

# SYMPOSIUM T

## Crystalline Oxides on Semiconductors

December 2 - 4, 2002

### Chairs

Supratik Guha  
Darrell G. Schlom  
Scott A. Chambers  
Ravi Droopad

IBM T.J. Watson Research Ctr  
Pennsylvania State Univ  
Pacific Northwest Natl Laboratory  
Motorola Labs

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\* Invited paper

### SESSION T1: EPITAXIAL OXIDE-SILICON HETEROSTRUCTURES - I

Chairs: Supratik Guha and Scott A. Chambers  
Monday Afternoon, December 2, 2002  
Room 308 (Hynes)

#### 1:30 PM \*T1.1

CRYSTALLINE OXIDES ON SEMICONDUCTORS: ENABLERS OF NEXT-GENERATION FUNCTIONAL ELECTRONICS. R. Ramesh, University of Maryland, College Park, MD; D.G. Schlom, Pennsylvania State University, University Park, PA; R. Droopad and K. Eisenbeiser, Motorola, Phoenix, AZ; C.B. Eom, Univ of Wisconsin-Madison, Madison, WI.

#### 2:15 PM T1.2

THEORY OF THE ATOMIC AND ELECTRONIC STRUCTURE OF THE Si/SrTiO<sub>3</sub> INTERFACE. A.A. Demkov, and X. Zhang, M. Hu, H. Li, J. Edwards Jr., R. Droopad, Physical Sciences Research Laboratories, Motorola Inc., Tempe, AZ.

#### 2:30 PM T1.3

EPITAXIAL SrTiO<sub>3</sub> THIN FILMS GROWTH ON Si USING SULFIDE BUFFERS. Y.-Z. Yoo, Z. Jin, P. Ahmet, K. Nakajima, T. Chikyow, National Institute for Materials Science, Ibaraki, JAPAN; Y. Konishi, Y. Yonezawa, Fuji Electric Corporate Research and Development Ltd, JAPAN; M. Kawasaki, Institute for Materials Research, Tohoku Univ, Sendai, JAPAN; J.H. Song, H. Koinuma, Materials and Structures Lab, Tokyo Institute of Technology, Yokohama, JAPAN.

#### 2:45 PM BREAK

#### 3:15 PM \*T1.4

ELECTRODYNAMICS IN OXIDE/SEMICONDUCTOR NANOSYSTEMS. Rodney McKee, Oak Ridge National Laboratory, Oak Ridge, TN.

#### 3:45 PM T1.5

SMOOTH NEAR 2-D EPITAXIAL Si AND Ge FILMS GROWN ON LATTICE MATCHED (La<sub>x</sub>Y<sub>1-x</sub>)<sub>2</sub>O<sub>3</sub>/Si (111) STRUCTURES BY MOLECULAR BEAM EPITAXY. Vijay Narayanan, Supratik Guha, Nestor A. Bojarczuk and Matthew Copel, IBM T.J. Watson Research Center, Yorktown Heights, NY.

#### 4:00 PM T1.6

MBE GROWTH OF HIGH CRYSTALLINE QUALITY (La<sub>x</sub>Y<sub>1-x</sub>)<sub>2</sub>O<sub>3</sub> DIELECTRICS ON EXACT AND VICINAL Si(001) SURFACES. A. Dimoulas, G. Vellianitis, G. Apostolopoulos, Institute of Materials Science, NCSR "Demokritos", Athens, GREECE; M. Alexe, R. Scholz, Max-Planck Institute for Microstructure Physics, Halle, GERMANY; M. Fanciulli, D.T. Dekadjevi, C. Wiemer, Laboratorio MDM-INFM, Agrate Brianza, ITALY.

#### 4:15 PM T1.7

ROLE OF THE FIRST ATOMIC LAYERS IN EPITAXIAL RELATIONSHIP AND INTERFACE CHARACTERISTICS OF SrTiO<sub>3</sub> FILMS ON CeO<sub>2</sub>/YSZ/Si(001). Tomoaki Yamada, Naoki

Wakiya, Kazuo Shinozaki, and Nobuyasu Mizutani, Tokyo Institute of Technology, Graduate School of Science and Engineering, Dept of Metallurgy and Ceramics Science, Tokyo, JAPAN.

### SESSION T2/U7: JOINT POSTER SESSION FERROELECTRIC THIN FILMS ON SILICON

Chairs: Darrell G. Schlom 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 PIEZO- ELECTRIC RESPONSE OF PbZr<sub>x</sub>Ti<sub>1-x</sub>O<sub>3</sub> THIN FILMS ON Si PREPARED BY PULSED LASER DEPOSITION. T. Zhao, B.T. Liu, N. Valanoor, S. Prasertchoung, L. Chen, L. DiAngelo, H.M. Zheng, L. Salamanca-Riba, R. Ramesh, Department of Materials and Nuclear Engineering, University of Maryland, College Park, MD; J.M. FINDER, R. Droopad, K. Eisenbeiser, Physical Sciences Research Laboratories, Motorola Labs, Tempe, AZ.

#### T2.2/U7.2

Sm DOPING EFFECTS ON ELECTRICAL PROPERTIES OF SOL-GEL DERIVED SrBi<sub>2</sub>Ta<sub>2</sub>O<sub>9</sub> FILMS. E. Tokumitsu, M. Kishi, Precision & Intelligence Laboratory, Tokyo Institute of Technology, Yokohama, JAPAN.

#### T2.3/U7.3

MFIS AND MFS STRUCTURES USING SrBi<sub>2</sub>Ta<sub>2</sub>O<sub>9</sub> FILMS FOR FRAM APPLICATIONS. P. Victor, S.B. Krupanidhi, Materials Research Center, Indian Institute of Science, Bangalore, INDIA; S. Bhattacharyya, 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) SiON BUFFER LAYERS AND/OR TiN LAYERS ON EPITAXIAL GROWTH AND ELECTRICAL PROPERTIES OF Bi-BASED FERROELECTRIC FILMS ON Si(100) AND (111) SURFACES. Hitoshi Tabata<sup>a,b</sup>, Eiji Rokuta<sup>a</sup>, Yasushi Hotta<sup>a</sup> and Tomoji Kawai<sup>a</sup>; Osaka Univ.<sup>a</sup>; PRESTO21 JST<sup>b</sup>; Osaka, JAPAN.

#### T2.5/U7.5

HIGH-PRESSURE CRYSTALLIZATION OF CERAMIC OXIDE THIN FILMS AT LOW TEMPERATURES. Chung-Hsin Lu and Wen-Jeng Hwang, 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 308 (Hynes)

#### 8:30 AM \*T3.1

EPITAXIAL OXIDES ON SEMICONDUCTORS. Z. Yu, R. Droopad, Y. Liang, H. Li, C.D. Overgaard, Y. Wei, X. Hu, J.L. Edwards Jr., J.M. FINDER, K.W. Eisenbeiser, A. Talin, S. Smith, S. Voight, J. Wang, D.S. Marshall, K. Moore, and W.J. Ooms, Physical Sciences Research Laboratories, Motorola Labs, Tempe, AZ.

#### 9:00 AM T3.2

EPITAXIAL GROWTH AND PROPERTIES OF Co-DOPED TiO<sub>2</sub> ANATASE ON Si(001). S.A. Chambers, T. Droubay, A.C. Tuan, Fundamental Science Division, Pacific Northwest National Laboratory, Richland, WA; R.F.C. Farrow, 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 Vaithyanathan, James Lettieri, Darrell G. Schlom, Dept of Materials Science and Engineering, The Pennsylvania State University, PA; Jeremy Levy, Dept of Physics and Astronomy, University of Pittsburgh, Pittsburgh, PA.

#### 9:30 AM T3.4

EPITAXIAL GROWTH AND MAGNETIC BEHAVIOR OF (Ni,Zn)Fe<sub>2</sub>O<sub>4</sub> THIN FILMS ON Si SUBSTRATE USING DESIGNED BUFFER LAYERS FOR NOVEL MEMORY APPLICATION.

Naoki Wakiya, Kazuo Shinozaki and Nobuyasu Mizutani, Dept of Metallurgy and Ceramics Science, Tokyo Inst of Technology, JAPAN.

**9:45 AM BREAK**

**10:15 AM T3.5**

EPITAXIAL BaTiO<sub>3</sub> THIN FILMS ON BARE Si BY A TEMPERATURE GRADIENT CRYSTALLIZATION TECHNIQUE. N. Stavitski, V. Lyahovitskaya, I. Zon and I. Lubomirsky, Weizmann Insitute of Science, Rehovot, ISRAEL.

**10:30 AM T3.6**

STABILITY AND STRUCTURE OF THE (AO)<sub>n</sub>/(ABO<sub>3</sub>)<sub>m</sub> INTERFACE GROWN ON SEMICONDUCTORS. Fred Walker, University of Tennessee, Knoxville, TN; M.F. Chisholm and R.A. McKee, Oak Ridge National Laboratory, Oak Ridge, TN.

**10:45 AM T3.7**

FIRST PRINCIPLES DESIGN OF EPITAXIAL THIN FILM AND SUPERLATTICE PEROVSKITE FERROELECTRICS AND DIELECTRICS. J.B. Neaton and K.M. Rabe, Department of Physics and Astronomy, Rutgers University, Piscataway, NJ.

**11:00 AM T3.8**

A THEORETICAL STUDY OF THE Sr-INDUCED RECONSTRUCTION OF THE Si (001) SURFACE. Xiaodong Zhang and Alexander A. Demkov, Physical Sciences Research Labs, Motorola, Inc., Tempe, AZ.

**11:15 AM T3.9**

ATOMIC STRUCTURE AND THE COULOMB BUFFER AT A SrO/Si(100) INTERFACE. William A. Shelton, Computational Science and Mathematics Division, Oak Ridge National Laboratory, Oak Ridge, TN; Marco Buongiorno Nardelli, Department of Physics, North Carolina State University, Raleigh, NC, and Computational Science and Mathematics Division, Oak Ridge National Laboratory, Oak Ridge, TN; G. Malcom Stocks, Metals and Ceramics Division, Oak Ridge National Laboratory, Oak Ridge, TN.

SESSION T4/U9: JOINT SESSION  
FERROELECTRIC THIN FILMS ON SILICON  
Chairs: Ramamurthy Ramesh and Hiroshi Funakubo  
Tuesday Afternoon, December 3, 2002  
Room 304 (Hynes)

**1:30 PM \*T4.1/U9.1**

GROWTH AND PROPERTIES OF UNIFORMLY *a*-AXIS ORIENTED FERROELECTRIC Bi<sub>3.25</sub>La<sub>0.75</sub>Ti<sub>3</sub>O<sub>12</sub> THIN FILMS ON Si(100) SUBSTRATES. D. Hesse, H.N. Lee, N.D. Zakharov, and U. Gösele, Max-Planck-Institut für Mikrostrukturphysik, Halle (Saale), GERMANY.

**2:00 PM T4.2/U9.2**

EPITAXIAL La-DOPED SrTiO<sub>3</sub> ON SILICON: A CONDUCTIVE TEMPLATE FOR EPITAXIAL FERROELECTRICS ON SILICON. B.T. Liu, K. Maki<sup>†</sup>, Y. So, V. Nagarajan, R. Ramesh, Department of Materials and Nuclear Engineering and Center for Superconductivity Research, University of Maryland, College Park, MD; J. Lettieri, J.H. Haeni, 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 Science and Engineering, The University of Michigan, Ann Arbor, MI; F.J. Walker, R.A. Mckee, Oak Ridge National Laboratory, Oak Ridge, TN; <sup>†</sup>also at Mitsubishi Materials Corporation, Development Section, Sanda Plant, Sanda, Hyogo, JAPAN.

**2:15 PM T4.3/U9.3**

FABRICATION OF LEAD-BASED FERROELECTRIC CAPACITORS INTEGRATED ON SrTiO<sub>3</sub>/Si WAFERS BY CHEMICAL VAPOR DEPOSTION. S.Y. Yang, B.T. Liu, V. Nagarajan, S. Prasertchoung, A. Stanishevsky, J. Melngailis, and R. Ramesh, Department of Materials and Nuclear 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. Eisenbeiser, Physical Sciences Research Laboratories, Motorola Laboratories, Tempe, AZ.

**2:30 PM T4.4/U9.4**

Abstract Withdrawn

**2:45 PM BREAK**

**3:15 PM \*T4.5/U9.5**

RECENT PROGRESS IN FERROELECTRIC-GATE FETs. Hiroshi Ishiwara, Frontier Collaborative Research Center, Tokyo Institute of Technology, Yokohama, JAPAN.

**3:45 PM T4.6/U9.6**

INTEGRATION PROCESSES AND PROPERTIES OF ONE TRANSISTOR MEMORY DEVICES. Tingkai Li, Sheng Teng Hsu, Bruce Ulrich, Fengyan Zhang, Dave Evans, Sharp Laboratory of America, Inc., Camas, WA.

**4:00 PM T4.7/U9.7**

Pt/Bi<sub>3.25</sub>La<sub>0.75</sub>Ti<sub>3</sub>O<sub>12</sub>/Al<sub>2</sub>O<sub>3</sub>/Si<sub>3</sub>N<sub>4</sub>/Si MFIS STRUCTURE WITH LONG RETENTION CHARACTERISTICS. Yoshihisa Fujisaki, Kunie Iseki and Hiroshi Ishiwara, Tokyo Institute of Technology, Frontier Collaborative Research Center, Yokohama, JAPAN.

**4:15 PM T4.8/U9.8**

X-RAY PHOTOELECTRON AND UV PHOTOYIELD SPECTROSCOPIC STUDIES ON BARRIER HEIGHTS OF SrBi<sub>2</sub>Ta<sub>2</sub>O<sub>9</sub> FILM SCHOTTKY JUNCTIONS. Mitsue Takahashi, Minoru Noda, and Masanori Okuyama, Area of Materials and Device Physics, Department of Physical Science, Graduate School of Engineering Science, Osaka University, Toyonaka, Osaka, JAPAN.

**4:30 PM T4.9/U9.9**

EFFECTS OF HYDROGEN ANNEALING AT THE CURIE TEMPERATURE ON THE INTERFACE OF SrBi<sub>2</sub>Nb<sub>2</sub>O<sub>9</sub>/Si GATE STRUCTURES. Ik Soo Kim, Yong Tae Kim, Seong-Il 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.

**4:45 PM T4.10/U9.10**

ATOMIC-LAYER-DEPOSITION OF SrTiO<sub>3</sub> THIN FILMS USING REMOTE-PLASMA ACTIVATED H<sub>2</sub>O AS AN OXIDANT. Oh Seong Kwon, Seong Keun Kim, Cheol Seong Hwang, Seoul National Univ, Dept of Materials Science and Engineering, Seoul, KOREA; Jae hak Jeong, Kwang Soo Hyun, Ever-tek, Sungnam, KOREA.

SESSION T5/N7: JOINT SESSION  
THEORY AND MODELING  
Chairs: Susanne Stemmer and Darrell G. Schlom  
Wednesday Morning, December 4, 2002  
Room 202 (Hynes)

**8:30 AM \*T5.1/N7.1**

FIRST PRINCIPLES MODELING OF HIGH-K DIELECTRIC MATERIALS. Gyuchang Jun<sup>a</sup> and Kyeongjae Cho<sup>b</sup>, Stanford University; <sup>a</sup>Dept of Materials Science and Engineering, <sup>b</sup>Dept of Mechanical Engineering; Stanford, CA.

**9:00 AM T5.2/N7.2**

FIRST-PRINCIPLES STUDY OF STRUCTURAL AND DIELECTRIC PROPERTIES OF ZrO<sub>2</sub> and HfO<sub>2</sub>. Xinyuan Zhao, David Vanderbilt, Rutgers University, Department of Physics and Astronomy, Piscataway, NJ.

**9:15 AM T5.3/N7.3**

EVALUATION OF CRYSTALLINE GATE OXIDES FOR Si MICROELECTRONICS: BAND OFFSETS, ENERGETICS, AND DIELECTRIC PROPERTIES OF Si/BaO, Si/HfO<sub>2</sub>, and Si/ZrO<sub>2</sub> (001) INTERFACES. Gianluca Gulleri and Vincenzo Fiorentini, INFN and Dipartimento di Fisica, Università di Cagliari, ITALY.

**9:30 AM \*T5.4/N7.4**

ELECTRON MOBILITY IN Si INVERSION LAYERS IN MOS SYSTEMS WITH A HIGH-K INSULATOR: THE ROLE OF REMOTE-PHONON SCATTERING. Massimo V. Fischetti, Deborah A. Neumayer, and Eduard A. Cartier, IBM Semiconductor Research and Development Center (SRDC), IBM Research Division, Thomas J. Watson Research Center, Yorktown Heights, NY.

**10:00 AM BREAK**

**10:30 AM \*T5.5/N7.5**

ATOMIC STRUCTURE, BAND OFFSET ENGINEERING AND HYDROGEN AT HIGH-k OXIDE: Si INTERFACES. John Robertson, Paul W. Peacock, Engineering Dept, Cambridge University, Cambridge, UNITED KINGDOM.

**11:00 AM T5.6/N7.6**

OXYGEN VACANCY DEFECTS IN TANTALUM PENTOXIDE: A DENSITY FUNCTIONAL STUDY. R. Ramprasad, Motorola, Inc., Tempe, AZ; M. Sadd, D.R. Roberts, Motorola, Inc., Austin, TX; T.P. Remmel, Motorola, Inc., Tempe, AZ; M.V. Raymond, E.D. Luckowski, S. Kalpat, C.C. Barron, Motorola, Inc., Austin, TX; M. Miller, Motorola, Inc., Tempe, AZ.

**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, Watson Laboratory of Applied Physics, Pasadena, CA; L. Douglas Bell, Jet Propulsion Laboratory, Pasadena, CA; Brett W. Busch, 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 Gutowski, John Jaffe, Pacific Northwest National Laboratory, Environmental Molecular Sciences Laboratory, Theory, Modeling & Simulation, Richland, WA.

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

Chairs: John Robertson and Rodney A. McKee  
Wednesday Afternoon, December 4, 2002  
Room 202 (Hynes)

**1:30 PM \*T6.1/N8.1**

HIGH  $\kappa$  GATE DIELECTRICS FOR Si AND COMPOUND SEMICONDUCTORS BY MBE. J. Raynien Kwo, and Minghwei Hong, Agere Systems, Murray Hill, NJ.

**2:00 PM \*T6.2/N8.2**

ULTRATHIN METAL OXIDES ON SILICON AS HIGH-K MATERIAL FOR GATE DIELECTRIC APPLICATIONS. Evgeni Gusev, Doug Buchanan, Alesandro Callegari, Eduard Cartier, Matt Copel, Mike Gribelyuk, Supratik Guha and Harald Okorn-Schmidt, IBM Semiconductor Research and Development Center, T.J. Watson Research Center, Yorktown Heights, NY.

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

CORRELATION OF THE PHYSICAL CHARACTERIZATION WITH THE ELECTRICAL PERFORMANCE OF HAFNIUM SILICATE THIN FILMS. P.S. Lysaght, G. Bersuker, B. Foran, L. Larson, R.W. Murto and H.R. Huff, International SEMATECH, Austin, TX.

**2:45 PM BREAK****3:15 PM \*T6.4/N8.4**

INTERFACE AND MATERIALS PROPERTIES OF HIGH-K GATE STRUCTURES. S. Sayan, W.H. Schulte, R.A. Bartynski, T. Nishimuri, D. Starodub, M. Croft, X. Zhao, D. Vanderbilt, T. Gustafsson and E. Garfunkel, Departments of Chemistry and Physics, and Laboratory for Surface Modification, Rutgers University, Piscataway, NJ.

**3:45 PM T6.5/N8.5**

EPITAXIAL  $\text{Pr}_2\text{O}_3$  ON SILICON AS AN ALTERNATIVE GATE OXIDE FOR FUTURE CMOS APPLICATIONS. Sebastian Gottschalk, 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. Huan, Institute of Materials Research & Engineering, SINGAPORE; C.K. Ong, Department of Physics, National University of Singapore, SINGAPORE.

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

THE INFLUENCE OF DEFECTS ON COMPATIBILITY AND YIELD OF THE  $\text{HfO}_2$ -POLYSILICON GATE STACK FOR CMOS INTEGRATION. V.S. Kaushik, J. Kluth, A. Kerber, E. Cartier, W. Tsai, E. Young, M. Green, J. Chen, S-A. Jang, S. Lin, International Sematech, Austin, TX; S. DeGendt, R. Carter, M. Claes, E. Rohr, L. Pantisano, O. Richard, C. Zhao, H. Bender, M. Caymax, M. Heyns, Inter-university MicroElectronic Center (IMEC), Leuven, BELGIUM;

Y. Manabe, Hitachi, Ltd., Semiconductor & Integrated Circuits, Tokyo, JAPAN.

**4:30 PM T6.8/N8.8**

ELECTRICAL CHARACTERIZATION OF CRYSTALLINE ALKALINE EARTH OXIDES. Curt Billman, Fred Walker, Rodney Mckee, Oak Ridge National Laboratory, Oak Ridge, TN.

SESSION T7/N9: JOINT POSTER SESSION  
CRYSTALLINE OXIDES FOR GATE DIELECTRICS

Chairs: Jon-Paul Maria and Darrell G. Schlom  
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  $\text{YSZ}/\text{Si}(001)$  AND  $\text{ZrO}_2/\text{Si}$  THIN FILMS BY Nb-DOPING. Naoki Wakiya, Tomohiko Moriya, Kazuo Shinozaki and Nobuyasu Mizutani, Tokyo Institute of Technology, Dept of Metallurgy and Ceramics Science, JAPAN.

**T7.2/N9.2**

A STUDY OF  $\text{Al}_2\text{O}_3(\text{C})$  FILMS ON  $\text{Si}(100)$  GROWN BY LOW-PRESSURE MOCVD. M.P. Singh, S.A. Shivashankar, 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. Hoon Sang Choi, Geun-Sik Lim, Jong-Han Lee, Yu Min Jang and In-Hoon Choi, Department of Materials Science and Engineering, Korea University, Seoul, KOREA.

**T7.4/N9.4**

Abstract Withdrawn

**T7.5/N9.5**

CONDUCTION MECHANISMS IN  $\text{SrTiO}_3$  THIN FILMS ON SILICON. Bogdan Mereu, 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-Zürich, Zürich, SWITZERLAND; Marin Alexe, Max Planck Institute of Microstructure Physics, Halle, GERMANY.

**T7.6/N9.6**

ELECTRICAL CHARACTERIZATION OF ATOMIC-LAYER-DEPOSITED  $\text{SrTiO}_3$  THIN FILMS FOR CMOS APPLICATIONS. Seong Keun Kim, Oh Seong Kwon, Cheol Seong Hwang, Seoul National University, School of Materials Science and Engineering, Seoul, KOREA.

**T7.7/N9.7**

HRTEM INVESTIGATION OF EFFECT OF VARIOUS RARE EARTH OXIDE DOPANTS ON EPITAXIAL ZIRCONIA HIGH-K GATE DIELECTRICS. Takanori Kiguchi, Tokyo Institute of Technology, Center for Advanced Materials Analysis; Naoki Wakiya, Kazuo Shinozaki and Nobuyasu Mizutani, Tokyo Institute of Technology, Dept of Metallurgy and Ceramics Science, Tokyo, JAPAN.

**T7.8/N9.8**

THERMAL STABILITY OF ATOMIC-LAYER-DEPOSITED  $\text{HfO}_2$  THIN FILMS ON THE  $\text{SiN}$ -PASSIVATED  $\text{Si}$  SUBSTRATE. Hong Bae 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; Jaehack Jeong and Kwang Soo Hyun, Ever-tek Co., Kyunggi-Do, KOREA.

**T7.9/N9.9**

THE ATOMISTIC ORIGIN OF HIGH DIELECTRIC CONSTANTS OF  $\text{Ta}_2\text{O}_5$  THIN FILM DEPOSITED ON Ru ELECTRODES. Tomoyuki Hamada, Takuya Maruizumi, Masahiko Hiratani, Advanced Research Laboratory, Hitachi Ltd, Tokyo, JAPAN.

**T7.10/N9.10**

ELECTRICAL BEHAVIOR OF EPITAXIAL HIGH-k  $\text{Y}_2\text{O}_3 / \text{Si}(001)$  WITH ATOMICALLY SHARP INTERFACES. A. Dimoulas, G. Vellianitis, G. Apostolopoulos, MBE Laboratory, Institute of

Materials Science, NCSR "Demokritos", Athens, GREECE; B. Mereu, R. Scholz, M. Alexe, Max Planck Institute for Microstructural Physics, Halle, GERMANY; J.C. Hooker, Philips Research Leuven, Leuven, BELGIUM.

**T7.11/N9.11**

Abstract Withdrawn

**T7.12/N9.12**

STUDY OF INTERFACE FORMATION OF (Ba,Sr)TiO<sub>3</sub> THIN FILMS GROWN BY RF SPUTTER DEPOSITION ON BARE Si AND THERMAL SiO<sub>2</sub>/Si SUBSTRATES. Natalya Suvorova, Alex Mueller, Eugene Irene, Univ of North Carolina, Dept of Chemistry, Chapel Hill, NC; Alexandra Suvorova, Martin Saunders, Univ of Western Australia, Centre for Microscopy and Microanalysis, Crawley, WA, AUSTRALIA.