Thursday Morning, December 7, 1989 (8:30 - 12:10)

**Session I: Thin Dielectrics**

**Chairmen: T. P. Ma, R. D. McGrath**

**I.1** (Invited: This talk is part of the Plenary Session for the SISC 20th anniversary)
The Evolution and Scaling of DRAMs
R. H. Dennard (IBM T. J. Watson Research Center)

**I.2** Defect Dynamics and Wear-out in Thin Silicon Oxide Dielectrics
K. R. Farmer, E. C. Carr and R. A. Buhrman (Cornell University)

**I.3** A Model Based on Trap-Assisted Tunneling for Two-Level Current Fluctuations in Submicron MOS Diodes
M. O. Andersson, Z. Xiao, and O. Engstrom (Chalmers University, Sweden)
of Technology)

**I.4** Capture and Emission Time Constants of Individual defects in MOSFETs
M. Schulz and A. Karmann (Institut fur Angewandte Physik, F.R. Germany)

**I.5** Hole Trapping in Reoxidized Nitrided Oxides
K. S. Krisch, B. J. Gross, C. G. Sodini (Massachusetts Institute of Technology

**I.6** Field Dependent Mobilities at RT and 77K for n- and p-MOSFETs With Nitrided Gate Oxide by RTP
H. S. Momose, S. Takagi, S. Kitagawa, K. Yamabe, and H. Iwai
(ULSI Research Center, Toshiba, Japan)

**I.7** Poster Presentations (Session PI; E. R. Fossum, Chair)

**Session** **PI (Poster)**

**Chairman:** **E. R. Fossum**

**PI.1** Resonant Tunneling and the Breakdown of Very Thin $SiO_2$ Films
J. Sune, E. Farres, F. Martin and X. Aymerich (University Autonoma de Barcelona, Spain)

**PI.2** Correlations Between Stress-Induced Charge Trapping and Time-Dependent Dielectric Breakdown in Untra-Thin Silicon Oxide Films
H. Yamada and T. Makino (NTT LSI Labs, Japan)

**PI.3** Effect of Surface Defects on Dielectric Breakdown
W. W. Abadeer (IBM General Technology Division)

**PI.4** The Independence of Breakdown and Wearout in Thin Silicon Oxide
N. B. Heilemann and D. J. Dumin (Center for Semiconductor Device Reliability Research, Clemson Universit)

**PI.5** Entropy Measurements on Slow $Si/SiO_2$ Interface States
D. H. Cobden (Cavendish Lab, England) M. J. Uren, and M. J. Kirton (RSRE Lab, England)

**PI.6** Interface and Bulk Trap Generation in Metal-Oxide-Semiconductor Capacitors
D. A. Buchanan and D. J. DiMaria (IBM T. J. Watson Research Center)

**PI.7** Spectroscopic Charge Pumping: A New Procedure for Measuring Interface Trap Distributions on MOSFET's
G. Van den Bosch, G. Groeseneken, P. Heremans, and H. E. Maes (IMEC, Belgium)

**PI.8** Explanation of the Negative-Bias-Temperature Instability
C. Blat, E. H. Nicollian (Univ. of North Carolina, Charlotte), and E. H. Poindexter (US Army ET&D Lab, NJ)

**Thursday Afternoon, December 7, 1989 (2:00 - 5:30)**

**Session II:** **Trapping**

**Chairmen:** **R. DeKeersmaecker, Y. Nishioka**

**II.1** (Invited) Hot-Electron Degradation in Devices
H. E. Maes (IMEC, Belgium)

**II.2** Temperature Dependence of Trap Creation in Silicon Dioxide
D. J. DiMaria (IBM T. J. Watson Research Center)

**II.3** Poster Presentations (Session PII; A. Edwards, Chair)

√**II.4** Reliability of MOSFETs After Hot-Carrier Injection: Time-Dependent Behavior
E. F. daSilva, Jr. (Univ. of Brazil), Y. Nishioka, M. Kato (Central Research Lab, Hitachi, Japan), and T. P. Ma (Yale Univ.)

**II.5** BT Reliability for Thin Gate Oxide $N^{+}$ and $P^{+}$ Poly MOSFETs
H. Iwai, F. Matsuoka, H. Oyamatsu, H. S. Momose, K. Hama, Y. Toyoshima, and H. Hayashida (ULSI Research Center, Toshiba, Japan)

√ **II.6** Early Stages of Interface-Trap Transformation in (100)Si/$SiO_2$ Structures
Y. Wang, T. P. Ma, and R. C. Barker (Yale University)

**I.7** Poster Presentations (Session PIII; T.N. Nguyen, Chair)

**Session** **PII (Poster)**

**Chairman:** **A. Edwards**

**PII.1** Ultra Thin Oxide-Nitride-Oxide Films
K. J. Stein, Z. A. Weinberg, T. N. Nguyen, and Y-C. Sun (IBM T. J. Watson Research Center)

**PII.2** Trapped Positive Charge in Plasma-Enhanced Chemical-Vapor-Deposited Silicon Dioxide Films
J. H. Stathis, D. A. Buchanan, and P. R. Wagner (IBM T. J. Watson Research Center)

**PII.3** Charge Distribution in LPCVD Silicon Oxynitride Layers Upon Anneal Treatments
M. Heyns, E. Dooms, H. E. Maes, R. DeKeersmaecker (IMEC, Belgium) F. Habraken, J. Oude-Elferink, W. Van Der Weg (Utrecht State Univ., Netherlands), and A. Kuiper (Philips Research Lab, Netherlands)

**PII.4** Study of Thin Ultra-Dry/Clean Oxides Grown in a Custom-Designed Triple-Wall Oxidation Furnace
S. Yoon, and M. H. White (Lehigh University)

**PII.5** The Effect of Rapid Thermal Annealing on the Stress and Midgap Interface State Density in Thermally Grown $SiO_2$
C. H. Bjorkman, J. T. Fitch, and G. Lucovsky (North Carolina State University)

**PII.6** The Depth Profiles of Electron Traps in Silicon Nitride Thin Films
Y. C. Park (Stanford Univ.), W. B. Jackson, N. M. Johnson (Xerox Research Center), and S. B. Hagstrom (Stanford Univ.)

**PII.7** Electronic Structure of Silicon/Metal Disilicide Interfaces
K. W. Sulston and S. M. Bose (Drexel University, PA)

**Session** **PIII (Poster)**

**Chairman: T. N. Nguyen**

**PIII.1** Weak Localization Measurement of the $Si/SiO_2$ Interface Roughness
W. R. Anderson, R. G. Wheeler, and T. P. Ma (Yale University)

**PIII.2** Radiation-Induced $Si/SiO_2$ Interface-Trap Peaks from ac Conductance Measurements
L. Vishnubhotla and T. P. Ma (Yale University)

**PIII.3** Short Time Dynamics of MOS Interface States After Irradiation
Y. Wang and W. R. Fahrner (Fern-Universitat Hagen, West Germany)

**PIII.4** Radiation-Induced Charge Neutralization and Interface-Trap Buildup in MOS Devices
D. M. Fleetwood (Sandia National Laboratories)

**PIII.5** Time-Dependent Degradation of MOSFET Channel Mobility Following Pulsed Irradiation
F. B. McLean and H. E. Boesch, Jr. (Harry Diamond Laboratories)

**PIII.6** Correlation Between 1/F Noise of MOSFETs and Oxide Trapped Charge Following Co-60 Irradiation
J. H. Scofield, N. Schwadron (Oberlin College), and D. M. Fleetwood (Sandia National Labs)

**PIII.7** Traps at $Si/SiO_2$ Interface Formed by Implantation of Si
A. Kalnitsky (Northern Telecom, Canada), A. R. Boothroyd (Carleton Univ., Canada), J. P. Ellul, E. H. Poindexter, and P. J. Caplan (US Army ET&D Lab)

**PIII.8** Thermally Activated Capture of Electrons into $Si/SiO_2$ Interface States Induced by $Co^{60}$ Irradiation
A. Ricksand and O. Engstrom (Chalmers University, Sweden)

Friday Morning, December 8, 1989 (8:30 - 12:10)

**Session III: Radiation and H Effects**

**Chairmen: P. J. Grunthaner, I. Ohdomari**

**III.1** (Invited) Defect and Electric Field Studies of the $SiO_2$/Si Interface Utilizing Variable-Energy Positron Beams
K. G. Lynn (Brookhaven National Laboratory)

**III.2** Observation of $H^+$ Motion During Interface Trap Formation
N. S. Saks and D. B. Brown (Naval Research Laboratory)

**III.3** Post-Irradiation Formation of Interface States in a Hydrogen Ambient
R. E. Stahlbush, and B. J. Mrstik (Naval Research Laboratory)

**III.4** How do Holes Transport in a-$SiO_2$ at Low Temperature?
P. U. Kenkare, and S. A. Lyon (Princeton University)

**III.5** The Dynamics of Hydrogen in the MOS-System as Measured by Nuclear Reaction Analysis
M. Briere, F. Wulf, and D. Braunig (Hahn-Meitner-Institut Berlin, West Germany)

**III.6** Chemical Kinetics of $HP_b$ Dissociation at the (111) Si/$SiO_2$ Interface
K. L. Brower (Sandia National Laboratories)

**III.7** The Role of Positive Ions in Interface State Formation in Irradiated Si/$Sio_2$ Structures
P. U. Kenkare and S. A. Lyon (Princeton University)

**Friday Afternoon, December 8, 1989 (4:00 - 7:15)**

**Session IV: Plenary Session for the SISC 20th Anniversary**

**Chairmen: Z.A. Weinberg, M. White, E.H. Nicollian, and P.V.** Dressendorfer

**IV.1** The Evolution of Silicon Surface Physics
C-T Sah (University of Florida)

**IV.2** The Physics of Hydrogen Annealing
P. Balk, (Delft Technical University, Netherlands)

**IV.3** Charges in $SiO_2$
B. E. Deal (Advantage Inc.)

**IV.4** ESR Centers in $SiO_2$ and $Si_3N_4$
P. M. Lenahan (Pennsylvania State University)

**Saturday Morning, December 9, 1989 (8:30 - 12:10)**

**Session V: Interfaces and Processing**

**Chairmen: L. Manchanda, M. J. Schulz**

**V.1** (Invited) Ultra-High Clean Oxides
T. Ohmi (Tohoku University)

**V.2** Influence of the Si-Surface Characteristics on the Quality of thin Thermal $SiO_2$ Layers
M. Heyns, C. Hasenack, R. De Keersmaecker and R. Falster (IMEC, Belgium)

**V.3** Dielectric Breakdown on MOS Capacitors Fabricated by Ultraclean, Integrated Processing
M. Offenberg, M. Liehr, S. R. Kasi, T. N. Nguyen, and G. W. Rubloff (IBM T. J. Watson Research Center)

**V.4** Low Temperature (> 300°C) Deposition of $SiO_2$ Combined with High Temperature (~ 1100°C) Rapid Thermal Annealing: A New Approach to the Form of Gate-Quality Dielectrics
J. T. Fitch, S. S. Kim, and G. Lucovsky (North Carolina State University)

**V.5** X-Ray Scattering Study of Epitaxial Oxides on Si (001)
G. Renaud, P. H. Fuoss, A. Ourmazd, J. Bevk (AT&T Bell Labs), and P. O. Hahn (Wacker, W. Germany)

**V.6** Morphology and Atomic configuration at the Si/$Sio_2$ Interface Deduced from the Simulation of the TED Pattern
H. Akatsu and I Ohdomari (Waseda University, Japan)

**V.7** Investigation of fluorine in $SiO_2$ and on Si Surface by Nuclear Resonant Reaction, XPS, and Electronic Methods
Y. Nishioka, Y. Ohji, S. Iwata (Central Research Lab, Hitachi), B.-G. Yu, Y. Oguri, E. Arai (Tokyo Insitute of Technology), and T. P. Ma (Yale University)