thermal stability of atomic layer deposited (ALD) TiN as gate electrode in MOS devices**
J. Westlinder, *Uppsala University*
T. Schram, L. Pantisano, G.S. Lujan, G. Groeseneken, *IMEC*
E. Cartier, *IBM*
A. Kerber, *Infineon Technologies*

16:09 **P-15 - Improved DCIV method for interface characterization of MOSFET devices with direct tunneling regime gate oxide**
S. S. Chung, D. -K. Lo, S. -J. Chen, *National Chiao Tung University*
J. -J. Yang, *Chang Gung University*
T. -C. Lin, *TSMC*

16:12 **P-16 - An incremental frequency charge pumping technique for the characterization of ultra-thin gate oxide nano-Scale CMOS devices**
S. S. Chung and S.-J. Chen, *National Chiao Tung University*
C.-K. Yang, T.-F. Chen, Y.-J. Lin, D.-Y. Wu, J.-K. Chen, and S.-C. Chien, *UMC*

16:15 **P-17 – Electron trap generation at different temperatures in the gate oxide**
W.D.Zhang, J.F.Zhang, M.Wood, M.Lalor and D.Burton, *Liverpool John Moores University*
G.Groeseneken, and R.Degraeve, *IMEC*

16:18 **P-18 - Electron mobility controlled by the built-in interface of SiON gate dielectric**
Y. Shimamoto, S. Saito, S. Tsujikawa, O. Tonomura, K. Torii, M. Hiratani, and J. Yugami, *Hitachi Ltd.*

16:21 **P-19 - Passivation of Ga_2O_3-GaAs interfaces using atomic hydrogen plasma**
M. Passlack, S.B. Clemens, Z. Yu, R. Droopad, C. Overgaard, J.K. Abrokwah, *Motorola*
T. Büyüklimanli, *Evans East*

16:24 **P-20 - Constrains for lateral profiling of hot-carrier-induced oxide charges and interface traps in MOSFETs**
C-Y. Lu and K-S. Chang-Liao, *National Tsing Hua University*

16:27 **P-21 - Predicting oxynitride gate dielectric properties from physical metrology via simple physical models**
P. Kraus, K. Ahmed, C. Olsen, and F. Nouri, *Applied Materials*

16:30 **P-22 - Interfacial adhesion studies of CVD TaSiN on SiLK and SiO_2 Dielectric Films**
S. Padiyar, W. Zeng, E. T. Eisenbraun, and R. E. Geer, *University at Albany*
D. Frye, *Dow Chemical Company*

Session 4 – Thin Oxides – Defects

16:35 **4.1 - Influence of in situ applied stress during thermal oxidation of (111) Si on P_b interface defects**
A. Stesmans and D. Pierreux, *University of Leuven*
R.J. Jaccodine, M.-T. Lin, and T.J. Delph, *Lehigh University*

16:55 **4.2 - The Interface of HfO_2/Si Deposited via ALD Using $Hf(NO_3)_4$ Precursor**
Andrew Y. Kang, Patrick M. Lenahan, *Penn State University*
John F. Conley, Jr., *Sharp Labs of America*

17:15 **4.3 - The invasive nature of corona charging on thermal Si/SiO_2 structures with nm-thin oxides revealed by electron spin resonance**
A. Stesmans and V. V. Afanas'ev, *University of Leuven*

17:35 **Adjourn**

19:00: Thursday Evening ***Poster Reception***

Session 5 –SiC / Wide Bandgap
Friday, December 6, 2002

08:00 **Morning Announcements**

08:05 **5.1 *Invited* – SiC MOSFETS and their interfaces**
Hiroshi Yano, *Nara Institute of Science and Technology*

08:40 **5.2 HfO_2-based insulating stacks on 4H-SiC(0001)**
V. V. Afanas'ev and A. Stesmans, *University of Leuven*
F. Chen, R. Smith, and S. A. Campbell, *University of Minnesota*

09:00 **5.3 Interface effects on channel mobility on SiC MOSFETs**
S.K. Powell, N.Goldsman and J.M. McGarrity, *University of Maryland*
A.Lelis, C. J. Scozzie, and F. B. McLean, *U.S.Army Research Laboratory*

09:20 **BREAK**

Session 6 – Modeling High K Interfaces
Friday, December 6, 2002

09:45 **6.1 *Invited* - Electronic structure and band offsets in high-k dielectrics**
John Robertson, *Cambridge*

10:20 **6.2 *Invited*- Electronic structure at Si/high-k dielectronic interfaces**
Gerry Lucovsky, *North Carolina State University*

10:55 **6.3 Water and hydrogen In zirconia: Density functional modelling**
J. L. Gavartin and A. L. Shluger, *University College London*

11:15 **6.4 Si 2p core-level shifts at Si-$(ZrO_2)_x$ $(SiO_2)_{1-x}$ interfaces**
F. Giustino, A. Bongiorno, and A.Pasquarello, *Institut de Théorie des Phénomènes Physiques (ITP), Ecole Polytechnique Fédérale de Lausanne (EPFL), Institut Romand de Recherche Numérique en Physique des Matériaux (IRRMA)*

11:35 **6.5 Role of hydrogen in Negative-Bias Temperature Instability**
J. Ushio, K. Watanabe, K. Kushida-Abdelghafar, and T. Maruizumi, *Hitatchi, Ltd.*

11:55 **Adjourn for Lunch**

14:00 **Optional Friday Afternoon Rump Session – *High-k Dielectrics: "Materials of the Future?"***

19:00 Friday Evening ***Conference Banquet and Limerick Contest***

Session 7 – Issues for High-K Gate Dielectrics - I
Saturday, December 7, 2002

09:00 **Morning Announcements**

09:05 **7.1 *Invited* - Charge trapping, mobility degradation and reliability of high-k gate stacks**
Eduard Cartier, *IBM and IMEC*
A. Kerber, *IMEC and International Sematech*
L. Pantisano, R. Carter, T. Kauerauf, and R. Degraeve, *IMEC*

09:40 **7.2 - Mobility extraction for MOSFET's made with ultra-thin high-k dielectrics: correct accounting of channel carriers**
W.J.Zhu, W.Y.Wang and T.P.Ma, *Yale University*
T. Tamagawa, *Jet Process Corporation*

10:00 **7.3 – Radiation response and reliability of hafnium silicate capacitors**
J.A. Felix, D.M. Fleetwood, R.D. Schrimpf, J.G. Hong, *Vanderbilt University*
G. Lucovsky, *University of North Carolina*
J.R. Schwank, and M.R. Shaneyfelt, *Sandia National Laboratory*

10:20 **BREAK**

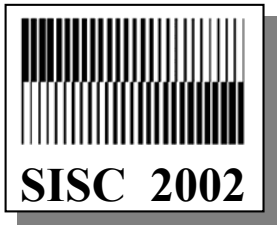
Session 8 – Issues for High-K Gate Dielectrics - II
Saturday, December 7, 2002

10:40 **8.1 – *Invited* - Effects of interface states and charge trapping on the performance of high-k gate dielectrics devices**
Jack C. Lee, *University of Texas at Austin*

11:15 **8.2 - Charging instability in n-channel MOS-FETs with SiO_2 / HfO_2 gate dielectrics**
A. Kerber, E. Cartier, L. Pantisano, R. Degraeve, Y. Kim, A. Hou, G. Groeseneken, H. E. Maes and U. Schwalke, *Infineon Technologies AG, IBM Research Division, IMEC, International SEMATECH, KU Leuven, Institut für Halbleitertechnik TU-Darmstadt*

11:35 **8.3 - Polarity dependent charge trapping in thin SiO_2/ Al_2O_3 gate stacks with Poly-Si gate electrodes: influence of high temperature annealing**
L.Lucci, L.Pantisano, E.Cartier, A.Kerber, G.Groeseneken, M.-Y. Ho, M.Green and L.Selmi, *IMEC, IBM Research Division, Infineon Technologies AG, Agere Systems, International SEMATECH, KU Leuven, DIEGM - Università di Udine*

11:55 **Closing Remarks**



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Thursday, December 5, 2002
Session Chair: Lori Lipkin

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08:10 **1.1 *Plenary Talk* – CMOS Scaling and requested new technologies**
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M. R. Visokay, A. LiFatou, M.J. Bevan, and L. Colombo, *Texas Instruments*

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G. Sjöblom, J. Olsson, H.-O. Blom
Uppsala University, Ångström Laboratory, SE-751 21 Uppsala, Sweden
E. Vainonen-Ahlgren, W.-M. Li, E. Tois, M. Tuominen, *ASM Microchemistry Ltd.*

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Thursday, December 5, 2002
Session Chair: Bob Wallace

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Tsu-Jae King, *University of California at Berkeley*

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G.D. Wilk, *Agere Systems*

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G.D. Wilk, M.A. Alam and B.W. Busch, *Agere Systems*
R.L. Opila, *University of Delaware*

12:15 **Adjourn for Lunch (on your own)**

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Poster Session II – High-κ Dielectrics

Thursday, December 5, 2002
Session Chair: Xiewen Wang

14:00 **P-7 Stacked structure of hafnium silicate gate dielectrics from UV/ozone oxidation of hafnium silicide and reactive sputtering**
P. Punchaipetch, G. Pant, M. A. Quevedo-Lopez, C. Yao, H. Zhang, M. J. Kim, M. El-Bouanani, R. M. Wallace and B. E. Gnade, *University of North Texas*

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H.-S. Kim, P.C. McIntyre and K.C. Saraswat, *Stanford University*

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C. L Hinkle, G. Appel, G. Lucovsky and H. Ade, *North Carolina State University*

14:12 **P-11 - Ultra thin SiO_2 and SiON film formation by VUV excitation for interface of high-k gate dielectrics**
S. Aoyama, M. Igeta and H. Shinriki, *Tokyo Electron AT Ltd.*

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December 5-7, 2002
The Catamaran, San Diego, CA

Session 3 – Issues for Conventional Oxides

Thursday, December 5, 2002
Session Chair: Matt Copel

14:15 **3.1 – Breakdown transients in ultra-thin gate oxides: Transition in the degradation rate,** S. Lombardo, *CNR - IMM, Sezione di Catania*
J. H. Stathis, and B. P. Linder, *IBM Research Division*

14:35 **3.2 - Generation of hole traps in oxides under high field stresses**
C.Z.Zhao and J.F.Zhang, *Liverpool John Moores University*
G.Groeseneken and R.Degraeve, *IMEC*

14:55 **3.3 - Physical model for enhanced interface-trap formation at low dose rates**
S. N. Rashkeev, C. R. Cirba, D. M. Fleetwood, R. D. Schrimpf, *Vanderbilt University*
S.C. Witczak, *Sandia National Laboratory*
A. Michez, *CEM2 Universite Montpellier II*
S. T. Pantelides, *Vanderbilt University and Oak Ridge National Laboratory*

15:15 **3.4 - Si/SiO_2 interface roughness studied by Scanning Tunneling Microscopy and its role in the effective mobility of an inversion layer**
J. Yu, L. Liu, J. Lyding, R. Timp, G. Timp, *University of Illinois*
D. Vasileska, S. Goodnick, *Arizona State University*
J. Grazul, D. Muller, T. Sorsch, *Lucent Technologies*
M. Green, C.Y. Kim, K. Evans-Lutterodt, W. Mansfield, *Agere Systems*

15:35 **BREAK**

Poster Session III

Session Chair: Greg Parsons

16:00 **P-12 – Degradation of inversion layer mobility in 6H-SiC by interface charge**
G.Pennington, S.K. Powell, N.Goldsman and J. M. McGarrity, *Univ. of Maryland*
A. Lelis and C. J. Scozzie, *U.S. Army Research Laboratory*

16:03 **P-13 - A comparison between the 4H-SiC/SiO_2, the 4H-SiC/Si_3N_4 and the 4H-SiC/AlN interfaces with focus on the interface traps near the SiC conduction band edge**
H. Ö. Ólafsson and E. Ö. Sveinbjörnsson, *Chalmers University of Technology*

16:06 **P-14 - On the thermal stability of atomic layer deposited (ALD) TiN as gate electrode in MOS devices**
J. Westlinder, *Uppsala University*
T. Schram, L. Pantisano, G.S. Lujan, G. Groeseneken, *IMEC*
E. Cartier, *IBM*
A. Kerber, *Infineon Technologies*

16:09 **P-15 - Improved DCIV method for interface characterization of MOSFET devices with direct tunneling regime gate oxide**
S. S. Chung, D. -K. Lo, S. -J. Chen, *National Chiao Tung University*
J. -J. Yang, *Chang Gung University*
T. -C. Lin, *TSMC*

16:12 **P-16 - An incremental frequency charge pumping technique for the characterization of ultra-thin gate oxide nano-Scale CMOS devices**
S. S. Chung and S.-J. Chen, *National Chiao Tung University*
C.-K. Yang, T.-F. Chen, Y.-J. Lin, D.-Y. Wu, J.-K. Chen, and S.-C. Chien, *UMC*

16:15 **P-17 – Electron trap generation at different temperatures in the gate oxide**
W.D.Zhang, J.F.Zhang, M.Wood, M.Lalor and D.Burton, *Liverpool John Moores University*
G.Groeseneken, and R.Degraeve, *IMEC*

16:18 **P-18 - Electron mobility controlled by the built-in interface of SiON gate dielectric**
Y. Shimamoto, S. Saito, S. Tsujikawa, O. Tonomura, K. Torii, M. Hiratani, and J. Yugami, *Hitachi Ltd.*

16:21 **P-19 - Passivation of Ga_2O_3-GaAs interfaces using atomic hydrogen plasma**
M. Passlack, S.B. Clemens, Z. Yu, R. Droopad, C. Overgaard, J.K. Abrokwah, *Motorola*
T. Büyüklimanli, *Evans East*

16:24 **P-20 - Constrains for lateral profiling of hot-carrier-induced oxide charges and interface traps in MOSFETs**
C-Y. Lu and K-S. Chang-Liao, *National Tsing Hua University*

16:27 **P-21 - Predicting oxynitride gate dielectric properties from physical metrology via simple physical models**
P. Kraus, K. Ahmed, C. Olsen, and F. Nouri, *Applied Materials*

16:30 **P-22 - Interfacial adhesion studies of CVD TaSiN on SiLK and SiO_2 Dielectric Films**
S. Padiyar, W. Zeng, E. T. Eisenbraun, and R. E. Geer,
University at Albany
D. Frye, *Dow Chemical Company*

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December 5-7, 2002
The Catamaran, San Diego, CA

Session 4 – Thin Oxides - Defects

Thursday, December 5, 2002
Session Chair: Bernie Mrstik

16:35 **4.1 - Influence of in situ applied stress during thermal oxidation of (111) Si on P_b interface defects**
A. Stesmans and D. Pierreux, *University of Leuven*
R.J. Jaccodine, M.-T. Lin, and T.J. Delph, *Lehigh University*

16:55 **4.2 - The Interface of HfO_2/Si Deposited via ALD Using $Hf(NO_3)_4$ Precursor**
A. Kang, P.M. Lenahan, *Penn State University*
J.F. Conley, Jr., *Sharp Labs of America*

17:15 **4.3 - The invasive nature of corona charging on thermal Si/SiO_2 structures with nm-thin oxides revealed by electron spin resonance**
A. Stesmans and V. V. Afanas'ev, *University of Leuven*

17:35 **Adjourn**

19:00 *(7 P.M.)* *Thursday Evening* ***Poster Reception***

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33rd IEEE
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Specialists Conference

December 5-7, 2002
The Catamaran, San Diego, CA

Session 5 –SiC / Wide Bandgap

Friday, December 6, 2002
Session Chair: Sima Dimitrijev

08:00 **Morning Announcements**

08:05 **5.1 *Invited* – SiC MOSFETS and their interfaces**
Hiroshi Yano, *Nara Institute of Science and Technology*

08:40 **5.2 HfO_2-based insulating stacks on 4H-SiC(0001)**
V. V. Afanas'ev and A. Stesmans, *University of Leuven*
F. Chen, R. Smith, and S. A. Campbell, *University of Minnesota*

09:00 **5.3 Interface effects on channel mobility on SiC MOSFETs**
S.K. Powell, N.Goldsman and J.M. McGarrity, *University of Maryland*
A.Lelis, C. J. Scozzie, and F. B. McLean, *U.S.Army Research Laboratory*

09:20 **BREAK**

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33rd IEEE Semiconductor Interface Specialists Conference

December 5-7, 2002
The Catamaran, San Diego, CA

Session 6 – Modeling High-κ Interfaces

Friday, December 6, 2002
Session Chair: Art Edwards

09:45 **6.1 *Invited* - Electronic structure and band offsets in high-κ dielectrics**
John Robertson, *Cambridge*

10:20 **6.2 *Invited*- Electronic structure at Si/high-κ dielectronic interfaces**
Gerry Lucovsky, *North Carolina State University*

10:55 **6.3 Water and hydrogen In zirconia: Density functional modeling**
J. L. Gavartin and A. L. Shluger, *University College London*

11:15 **6.4 Si 2*p* core-level shifts at Si-$(ZrO_2)_x$ $(SiO_2)_{1-x}$ interfaces**
F. Giustino, A. Bongiorno, and A.Pasquarello,
Institut de Théorie des Phénomènes Physiques (ITP),
Ecole Polytechnique Fédérale de Lausanne (EPFL),
Institut Romand de Recherche Numérique en Physique des Matériaux (IRRMA)

11:35 **6.5 Role of hydrogen in Negative-Bias Temperature Instability**
J. Ushio, K. Watanabe, K. Kushida-Abdelghafar, and T. Maruizumi,
Hitatchi, Ltd.

11:55 **Adjourn for Lunch**

14:00 **Optional Rump Session – *High-k Dielectrics: "Materials of the Future?"***

19:00 *(7 P.M.) Friday Evening* ***Conference Banquet and Limerick Contest***

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Session 7 – Issues for High-κ Gate Dielectrics - I

Saturday, December 7, 2002
Session Chair: Eric Vogel

09:00 **Morning Announcements**

09:05 **7.1 *Invited* - Charge trapping, mobility degradation and reliability of high-ε gate stacks**
Eduard Cartier, *IBM and IMEC*
A. Kerber, *IMEC and International Sematech*
L. Pantisano, R. Carter, T. Kauerauf, and R. Degraeve, *IMEC*

09:40 **7.2 - Mobility extraction for MOSFET's made with ultra-thin high-κ dielectrics: correct accounting of channel carriers**
W.J.Zhu, W.Y.Wang and T.P.Ma, *Yale University*
T. Tamagawa, *Jet Process Corporation*

10:00 **7.3 – Radiation response and reliability of hafnium silicate capacitors**
J.A. Felix, D.M. Fleetwood, R.D. Schrimpf, J.G. Hong, *Vanderbilt University*
G. Lucovsky, *University of North Carolina*
J.R. Schwank, and M.R. Shaneyfelt, *Sandia National Laboratory*

10:20 **BREAK**

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33rd IEEE Semiconductor Interface Specialists Conference

December 5-7, 2002
The Catamaran, San Diego, CA

Session 8 – Issues for High-κ Gate Dielectrics - II

Saturday, December 7, 2002
Session Chair: Andre Stesmans

10:40 **8.1 – *Invited* - Effects of interface states and charge trapping on the performance of high-k gate dielectrics devices**
Jack C. Lee, *University of Texas at Austin*

11:15 **8.2 - Charging instability in n-channel MOS-FETs with SiO_2 / HfO_2 gate dielectrics**
A. Kerber, E. Cartier, L. Pantisano, R. Degraeve, Y. Kim, A. Hou, G. Groeseneken, H. E. Maes and U. Schwalke, *Infineon Technologies AG, IBM Research Division, IMEC, International SEMATECH, KU Leuven, Institut für Halbleitertechnik TU-Darmstadt*

11:35 **8.3 - Polarity dependent charge trapping in thin SiO_2/ Al_2O_3 gate stacks with Poly-Si gate electrodes: influence of high temperature annealing**
L.Lucci, L.Pantisano, E.Cartier, A.Kerber, G.Groeseneken, M.-Y. Ho, M.Green and L.Selmi, *IMEC, IBM Research Division, Infineon Technologies AG, Agere Systems, International SEMATECH, KU Leuven, DIEGM - Università di Udine*

11:55 **Closing Remarks**

SISC 2002

33rd IEEE Semiconductor Interface Specialists Conference

December 5-7, 2002
The Catamaran, San Diego, CA

INDEX OF CONTRIBUTORS

Abrokwah. *P-19*
Ade. *P-10*
Afanas'ev. *5.2*, *4.3*, *2.2*
Ahmed. *P-21*, *P-4*
Alam. *2.4*
Aoyama. *P-11*
Appel. *P-10*
Ashcraft. *P-8*
Barnett. *1.4*
Bersuker. *1.4*
Bevan. *P-3*, *1.3*
Blom. *P-5*
Bongiorno. *6.4*
Brown. *1.4*
Burton. *P-17*
Busch. *2.4*
Büyüklimanli. *P-19*
Callegari. *1.2*
Campbell. *5.2*
Carter. *P-2*
Cartier. *8.3*, *8.2*, *7.1*, *P-14*, *P-2*, *1.2*
Chambers. *P-3*
Chang-Liao. *P-20*
Chen
  F.. 5.2
  J.-K.. *P-16*
  P.J.. *P-2*
  S.-J.. *P-16*, *P-15*
  T.-F.. *P-16*
Chien. *P-16*
Chung. *P-16*, *P-15*
Cirba. *3.3*
Clemens. *P-19*
Colombo. *P-3*, *1.3*
Conley. *4.2*
Copel. *1.2*
DeGendt. *P-2*
Degraeve. *8.2*, *P-17*, *3.2*
Delph. *4.1*
Droopad. *P-19*
Eisenbraun. *P-22*
El-Bouanani. *P-7*, *1.3*
Evans-Lutterodt. *3.4*
Felix. *7.3*
Fleetwood. *7.3*, *3.3*
Foran. *1.4*
Frye. *P-22*
Fulton. *P-6*
Garfunkel. *2.3*
Gavartin. *6.3*
Gay. *P-3*
Geer. *P-22*
Giustino. *6.4*
Gnade. *P-7*, *1.3*
Goldsman. *5.3*, *P-12*
Goodnick. *3.4*
Gougousi. *P-8*
Grazul. *3.4*
Green. *8.3*, *3.4*
Groeseneken. *8.3*, *8.2*, *P-17*, *P-14*, *3.2*
Guha. *1.2*
Gusev. *1.2*
Gustafsson. *2.3*
Hellberg. *P-5*
Hinkle. *P-10*
Hiratani. *P-18*
Ho. *8.3*
Hong. *7.3*
Hou. *8.2*
Huff. *1.4*
Igeta. *P-11*
Iwai. *1.1*
Jaccodine. *4.1*
Jamison. *1.2*
Kang. *4.2*
Kaushik. *P-2*
Kerber. *8.3*, *8.2*, *P-14*, *P-2*
Kher. *P-3*
Kim
  C.Y.. *3.4*
  H.-S.. *P-9*
  M.J.. *P-7*, *1.3*
  Y.. *8.2*, *1.4*
King. *2.1*
Kraus. *P-21*, *P-4*
Kubicek. *P-2*
Kushida-Abdelghafar. *6.5*
Lalor. *P-17*
Lee
  J.C,. *8.1*
Lelis. *5.3*, P-12
Lenahan. *4.2*
Li. *P-5*
LiFatou. *1.3*
Lin
  M.-T.. *4.1*
  T.-C.. *P-15*
  Y.-J.. *P-16*
Linder. *3.1*
Lindgren. *P-5*
Liu. *3.4*
Lo. *P-15*
Lombardo. *3.1*
Lu. *P-20*
Lucci. *8.3*
Lucovsky. *7.3*, *6.1*, *P-10*, *P-6*
Lujan. *P-14*, *P-2*
Luo. *P-1*
Lyding. *3.4*
Lysaght. *1.4*
Ma. *7.2*, *P-1*
Maes. *8.2*
Mansfield. *3.4*
Maruizumi. *6.5*
McGarrity. *5.3*, *P-12*
McIntyre. *P-9*
McLean. *5.3*
Metzner. *P-3*
Michez. *3.3*
Muller. *3.4*
Murto. 1.4
Narayanan. *1.2*
Nemanich. *P-6*
Neumayer. *1.2*
Nishimura. *2.3*
Niu. *P-8*
Nouri. *P-21*, *P-4*
Ólafsson. *P-13*
Olsen. *P-21*, *P-4*
Olsson. *P-5*
Opila. *2.4*
Östling. *P-5*
Overgaard. *P-19*
Padiyar. *P-22*
Pant. *P-7*
Pantelides. *3.3*
Pantisano. *8.3*, *8.2*, *P-14*
Parsons. *P-8*
Pasquarello. *6.4*

Passlack. *P-19*
Pennington. *P-12*
Persson. *P-5*
Pierreux. *4.1*
Powell. *5.3*, *P-12*
Punchaipetch. *P-7*
Quevedo. *P-7*, *1.3*
Rashkeev. *3.3*
Reuter. *1.2*
Robertson. *6.1*
Rotondaro. *P-3*
Saito. *P-18*
Saraswat. *P-9*
Sayan. *2.3*
Schram. *P-14*
Schrimpf. *7.3*, *3.3*
Schulte. *2.3*
Schwalke. *8.2*
Schwank. *7.3*
Scozzie. *5.3*, *P-12*
Selmi. *8.3*
Shaneyfelt. *7.3*
Shanware. *P-3*
Shimamoto. *P-18*
Shinriki. *P-11*
Shluger. *6.3*
Sjöblom. *P-5*
Smith. *5.2*
Sorsch. *3.4*
Stathis. *3.1*
Stesmans. *5.2*, *4.3*, *4.1*, *2.2*
Sveinbjörnsson. *P-13*
Tamagawa. *7.2*, *P-1*
Timp
  G.. *3.4*
  R.. *3.4*
Tois. *P-5*
Tonomura. *P-18*
Torii. *P-18*
Tsai. *2.2*
Tsujikawa. *P-18*
Tuominen. *P-5*
Ushio. *6.5*
Vainonen-Ahlgren. *P-5*
Vasileska. *3.4*
Visokay. *P-3*, *1.3*
Wallace. *P-7*, *1.3*
Wang. *7.2*
Watanabe. *6.5*
Westlinder. *P-14*
Wilk. *2.4*, *2.3*
Witczak. *3.3*
Wood. *P-17*
Wu
  D.. *P-5*
  D.-Y.. *P-16*
Yang
  C.-K.. *P-16*
  J.-J.. *P-15*
Yano. *5.1*
Yao. *P-7*
Yu
  J., 8
  Z.. *P-19*
Yugami. *P-18*
Zeitzoff. *1.4*
Zeng. *P-22*
Zhang
  H.. *P-7*
  J.F.. *P-17*, *3.2*
  S.-L.. *P-5*
  W.D.. *P-17*
Zhao. *3.2*
Zhu. *7.2*