ABSTRACTS

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Technical Chair: W. L. Warren
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SESSION 1: Breakdown/Reliability  
Thursday 12/8/94, 8:15 am - 10:20 am  
Session Chair: Hisham Massoud, Duke University  
Session Chair: Guido Groeseneken, IMEC

8:15 am Opening Remarks  
8:30 am 1.1 "An Engineering Model of VLSI Gate Oxide Breakdown," Chenming Hu, University of California, Berkeley, Berkeley, CA, USA (Invited)  
9:05 am 1.2 "Defect Production, Degradation, and Breakdown of Silicon Dioxide Films," D. J. DiMaria, IBM Watson Research Center, Yorktown Heights, NY, USA (Invited)  
9:40 am 1.3 "Determining the Causes of Oxide Breakdown," C. Felsch and E. Rosenbaum, University of Illinois at Urbana-Champaign, Urbana, IL, USA  
10:00 am 1.4 "A Two Dimensional Analysis of a Correlation Between the Interface Nanoroughness and Electric Current Capabilities in LPCVD Oxides Deposited on Polycrystalline Silicon," J.H. Klootwijk, C. Cobianu, V. Petrescu, H. van Kranenburg, P.J. Woerlee, and H. Wallinga, University of Twente, Enschede, The Netherlands

SESSION 2: Oxide Traps/Interface Traps  
Thursday 12/8/94, 10:45 am - 12:00 pm  
Session Chair: Max Schulz, Erlangen University  
Session Chair: Beall Fowler, Lehigh University

10:45 pm 2.1 "MOSFET Based Sensors for Molecular Hydrogen at Ambient Temperatures Using Palladium Alloy Gates," Robert C. Hughes, Sandia National Laboratories, Albuquerque, NM, USA (Invited)  
11:20 pm 2.2 "H-Bonds at Si/SiO2 Interfaces-Their Role in a Novel Mechanism for Defect Generation, Defect Metastability and Defect Removal by Rapid Thermal Annealing," G. Lucovsky, Z. Jing, and J.L. Whitten, North Carolina State University, Raleigh, NC, USA  
11:40 pm 2.3 "Hydrogen Related SiO2 Hole Traps with Small Cross Section," J.M.M. de Nijs, V.V. Afanas'ev, and P. Balk, DIMES, Delft, The Netherlands
POSTERS P1.1 - P1.5, Oral Summary
Thursday 12/8/94 12:00 pm - 12:30 pm
Session Chair: Mats Andersson, Chalmers University of Technology
Session Chair: Nelson Saks, Naval Research Laboratory

12:00 pm P1.1 "High Field Related Wearout and Breakdown in Thin Silicon Oxide," D.J. Dumin, J.R. Maddux, R. Subramoniam, R.S. Scott, S. Vanchinathan, N.A. Dumin, K.J. Dickerson, and S. Mopuri, Clemson University, Clemson, SC, USA

12:03 pm P1.2 "Effects of Reliability Screens on MOS Charge Trapping," M.R. Shaneyfelt, D.M. Fleetwood, J.R. Schwank, T.L. Meisenheimer, and P.S. Winokur, Sandia National Laboratories, Albuquerque, NM, USA

12:06 pm P1.3 "Polarity Dependence of Dielectric Breakdown and its Impact on Oxide Scaling," L.K. Han, M. Bhat, D. Wristers, D.L. Kwong, and J. Fulford, The University of Texas, Austin, TX, USA

12:09 pm P1.4 "Trap Generation in n-MOSFETs During Substrate Hot Electron Injection," M.J. Kivi and S. Taylor, Liverpool University, Liverpool, UK, and S.P. Zhao, National University of Singapore, Chai Chee Ind. Park, Singapore

12:12 pm P1.5 "Enhanced n-MOSFET Hot Carrier Degradation Due to Cl-Rich Plasma Poly Etching," Xiao-Yu Li, Tomasz Brozek, and C.R. Viswanathan, University of California, Los Angeles, CA, USA, and Y.D. Chan, SEMATECH, Austin, TX, USA

SESSION 3: Oxide Traps/Interface Traps Cont.
Thursday 12/8/94, 2:00 pm - 3:20 pm
Session Chair: Ed Nicollian, Univ. North Carolina-Charlotte
Session Chair: Ed Poindexter, Army Research Laboratory

2:00 pm 3.1 "Dissociation Kinetics of Hydrogen-Passivated (100) Si/SiO₂ Interface Defects," Jim Stathis, IBM Watson Research Center, Yorktown Heights, NY, USA

2:20 pm 3.2 "Electron Spin Resonance Analysis of the Passivation of Pb₀ and Pb₁ Defects at the (100) Si/SiO₂ Interface in Molecular Hydrogen," A. Stesmans, Universiteit Leuven,

DENSITY AND ENERGY OF OXIDE-TRAP CHARGE DUE TO HIGH-FIELD STRESS," D.M. Fleetwood, Sandia National Laboratories, Albuquerque, NM, USA, and N.S. Saks, Naval Research Laboratory, Washington, D.C., USA

SESSION 4: BORDER TRAPS/APC
Thursday 12/8/94, 3:45 - 5:05
Session Chair: Dan Fleetwood, Sandia National Laboratories
Session Chair: Jim Stathis, IBM Watson Research Center

DETECTION AND CHARACTERIZATION OF BORDER TRAPS IN MOSFET's USING 3-LEVEL CHARGE PUMPING TECHNIQUE," J.-L. Autran, B. Balland, and D. Babot, Institut National des Sciences Appliques de Lyon, Villeurbanne, France

A LOW FREQUENCY C-V MODEL TO CHARACTERIZE INTERFACE AND NEAR-INTERFACE OXIDE TRAPS IN THIN GATE CMOS DEVICES," N.L. Cohen, M.G. Martin, R.E. Paulsen, and M.H. White, Lehigh University, Bethlehem, PA, USA


POSTERS P5.1 - P8.3, ORAL SUMMARY
Thursday 12/8/94, 5:05 - 5:45
Session Chair: T.-P. Ma, Yale University
Session Chair: Hsing-Huang Tseng, Motorola


FOUNDER-NORDHEIM INJECTION IN PLASMA-ENHANCED CHEMICAL VAPOR DEPOSITED SILICON DIOXIDE FILMS WITH NITRIDED INTERFACE," D. Landheer, Y. Tao, D.-X. Xu, and G.I. Sproule, National Research Council of Canada, Ottawa, Canada

IMPROVEMENT OF SUB-5NM GATE OXIDES BY POST-OXIDATION ANNEALING IN NITRIC OXIDE AMBIENT," Z.-Q. Yao, H.B. Harrison, and S. Dimitrijev, Griffith University, Nathan, Australia, and Y.T. Yeow, The University of Queensland, St. Lucia, Australia
SESSION 5: Nitrogen Containing Oxides
Friday 12/9/94, 8:15 am - 10:10 am
Session Chair: Lalita Manchanda, AT&T Bell Laboratories
Session Chair: Mizuho Morita, Tohoku University

8:15 am 5.1 "Oxynitride Dielectrics Grown in N₂O and NO," Yoshio Okada and Phillip J. Tobin, Motorola, Austin TX, USA (Invited)

8:50 am 5.2 "Removal of Nitrogen from N₂O Oxide by Rapid Thermal Oxidation in N₂O," E.C. Carr and R.A. Buhrman, Cornell University, Ithaca, NY, USA
SESSION 6: Ultra-Thin Oxides/Advanced Technologies
Friday 12/9/94, 10:40 am - 12:15 pm
Session Chair: Ed Boesch, Jr., Army Research Laboratory
Session Chair: Akihiko Ishitani, NEC Corporation


11:15 am 6.2 "N2O Oxynitride/CVD TEOS Stacked Gate Dielectric for Submicron Technology," Hsing-Huang Tseng, P.J. Tobin, C. Ramiah, and J.W. Miller, Motorola, Austin, TX, USA


11:55 am 6.4 "Silicon Nitride Thin Films Made by Jet Vapor Deposition," Xiewen Wang and T.-P. Ma, Yale University, New Haven, CT, USA

PANEL SESSION 7
Characterization and Growth of Ultra-Thin Oxides
Friday 2:00 pm - 4:00 pm
Panel Organizer and Moderator: Peter S. Winokur, Sandia National Laboratories

The invited panel members will discuss the latest measurement techniques for the characterization and growth of ultra-thin dielectrics in light of the National Technology Roadmap. The panel will discuss issues such as: an overview of the roadmap and its vision for the gate oxide of the future; required impurity levels, if they are achievable, and if they matter for device performance; the cost and feasibility of implementing the roadmap from a gas supplier and equipment perspective; various characterization tools, and alternative dielectrics to SiO2. A preliminary list of speakers include:

C. Robert Helms, Stanford University, Stanford, CA, USA
Ralph Richardson, Air Products, Allentown, PA, USA
Frank Robertson, SEMATECH, Austin, TX, USA
Peter S. Winokur, Sandia National Laboratories, Albuquerque, NM, USA
Jimmie J. Wortman, North Carolina State University, Raleigh, NC, USA
SESSION 8: Interface Characterization
Saturday 12/10/94, 8:15 am - 10:10 am
Session Chair: Doug Buchanan, IBM Watson Research Center
Session Chair: Rod Devine, France Telecom/CNET

8:15 am 8.1  "Cluster Analogs for Si/SiO2 Interfaces and Their Structural Implications,"
F.R. McFeely, IBM Watson Research Center, Yorktown Heights, NY, USA (Invited)
8:50 am 8.2  "Orientation Dependent Changes in Si/SiO2 Interface Structures with Progress of
Yamauchi, Musashi Institute of Technology, Tokyo, Japan, and N. Tate and M.
Katayama, Shin-Etsu Handotai Co. Ltd., Japan
9:10 am 8.3  "A Study of Tunneling Current Oscillation Dependence on SiO2 Thickness and Si
Roughness at the Si/SiO2 Interface," S. Zafar, Q. Liu, and E.A. Irene, University of
North Carolina at Chapel Hill, Chapel Hill, NC, USA
9:30 am 8.4  "Si/SiO2 Interface Roughness Measured with X-ray Diffraction," K.W. Evans-
Lutterodt, M.-T. Tang, M.L. Green, D. Brasen, K. Krisch, L. Manchanda, G.S. Higashi,
and T. Boone, AT&T Bell Laboratories, Murray Hill, NJ, USA
9:50 am 8.5  "Microroughness Characterization Using 2D Fourier Transform of AFM Images,"
Mats Bergh, M.O. Andersson, and Stefan Bengtsson, Chalmers University of Tech-
nology, Goteborg, Sweden

SESSION 9: Interface Characterization Cont.
Saturday 12/10/94, 10:40 am - 12:15 pm
Session Chair: Bill Lynch, Semiconductor Research Corporation
Session Chair: Bob Stahlbush, Naval Research Laboratory

10:40 am 9.1  "In-situ TEM Study of Silicon Oxidation," J.M. Gibson, University of Illinois at
Urbana-Champaign, Urbana, IL, USA (Invited)
11:15 am 9.2  "Second Harmonic Generation from SiO2/Si Interfaces," Hiroyuki Hirayama,
Fuminori Ito, and Kohji Watanabe, NEC Corporation, Tsukuba, Japan
11:35 am 9.3  "Channel Length Dependence of Random Telegraph Signal in MOSFET's," Ming-
Horn Tsai and T.-P. Ma, Yale University, New Haven, CT, USA, and Terence Hook,
IBM Corporation, Essex Junction, VT, USA
11:55 am 9.4  "Conductance Modulations Induced by Single Electron Switching in Sub-Micron
MOS Inversion Channels," H.H. Mueller and M.J. Schulz, University of Erlangen-
Nurnberg, Erlangen, Germany