TECHNICAL PROGRAM

1991 IEEE SEMICONDUCTOR INTERFACE SPECIALISTS CONFERENCE

December 11-14, 1991

Lake Buena Vista, Florida

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Thursday Morning, December 12, 1991 (8:30 am- 12:15 pm)

Plenary Address

Oxide and Interface Issues in Nonvolatile Memory
S. K. Lai, Intel

Session I: Microscopic Models from Electrical Measurements

Session Chairs: R. C. Barker (Yale University) and Y. Nishioka (Texas Instruments, Japan)

I. 1 "Are We Really Seeing P_{b0} and P_{b1} Centers by Electrical Measurement?"
N. Haneji, L. Vishnubolta, and T. P. Ma (Yale University)

Oral Poster Presentations P1: (Chair: R. E. Stahlbush, Naval Research Laboratory)

Coffee Break

I.2 "Random Telegraph Signals Arising From Fast Interface States in MOS Transistors"
M.-H. Tsai, H. Muto, and T. P. Ma (Yale University)

I.3 "Measurement of Two Distinct Fast Interface States at the (100) Si/SiO_2 Interface Using the Conductance Technique"
M. J. Uren and K. M. Brunson (RSRE Malvern)

I.4 "Observation of Interface Traps in the Silicon Conduction Band Using the AC Conductance Technique at 4.2 Kelvin"
W. R. Anderson, R. G. Wheeler, and T. P. Ma (Yale University)

Oral Poster Presentations P2: (Chair: L. Trombetta, University of Houston)

Thurday Afternoon, December 12, 1991 (2:00 - 6:00 pm)

Session II: Microscopic Models from Theory

Chair: A. Ourmazd (AT&T Bell Laboratories)

II.1 Invited Paper

Recent Advances in the Theory of Silicon Dioxide
A. M. Stoneham (AEA Industrial Technology, Harwell)

II.2 "Recent Studies of Hole-Traps in a-SiO_2"
A. H. Edwards, (UNC- Charlotte)

Oral Poster Presentations P3:(T. Oldham, Harry Diamond Laboratory)

Coffee Break

Session III: Microscopic Models from Electron Spin Resonance

Chair: B. Triplett (Intel)

III.1 "^{17}O Hyperfine Study of the P_bCenter"
J. H. Stathis (IBM), S. Rigo, I. Trimaille (Universite Paris VII), and
M. S. Crowder (IBM)

III.2 "O Surrounding P_b Defects at the (111) Si/SiO_2 Interface"
A. Stesmans, (Universiteit Leuven)

Oral Poster Presentations P4: (W. L. Warren, Sandia)

Session P1: Posters 1

P1.1 “Changes in the Behavior of Anomalous Positive Charge Following Tunnel Injection in MOS Capacitors
L. Trombetta and J. Han (University of Houston)

P1.2 “Non Steady-State Simulation and Characterization of Fowler-Nordheim Tunneling in Floating Gate EEPROMs”
J. Sune, P. Olivo, M. Lanzoni, and B. Ricco (Universita di Bologna)

P1.3 “Energy Spectrum of Shallow Oxide Traps in Thin Industrial Oxides
” Using the Electric Field Stimulated Trap-to-Band Tunnel Emission Technique”
S. E. Thompson and T. Nishida (University of Florida)

P1.4 “Characterization of Radiation Damage Near the Drain/Source Junctions Using Gate-controlled Tunnel Diodes”
A. Balasinski and T. P. Ma (Yale University), and A. Acovic (IBM)

P1.5 “Effect of Correlation on Hole Trapping Near Si/SiO_2 Interface”
V. V. Afanas’ev and V. K. Adamchuk (Leningrad State University)

P1.6 “Oxide Field Dependence of “P_b-like” Defect Creation at <100> Si/SiO_2 Interface in High Electric Field Stressed MOS”
D. Vuillaume (CNRS, ISEN)

Session P2: Posters 2

P2.1 "Time-Dependent Charging in Aluminum and Polycrystalline Silicon Gate Metal - Tunnel Oxide - Silicon Diodes"
K. R. Farmer, M. O. Andersson, P. Lundgren and O. Engstrom (Chalmers University of Technology)

P2.2 "Positron Annihilation at Si-SiO_2 Interface"
Z. A. Weinberg, T. C. Leung, P. Asoka-Kumar, B. Nielsen, G. W. Rubloff, and K. G. Lynn (IBM)

P2.3 "Latent, Thermally-Activated Interface-Trap Generation in MOS Devices"
J. R. Schwank, D. M. Fleetwood, M. R. Shaneyfelt, and P. S. Winokur (Sandia)

P2.4 "Initial Hydrogen Ion Profiles Following Pulsed Irradiation During Interface Trap Formation in MOS Devices"
D. B. Brown and N. S. Saks (Naval Research Laboratory)

P2.5 "Electron Trapping at 40 K in Irradiated SIMOX"
R. E. Stahlbush (Naval Research Laboratory)

P2.6 "Charge Compensation in Oxynitride Transistors"
R. B. Klein (SFA Inc.) and N. S. Saks (Naval Research Laboratory)

Session P3: Posters 3

P3.1 "Identification of a Dominant Point Defect Created by Channel Hot-Hole Injection in Silicon nMOS Transistors
J. T. Krick, P. M. Lenahan (Pennsylvania State University), and G. J. Dunn (MIT Lincoln Laboratory)

P3.2 "Theory of Bi- and Metastable Defects in Silicon Dioxide and Their Relationship to Possible Valence-Alternation-Pairs"
K. C. Snyder and W. B. Fowler (Lehigh University)

P3.3 "Dispersive Molecular Transport in SiO_2 : Application to Oxidation Kinetics of Si"
R. L. Pfeffer and R. A. Lux (US Army ETDL)

P3.4 "Charge Trapping Centers in Silicon Nitride Thin Films"
W. L. Warren (Sandia), J. Kanicki (IBM), J. Robertson (National Power Labs), E. H. Poindexter (US Army ETDL), C. H. Seager, and P. J. McWhorter (Sandia)

P3.5 "Electrically Detected Magnetic Resonance of a Transition Metal Related Recombination Center in Silicon p-n Diodes"
F. C. Rong, G. J. Gerardi, W. R. Buchwald, E. H. Poindexter (US Army ETDL), M. Umlor, D. J. Keeble (Michigan Technical University), and W. L. Warren (Sandia)

Session P4: Posters 4

P4.1 "Electrical Properties of Buried Oxide Layers in SOI Materials by Wafer Bonding Technology"
K. Mitani and H. Z. Massoud (Duke University)

P4.2 "Electroluminescence of Defect States at the Si-SiO_2 Interface"
A. Kux and F. Koch (TU Munchen)

P4.3 "Strain Evaluation at the Si/SiO_2 Interface Using the ER Method"
P. Yongwattanasoontorn, H. Kubo, M. Morifuji, K. Tanaguchi, and C. Hamaguchi (Osaka University)

P4.4 "Low Temperature Formation of SiO_2/Si(100) Interfaces with Low Densities of Interface Traps using a Two Step Remote Plasma Oxidation/Deposition Process"
T. Yasuda, Y. Ma, S. Habermehl, and G. Lucovsky (North Carolina State University)

P4.5 "Statistical Properties of Si-SiO_2 Interface Roughness Studied by STM"
H. Iwasaki (Osaka University), M. Niwa, Y. Watanabe , I. Sumita (Matsushita) and N. Akutsu (Osaka Electro-Communication University)

P4.6 "Electrtical Characterization of High-Pressure Field Oxides for SiGe Heterostructure devices"
C. J. Scott, G. Campisi, M. G. Ancona, D. J. Godbey, and F. J. Kub (Naval Research Laboratory)

Friday Morning, December 13, 1991 (8:30 am - 12:35 pm)

Session IV: SOI Oxides

Chair: Z. Weinberg (IBM)

IV.1 Invited Paper

Processing Induced Defects in SIMOX and Other Technologically Useful Oxide Films
R. A. B. Devine (CNET)

IV.2 "Hydrogen Related E' Centers in SIMOX Buried Oxides"
M. E. Zvanut, R. E. Stahlbush, W. E. Carlos, and H. L. Hughes (Naval Research Laboratory)

IV.3 "Hole Trapping Centers in SIMOX Buried Oxides"
J. F. Conley, P. M. Lenahan (Pennsylvania State University), and P. Roitman (NIST)

Coffee Break

Session V: $Si_xGe_{(1-x)}$ Devices and Processing

Chair: D. J. Di Maria (IBM)

V.1 Invited Paper

Extremely High Electron Mobility in Si/Ge_xSi_{1-x} Structures Grown by Molecular Beam Epitaxy
Y. H. Xie, E. A. Fitzgerald, D. Monroe, Y. J. Mii, F. A. Thiel, B. E. Weir, and L. C. Feldman (AT&T Bell Laboratories)

V.2 "Defects in Oxygen Implanted Silicon Germanium Alloys: A Germanium P_b center?"
W. E. Carlos, M. E. Zvanut, M. E. Twigg, R. E. Stahlbush and D. J. Godbey (Naval Research Laboratory)

V.3 "Photoluminescence Studies of Strained Si/$Si_{1-x}Ge_x$/Si Quantum Wells and Hole Effective Masses"
X. Xiao, J. C. Sturm (Princeton University), L. C. Lenchyshyn, and M. L. W. Thewalt (Simon Fraser University)

V.4 "Epitaxial Growth of $Si_{1-x}Ge_x$ Single Layers and Superlattices"
L. Vescan, H. P. Tang, R. Apetz, S. Mantl, K. Schmidt, C. Dieker, and H. Luth (ISI Julich)

Saturday Morning, December 14, 1991 (8:30 am - 11:45)

Session VI: Hot Electron and Radiation Effects

Chairs: P. Balk (DIMES) H. Massoud (Duke University)

VI.1 Invited Paper
Monte-Carlo Simulations for Acoustic Phonon Runaway
and Impact Ionization by Hot Electrons
D. J. Arnold, E. Cartier, and D. J. DiMaria (IBM)

VI.2 "Impact Ionization in Silicon-Dioxide: An Old Topic Revisited"
D. J. DiMaria, D. Arnold, and E. Cartier (IBM)

VI.3 "New Results on Hot Carrier Transport Studies using Soft X-Ray Photoelectron Spectroscopy"
E. Cartier, E. Eklund, D. Arnold, D. J. DiMaria, P. D. Kirchner, D. K. Shuh, and F. R. McFeely (IBM)

Coffee Break

VI.4 "Comparison of Time-Dependent Interface Trap Build-up in Oxides Annealed in H_2 or D_2
N. S. Saks and R. W. Rendell (Naval Research Laboratory)

VI.5 "Hot-electron Induced hydrogen Redistribution in SiO_2"
D. A. Buchanon, A. Marwick, L. Dori, and D. J. DiMaria (IBM)

VI.6 "Hole and Electron Trapping in Irradiated MOS Oxides"
D. M. Fleetwood, R. A. Reber, Jr. and P. S. Winokur (Sandia)

Saturday Afternoon, December 14, 1991 (1:30 - 3:35 pm)

Session VII: Inovative Processing Techniques for Silicon Technologies

Chair: K. Tanaguchi (Osaka University)

VII.1 Invited Paper

Influence of Metal Contaminations on MOS Capacitors
M. Takiyama, S. Ohtsuka, and M. Tachimori (Nippon Steel)

VII.2 "High Quality MNS Capacitors Prepared by Jet Vapor Deposition at Room Temperature"
D. Wang and T. P. Ma, (Yale University), J. W. Golz, B. L. Halpern, and J. J. Schmitt (Jet Process Corp.)

VII.3 "Passivation of (111) Si/SiO_2 Interface by Flourine"
X. Wang and T. P. Ma (Yale University)

VII.4 "Composition and Morphology of Nanoporous Luminescent Si from Thermoeffusion and FTIR Measurements"
V. Petrova-Koch, A. Kux, F. Muller, F. Koch (TU Munchen), and V. Lehman (Siemens AG)

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