SYMPOSIUM T

Crystalline Oxides on Semiconductors
December 2 – 4, 2002
Chairs
Supratik Guha
IBM T.J. Watson Research Ctr
Darrell G. Schrom
Pennsylvania State Univ
Scott A. Chambers
Pacific Northwest Natl Laboratory
Ravi Droopad
Motorola Labs

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Session T2/U7

SESSION T2/U7: JOINT POSTER SESSION
FERROELECTRIC THIN FILMS ON SILICON
Chairs: Darrell G. Schrom and Stephen R. Gilbert
Monday Evening, December 2, 2002
8:00 PM
Exhibition Hall D (Hynes)

T2.1/U7.1

COMPOSITION AND THICKNESS DEPENDENCE OF FERRO- AND PIEZOELECTRIC RESPONSE OF Pb-Zr-Ti-O THIN FILMS ON Si PREPARED BY PULSED LASER DEPOSITION.
T. Zhu, B.T. Liu, N. Valmacor, S. Prasertchoung, L. Chen, L. Diangele, H.M. Zheng, L. Solomanova-Billa, R. Ramas, Department of Materials and Nuclear Engineering, University of Maryland, College Park, MD; J.M. Fink, R. Droopad, K. Eisenbeiser, Physical Sciences Research Laboratories, Motorola Labs, Tempe, AZ.

T2.2/U7.2

SUB-DOPING EFFECTS ON ELECTRICAL PROPERTIES OF SOL-GEL DERIVED SrBi2Ta2O9 FILMS. E. Tokunaga, M. Kishi, Precision & Intelligence Laboratory, Tokyo Institute of Technology, Yokohama, Japan.

T2.3/U7.3

MFS AND MF5 STRUCTURES USING Nb2O5, Ta2O5 FILMS FOR FRAM APPLICATIONS. P. Victor, S.B. Krupamudi, Materials Research Center, Indian Institute of Science, Bangalore, India; S. Bhat, MBGya, Max-Planck-Institut für Mikrostrukturphysik, Halle, Germany; S. Saha, Materials Science Division, Argonne National Laboratory, Argonne, IL.

T2.4/U7.4

EFFECT OF ULTRA-THIN [1nm] SI ON BUFFER LAYERS AND ON Ti LAYERS ON EPITAXIAL GROWTH AND ELECTRICAL PROPERTIES OF Bi-BASED FERROELECTRICS ON Si[100] AND [111] SURFACES. Hitoshi Tabata, Eiji Rokuta, Yasushi Hotta, and Tomoki Kawanai; Osaka Univ.; PRESTO JST; Osaka, Japan.

T2.5/U7.5

HIGH-PRESSURE CRYSTALIZATION OF CERAMIC OXIDE THIN FILMS AT LOW TEMPERATURES. Chang-Han Lu and Wen-Jeng Huang, Electronic and Electro-optical Ceramics Lab, Dept of Chemical Engineering, National Taiwan University, Taipei, Taiwan, R.O.C.

SESSION T3: EPITAXIAL OXIDE-SILICON HETEROSTRUCTURES - II
Chairs: Ravi Droopad and Matthew Copel
Tuesday Morning, December 3, 2002
Room 306 (Hynes)

8:30 AM T3.1


9:00 AM T3.2

EPITAXIAL GROWTH AND PROPERTIES OF Co-DOPED TiO2 ANATASE ON Si[100]. S.A. Chambers, T. Droopad, A.C. Tune, Fundamental Science Division, Pacific Northwest National Laboratory, Richland, WA; R.F.C. Forrow, IBM Almaden Research Center, San Jose, CA.

9:15 AM T3.3

EPITAXIAL GROWTH OF A SPIN POLARIZED FERROMAGNETIC OXIDE ON SILICON. EuO/Si [100]. Venu Vaidyanath, James Lettieri, Darrell G. Schrom, Dept of Materials Science and Engineering, The Pennsylvania State University; Jeremy Levy, Dept of Physics and Astronomy, University of Pittsburgh, Pittsburgh, PA.

9:30 AM T3.4

EPITAXIAL GROWTH AND MAGNETIC BEHAVIOR OF [Ni, Zr]B2O4 THIN FILMS ON Si SUBSTRATE USING DESIGNED BUFFER LAYERS FOR NOVEL MEMORY APPLICATION.
3:15 PM *T4.5/9/9.5
RECENT PROGRESS IN FERROELECTRIC-GATE FETS.
Hiroshi Ishiwara, Frontier Collaborative Research Center, Tokyo Institute of Technology, Yokohama, JAPAN.

3:45 PM T4.6/9.6
INTEGRATION PROCESSES AND PROPERTIES OF ONE TRANSISTOR MEMORY DEVICES. Tingkai Li, Sheng Feng Hua, Bruce Ulrich, Fengyan Zhang, Dave Evans, Sharp Laboratory of America, Inc., Camas, WA.

4:15 PM T4.8/9.8
X-RAY PHOTOELECTRON AND UV PHOTOLUMINESCENT SPECTROSCOPIC STUDIES ON BARRIER HEIGHTS OF SrBi₂Ta₂O₇ FILM SCHOTTKY JUNCTIONS. Mitsu Takahashi, Misuru Nozoe, and Masanori Ogami, Area of Materials and Device Physics, Department of Physical Science, Graduate School of Engineering Science, Osaka University, Toyonaka, Osaka, JAPAN.

4:45 PM T4.9/9.9
EFFECTS OF HYDROGEN ANNEALING AT THE CURIE TEMPERATURE ON THE INTERFACE OF SrBi₂Nb₂O₇/Si GATE STRUCTURES. K. Soo Kim, Yong Tae Kim, Seong-II Kim, Semiconductor Materials and Devices Lab., Korea Institute of Science and Technology, Seoul, KOREA; In-Hoon Choi, Dept. of Materials Science and Engineering, Korea Univ., Seoul, KOREA.

Tuesday Afternoon, December 3, 2002
Room 304 (Hynes)

1:30 PM *T4.1/9.1
GROWTH AND PROPERTIES OF UNIFORMLY a-AXIS ORIENTED FERROELECTRIC Bi₁₂₋ₓLaₓSr₄Ti₄O₁₄ THIN FILMS ON Si(100) INTERFACE. D. Hesse, H. H. Lee, N. D. Zakharov, and U. Gosele, Max-Planck-Institut für Mikrostrukturphysik, Halle (Saale), GERMANY.

2:00 PM T4.2/9.2
EPIAXIAL LUBRIFIED SrTiO₃ ON Si. A CONDUCTIVE TEMPERATURE FOR EPITAXIAL FERROELECTRIC ON Si(100) SURFACE. B.T. Liu, K. Maek, Y. So, V. Naganraj, R. Ramesh, Department of Materials Science and Engineering Center for Superconductivity Research, University of Maryland, College Park, MD; J. Pettier, J.H. Hawes, and D.G. Schlom, Dept. of Materials Science and Engineering, Pennsylvania State University, University Park, PA; W. Tian and X.Q. Pan, Dept. of Materials Sciences and Engineering, The University of Michigan, Ann Arbor, MI; F.J. Walker, R.A. Mcke, Oak Ridge National Laboratory, Oak Ridge, TN; also Mitsubishi Materials Corporation, Development Section, Sendai Plant, Sendai, Hyogo, JAPAN.

2:15 PM T4.3/9.3
FABRICATION OF LEAD-BASED FERROELECTRIC CAPACITORS INTEGRATED ON SrTiO₃/S WAFERS BY CHEMICAL VAPOR DEPOSITION. S.Y. Yang, B.T. Liu, V. Naganraj, S. Pramucha, A. Shchukin, M. Mohtani, and R. Ramesh, Department of Materials Science and Engineering, Center for Superconductivity Research, University of Maryland, College Park, MD; J.N. Kidder Jr., Department of Mechanical Engineering, Vermont Technical College, Randolph Center, VT; J.M. Finder, R. Droopad, and K. Eisenthaler, Physical Sciences Research Laboratories, Motorlola Laboratories, Tempe, AZ.

2:30 PM T4.4/9.4
Abstract Withdrawn.

2:45 PM Break
11:00 AM. T5.6/N7.6

11:15 AM. T5.7/N7.7
PROGRESS IN THE CHARACTERIZATION OF LAYERED HIGH-K DIELECTRICS AS TUNNEL BARRIERS IN SILICON-BASED NONVOLATILE MEMORIES. Julie D. Casperson, Harry A. Atwater, California Institute of Technology, J. Appl. Phys., Applied Physics Laboratory, Pasadena, CA; Douglass Bell, Jet Propulsion Laboratory, Pasadena, CA; Brett W. Bocke, Mun Yee Ho, Martin L. Green, Agere Systems, Murray Hill, NJ.

11:30 AM. T5.8/N7.8
OXIDES AND SILICATES OF HAFNIUM AND ZIRCONIUM AS ALTERNATIVE GATE DIELECTRICS. DENSITY FUNCTIONAL THEORY STUDY. Maciej Gucziowski, John Jaffe, Pacific Northwest National Laboratory, Environmental Molecular Sciences Laboratory, Theory, Modeling & Simulation, Richmond, WA.

SESSION T6/N8: JOINT SESSION
CRYSTALLINE OXIDES FOR GATE DIELECTRICS

1:30 PM. T6.1/N8.1
HIGH k GATE DIELECTRICS FOR Si AND COMPOUND SEMICONDUCTORS BY MBE: J. Raymond, Keo, and Minghwei Hong, Agere Systems, Murray Hill, NJ.

2:00 PM. T6.2/N8.2
ULTRATHIN METAL OXIDES ON SILICON AS HIGH-k MATERIALS FOR GATE DIELECTRIC APPLICATIONS. Evgeni Gusev, Doug Buchholtz, Alexandre Callegari, Edward Carter, Matt Copley, Mike Griebel, Suprapti Gohn and Harold Okern-Schmidt, IBM Semiconductor Research and Development Center, T.J. Watson Research Center, Yorktown Heights, NY.

2:30 PM. T6.3/N8.3

2:45 PM. Break

3:15 PM. T6.4/N8.4
INTERFACE AND MATERIAL PROPERTIES OF HIGH-k GATE STRUCTURES. S. Sasan, W.H. Schue, R.A. Baryszk, T. Nakamura, D. Starostka, M. Croft, X. Zhao, D. Vanderbilt, T. Gustafsson and E. Griesel, Departments of Chemistry and Physics, and Laboratory for Surface Modification, Rutgers University, Piscataway, NJ.

3:45 PM. T6.5/N8.5
EPITAXIAL PbOx ON SILICON AS AN ALTERNATIVE GATE OXIDE FOR FUTURE CMOS APPLICATIONS. Sebatian Gotchelh, Horst Hahn, Darmstadt University of Technology, Institute of Materials Science, Thin Films Division, Darmstadt, GERMANY.

4:00 PM. T6.6/N8.6
DYNAMIC GROWTH MECHANISM AND INTERFACE STRUCTURE OF CRYSTALLINE ZIRCONIA ON SILICON. S.J. Wang, A.C.H. Haur, Institute of Materials Research & Engineering, SINGAPORE; C.K. Ong, Department of Physics, National University of Singapore, SINGAPORE.

4:15 PM. T6.7/N8.7

4:30 PM. T6.8/N8.8
ELECTRICAL CHARACTERIZATION OF CRYSTALLINE ALKALINE EARTH OXIDES. Curt Billman, Fred Walker, Rodney McKeen, Oak Ridge National Laboratory, Oak Ridge, TN

SESSION T7/N9: JOINT POSTER SESSION
CRYSTALLINE OXIDES FOR GATE DIELECTRICS
Chairs: Jon-Paul Marin and Darrell G. Schrom. Wednesday Evening, December 4, 2002. 8:00 PM. Exhibition Hall D (Hynes).

T7.1/N9.1
SUPPRESSION OF Hysteresis in CAPACITANCE-VOLTAGE (C-V) CHARACTERISTICS of YSZ/Si(100) and ZrO2/Si THIN FILMS BY Nb-DOPING. Naoki Wakiya, Tomohiko Moriyu, Kazuo Shirasaki and Nobuyasu Minatani, Tokyo Institute of Technology, Dept. of Metallurgy and Ceramics Science, JAPAN.

T7.2/N9.2
A STUDY of Al2O3(C) FILMS ON Si(100) GROWN BY LOW-PRESSURE MOCVD. M.P. Singh, S.A. Shivshankar, Materials Research Centre, Indian Institute of Science, Bangalore, INDIA.

T7.3/N9.3
GATE DIELECTRIC PROPERTY AND BUFFER INSULATOR CHARACTERISTICS OF ULTRATHIN ZIRCONIUM OXIDE FILMS DEPOSITED BY REACTIVE RF MAGNETRON SPUTTERING. Hoan Sang Choi, Geunsik Lim, Jong-Hun Lee, Yu Min Jung and In-Hoon Cho, Department of Materials Science and Engineering, Korea University, Seoul, KOREA.

T7.4/N9.4
Abstract Withdrawn

T7.5/N9.5
CONDUCTION MECHANISMS IN SiO2/Thin FILMS ON SILICON. Bogdan Mereru, Max Planck Institute of Microstructure Physics, Halle, GERMANY; National Institute for Material Physics, Bucharest-Magurele, ROMANIA; George Sarau, National Institute for Material Physics, Bucharest-Magurele, ROMANIA; Jean Fompeyrine, Gerd Norga, IBM-Zurich, Zurich, SWITZERLAND; Martin ALEXA Max Planck Institute of Microstructure Physics, Halle, GERMANY.

T7.6/N9.6
ELECTRICAL CHARACTERIZATION OF ATOMIC-LAYER-DEPOSITED SiO2/Thin FILMS FOR CMOS APPLICATIONS. Seong-Kun Kim, Oh Seong Kwan, Cheol Seong Hwang, Seoul National University, School of Materials Science and Engineering, Seoul, KOREA.

T7.7/N9.7
HREM INVESTIGATION OF EFFECT OF VARIOUS RARE EARTH OXIDE DOPANTS ON EPITAXIAL ZIRCONIA HIGH-k GATE DIELECTRICS. Takatoki Kikuchi, Tokyo Institute of Technology, Center for Advanced Materials Analysis; Naoki Wakiya, Kazuo Shirasaki and Nobuyasu Minatani, Tokyo Institute of Technology, Dept. of Metallurgy and Ceramics Science, Tokyo, JAPAN.

T7.8/N9.8
THERMAL STABILITY OF ATOMIC-LAYER-DEPOSITED HfO2 THIN FILMS ON THE Si-PASSIVATED Si SUBSTRATE. Hong-Bin Park, Moonju Cho, Jaehoo Park, and Cheol Seong Hwang, School of Materials Science and Engineering and Inter-university Semiconductor Research Center, Seoul National University, Seoul, KOREA; Jaeshick Jeong and Kwang Soo Hyun, Evertek Co., Kyunggi-Do, KOREA.

T7.9/N9.9
THE ATOMIC ORIGIN OF HIGH DIELECTRIC CONSTANTS OF Ta2O5 THIN FILM DEPOSITED ON Ru ELECTRODES. Tomoyuki Hamada, Tohoku University, Masaaki Hirata, Advanced Research Laboratory, Hitachi Ltd, Tokyo, JAPAN.

T7.10/N9.10
ELECTRICAL BEHAVIOR OF EPITAXIAL HIGH-k Y2O3/Si(100) WITH ATOMICALLY SHARP INTERFACES. A Dimoukias, G. Velegitas, G. Apostolopoulos, MBE Laboratory, Institute of
T7.11/N0.11
Abstract Withdrawn

T7.12/N0.12
STUDY OF INTERFACE FORMATION OF (Ba,Sr)TiO₃ THIN FILMS GROWN BY RF SPUTTER DEPOSITION ON BARE Si AND THERMAL SiO₂/Si SUBSTRATES. Natasha Svorova, Alex Mueller, Eugene Irene, Univ of North Carolina, Dept of Chemistry, Chapel Hill, NC; Alexandra Svorova, Martin Saunders, Univ of Western Australia, Centre for Microscopy and Microanalysis, Crawley, WA, AUSTRALIA.