Strasbourg (France)

E-MRS Spring Meeting 2004
May 24-28, 2004

SYMPOSIUM C

New materials in future silicon technology

Symposium Organizers:

Hans-Joachim Müssig, IHP, Frankfurt/Oder, Germany

Jarek Dąbrowski, IHP, Frankfurt/Oder, Germany

Gerard Ghibaudo, ENSERG, Grenoble, France

Alessandro Paccagnella, University of Padova, Italy

Lothar Risch, Infineon Technologies, München, Germany

Papers will be published in Materials Science in Semiconductor Processing

E-MRS 2004 SPRING MEETING

SYMPOSIUM C

Tuesday, May 25, 2004 Morning

Session I: Materials challenges I
Session chairs: J. Fompeyrine

	09:00		**WELCOME**
C-I.1	09:10	-INVITED-	DEVICES ARCHITECTURES AND MATERIALS FOR NANOCMOS AT THE END OF THE ROADMAP AND BEYOND **S. Deleonibus**, CEA-LETI DTS, CEA-Grenoble, 17 rue des Martyrs, 38054 Grenoble, Cedex 09, France
C-I.2	09:50		CAN WE MOVE UV ABSORPTION EDGE OF SILICA GLASS TO SHORTER WAVELENGTHS? A.J. Ikushima and K. Saito, Toyota Technological Institute, Tempaku-ku, Nagoya-city, Japan
	10:10		**BREAK**
C-I.3	10:20	-INVITED-	POST HAFNIUM OXIDE TECHNOLOGY FOR HIGH-K GATE DIELECTRICS **Hiroshi Iwai**, Frontier Collaborative Research Center, Tokyo Institute of Technology, 4259, Nagatsuta-cho, Midori-ku, Yokohama 226-8502, Japan
	10:50		**COFFEE BREAK**

Session II: High-K dielectrics theory
Session chairs: R. Elliott

C-II.1	11:20	-INVITED-	TOWARDS THE DESIGN OF HIGH-K DIELECTRICS FROM *AB INITIO* CALCULATIONS **Wanda Andreoni**, IBM Zuerich, Switzerland
	12:00		**LUNCH BREAK**

Tuesday, May 25, 2004 Afternoon

Session III: High-k dielectrics I
Session chairs: D. Schmeißer

C-III.1 14:00

DIELECTRIC PROPERTIES OF NANOMETER-THICK INSULATING LAYERS: A REFLECTION ELECTRON ENERGY LOSS SPECTROSCOPY APPROACH

M. Gautier-Soyer(a), F. Paumier(a), M.J. Guittet(a), G. Tan(b), R.H. French(b,c), Y.M. Chiang(d), A. Ramos(d), M. Tang(d), S.Y. Chung(d), L. DeNoyer(e), (a)Service de Physique et de Chimie des Surfaces et des Interfaces, DSM-DRECAM-SPCSI, CEA Saclay, 91191 Gif sur Yvette Cedex, France, (b)Dept of Materials Science and Engineering, University of Pennsylvania, Philadelphia PA, USA, (c)Experimental Station, DuPont Corporation Central Research, Wilmington DE, USA, (d)Deconvolution and Entropy Consulting, Ithaca NY, USA, (e)Dept of Mat. Sci. and Engineering, Massachussets Institute of Technology, Cambridge MA, USA

C-III.2 14:20

EFFECTS OF NITRIDATION OF THE HIGH-K OXIDES IN MOSFETS: DENSITY FUNCTIONAL STUDIES

Jacob Gavartin(a), Adam Foster(b) and Alexander Shluger(a), (a)Department of Physics and Astronomy, University College London, Gower street, London WC1E 6BT, U.K., (b)Laboratory of Physics, Helsinki University of Technology, Finland

C-III.3 14:40

STOICHIOMETRY AND FERMI LEVEL PINNING AT Si:HIGH K OXIDE INTERFACES

J. Robertson, P. W. Peacock, Engineering Dept, Cambridge University, Cambridge CB2 1PZ, U.K.

C-III.4 15:00

INTERFACE STATES ENERGY DISTRIBUTION IN (100)SI/HFO2

Y.G. Fedorenko, L. Truong, V.V. Afanas’ev, A. Stesmans, Department of Physics, University of Leuven, Belgium

C-III.5 15:20

LONG-TIME STABILITY OF THIN Pr(x)O(y)-FILMS ON Si(100) GROWN BY PULSED LASER DEPOSITION

D. Wolfframm, M. Ratzke, M. Kappa and J. Reif, LS Experimentalphysik II, BTU Cottbus, and JointLab IHP/BTU, Universitaetsplatz 3-4, 03044 Cottbus, Germany

C-III.6 15:40

PROPERTIES OF ZrSixOy THIN FILMS PREPARED BY LASER ABLATION

M. Filipescu(a), N. Scarisoreanu(a), D.G. Matei(a), G. Dinescu(a), A. Ferrari(b), M. Balucani(b), M. Dinescu(a), (a)National Institute for Laser, Plasma and Radiation Physics, PO Box MG–16 Magurele, Bucharest 77125, Romania, (b)INFM, Unit E6, University "La Sapienza", Rome, Italy

16:00 **COFFEE BREAK**

Session IV: High-k dielectrics II
Session chairs: H. Iwai

C-IV.1 16:30

CHARACTERIZATION OF INTERFACE STATES IN AMORPHOUS La2Hf2O7 GATE DIELECTRIC

G. Vellianitis(a), A. Dimoulas(a), G. Apostolopoulos(a), G. Mavrou(a), J.C. Hooker(b), Z.M. Rittersma(b), (a)MBE Lab, Institute of Materials Science, NCSR "DEMOKRITOS", Athens, Greece, (b)Philips Research Leuven, Belgium

C-IV.2 16:50

INLUENCE OF THE ORDER-DISORDER TRANSITION IN Y2O3/SI THIN FILM ON THE INTERFACIAL REACTIONS

F. Paumier, R.J. Gaboriaud, F.P. Pailloux, Laboratoire de Métallurgie Physique, Université de Poitiers, CNRS-SP2MI, BP 30179, 86962 Chasseneuil-Futroscope cedex, France

C-IV.3 17:10

PR4F OCCUPANCY AND VB/CB BAND OFFSETS OF PR$_{2}$O$_{3}$ AT THE INTERFACE TO SI(001) AND SIC(0001) SURFACES

Dieter Schmeißer, Angewandte Physik - Sensorik, BTU Cottbus, Postfach 10 13 44, 03044 Cottbus, Germany, H.-J. Müssig, IHP, Im Technologiepark 25, 15236 Frankfurt (Oder), Germany

C-IV.4 17:30

SOLID STATE REACTION BETWEEN PR AND SIO2 STUDIED BY PHOTOELECTRON SPECTROSCOPY AND AB INITIO CALCULATIONS

D. Schmeißer, Angewandte Physik-Sensorik, BTU Cottbus, PF 10 13 44, 03013 Cottbus, Germany and G. Lupina, J. Dabrowski, H.-J. Müssig, IHP, Im Technologiepark 25, 15236 Frankfurt (Oder), Germany

C-IV.5 17:50

PHYSICAL AND ELECTRICAL CHARACTERIZATION OF POLYSILICON VS. TiN GATE ELECTRODES FOR HfO2 TRANSISTORS

Patrick S. Lysaght, Jeff J. Peterson, Brendan Foran, Chadwin Young, Gennadi Bersuker and Howard R. Huff, International SEMATECH, Materials Evaluation Test Structures, 2706 Montopolis Drive, Austin TX 78741-6499, USA

C-IV.6 18:10

APPLICATION OF Ru-BASED GATE MATERIALS FOR CMOS TECHNOLOGY

M. Tapajna, P. Pisecný, R. Luptak, K. Husekova, K. Frohlich, L. Harmatha, J. C. Hooker, F. Roozeboom, Institute of Electrical Engineering, SAS, Dubravska cesta 9, 841 04 Bratislava, Slovak Republic, Faculty of Electrical Engineering and Information Technology, STU, Ilkovicova 3, 812 19 Bratislava, Slovak Republic, Philips Research Leuven, Kapeldreef 75, 3001 Leuven, Belgium, Philips Research Eindhoven, WA 1, Prof. Holstlaan 4, 5656 AA Eindhoven, The Netherlands

Wednesday, May 26, 2004 Afternoon

Session V: Non-volatile memories I
Session chairs: A.J. Ikushima

C-V.1 14:00 -INVITED- NON-VOLATILE MEMORY TECHNOLOGIES: EMERGING CONCEPTS AND NEW MATERIALS
R. Bez, STMicroelectronics, Non-Volatile Memory Technology Development, Central R&D, Via C.Olivetti 2, 20041 Agrate Brianza (Milan), Italy

C-V.2 14:40 -INVITED- CURRENT EFFECTS IN MAGNETIC LAYER STRUCTURES
R. Elliott, Theoretical Physics, University of Oxford, 1 Keble Road, Oxford OX1 3NP, U.K.

15:20 **BREAK**

Session VI: Non-volatile memories II
Session chairs: L. Risch

C-VI.1 15:30 -INVITED- CHARGE TRAPPING MEMORIES FOR FUTURE HIGH DENSITY NON-VOLATILE MEMORY APPLICATIONS
M. Specht, Infineon Technologies AG, Corporate Research, Otto-Hahn-Ring 6, 81730 Munich, Germany

C-VI.2 16:10 EXPERIMENTAL EVIDENCE OF SI NANOCLUSTER DELTA-LAYER FORMATION IN BURIED AND THIN SIO2 FILMS BY ION IRRADIATION
Lars Röntzsch, Karl-Heinz Heinig, and Bernd Schmidt, Research Center Rossendorf, Dresden, Germany

C-VI.3 16:30 PARTIAL SELF-ORDERING MECHANISM IN Si QUANTUM DOTS FORMED BY CHEMICAL VAPOUR DEPOSITION: IMPACT ON THE THRESHOLD VOLTAGE DISTRIBUTION OF NANOCRYSTAL MEMORIES
R.A. Puglisi, G. Nicotra, S. Lombardo, C. Spinella, CNR-IMM, Sez. Catania, Str.le Primosole 50, 95121 Catania, Italy, C. Gerardi, STMicroelectronics, Str.le Primosole 50, 95121 Catania, Italy, L. Perniola, B. DeSalvo, CEA-LETI, 17 Av. Des Martyrs, 38054 Grenoble, France

16:50 **COFFEE BREAK**

17:00 **POSTER SESSION I**

C/P01-C/P13: Gate dielectrics and gate materials

C/P01 DEFECT CHARACTERIZATION OF ULTRATHIN OXIDE LAYER ON SILICON WAFERS BY LOW-PHOTOPERTURBED SCANNING CAPACITANCE SPECTROSCOPY
M.N. Chang, C.Y. Chen, National Nano Device Laboratories and J.J. Luo, C.Y. Kung, National Chung Hsing University, Taiwan

C/P02 PROPERTIES OF HIGH-K DIELECTRIC MATERIALS STUDIED BY CONDUCTING ATOMIC-FORCE MICROSCOPY
H. Wurmbauer, S. Kremmer, C. Teichert, Institute of Physics, University of Leoben, 8700 Leoben, Austria and G. Tallarida, Laboratorio MDM - INFM, 20041 Agrate Brianza, Milan, Italy

C/P03 LOW-TEMPERATURE AND HIGH-QUALITY RADICAL ASSISTED OXIDATION TECHNOLOGY FOR HIGH PERFORMANCE STRAINED SiGe/Si MOSFETS
Young-Joo Song, Bongki Mheen, Jin-Young Kang and Kyu-Hwan Shim, High-speed SoC Research Department, Electronics and Telecommunications Research Institute, Daejon, Korea

C/P04 ELECTRON STATES AT THE (100)Ge/HfO_2 INTERFACE
V.V. Afanas’ev, Ya. Fedorenko, A. Stesmans, Department of Physics, University of Leuven, Celestijnenlaan 200D, 3001 Leuven, Belgium

C/P05 INTERFACE STATES DENSITIES AND ELECTRICAL LOSSES IN La-Hf BASED HIGH-K DIELECTRICS ON SILICON
B. Mereu(a,b), A. Dimoulas(c), G. Vellianitis(c), G. Apostolopoulos(c), M. Alexe(a), (a)Max-Planck-Institut für Mikrostrukturphysik, 06120 Halle, Germany, (b)National Institute of Materials Physics, P.O. Box MG-7, Bucharest-Magurele 76900, Romania, (c)MBE Laboratory, Institute of Materials Science, National Center for Scientific Research "Demokritos", Agia Paraskevi, 15310 Athens, Greece

C/P06 DEPOSITION OF THIN TITANIUM DIOXIDE FILMS AND ITS KINETICS STUDY
M.L. Chen(a), Z.M. Wang(a), J.Y. Zhang(a), Q. Fang(b), Ian W. Boyd(b), (a)Structure Research Laboratory, University of Science and Technology of China, Hefei, Anhui, 230026, PR China, (b)Electronic and Electrical Engineering, University College London, Torringon Place, London WC1E 7JK,U.K.

C/P07 INFLUENCE OF THE DEPOSITION CONDITIONS ON THE PROPERTIES OF TITANIUM OXIDE PRODUCED BY RF MAGNETRON SPUTTERING

P. Barquinha, L. Pereira, E. Fortunato, R. Martins Departamento de Ciência dos Materiais, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa and CEMOP, Campus da Caparica, 2829-516 Caparica, Portugal

C/P08 FIRST INVESTIGATIONS OF MIM CAPACITORS USING Pr_2O_3 DIELECTRICS
Christian Wenger, Gunther Lippert, Hans-Joachim Muessig, Peter Zaumseil, Roland Sorge, Jaroslaw Dambrowski, IHP Microelectronics, Frankfurt (Oder), Germany

C/P09 A COMBINED SYNCHROTRON X-RAY DIFFRACTION AND STM STUDY OF THE STRUCTURAL PROPERTIES OF ULTRA-THIN PRASEODYMIUM OXIDE LAYERS ON Si(111)
Laure Libralesso, Thomas Schroeder, Tien Lin Lee, Isabelle Joumard and Jörg Zegenhagen, E.S.R.F., ID 32, 6 Rue Jules Horowitz, 38043 Grenoble, France, Christian Wenger, Peter Zaumseil and Hans-Joachim Müssig, IHP, Im Technologiepark 25, 15236 Frankfurt(Oder), Germany

C/P10 GROWTH OF LANTHANUM OXIDE FILMS FOR APPLICATION AS A GATE DIELECTRICS IN CMOS TECHNOLOGY
P. Pisecny, K. Husekova, K. Frohlich, L. Harmatha, J. Soltys, D. Machajdik, J.P. Espinos, Institute of Electrical Engineering, SAS, Dubravská cesta 9, 841 04 Bratislava, Slovak Republic, Faculty of Electrical Engineering and Information Technology, STU, Ilkovicova 3, 812 19 Bratislava, Slovak Republic, Instituto de Ciencia de Materiales de Sevilla, CSIC, Avda. Americo Vespucio s/n., 41092 Sevilla, Spain

C/P11 EFFECT OF MAGNETIC METAL CLUSTER DOPING ON DIELECTRIC PROPERTY ENHANCEMENT OF $LaAlO_3$ THIN FILMS PREPARED BY PULSED LASER DEPOSITION
H. Jiang, G.L. Yuan, X.Y. Qiu, J.-M. Liu, Laboratory of Solid State Microstructures, Nanjing University, Nanjing 210093, China

C/P12 DEVELOPMENT OF SOL-GEL MgO THIN FILMS FOR INSULATION ON SiC
Céline Bondoux, Philippe Prené, Philippe Belleville, François Guillet, Laboratoire Sol-Gel, CEA-Le Ripault, B.P. 16, 37260 Monts, France, Robert Jérisian, Laboratoire de Microélectronique de Puissance, université de Tours, STMicroelectronics, 16 rue Pierre et Marie Curie, B.P. 7155, 37071 Tours cedex 2, France

C/P13 PREPARATION OF SrRuO3 FILMS FOR ADVANCED CMOS METAL GATES
K. Frohlich, K. Husekova, D. Machajdik, R. Luptak, M. Tapajna, J.C. Hooker, F. Roozeboom, A.P. Kobzev, C. Wiemer, S. Ferrari, M. Fanciulli, C. Rossel, C. Cabral, Jr., Institute of Electrical Engineering, SAS, Dúbravská cesta 9, 841 04 Bratislava, Slovak Republic, Philips Research Leuven, Kapeldreef 75, 3001 Leuven, Belgium, Philips Research Eindhoven, WA 14, Prof. Holstlaan 4, 5656 AA Eindhoven, The Netherlands, Frank Laboratory of Neutron Physics, Joint Institute for Nuclear Research, Dubna, Russia, MDM – INFM, Via C. Olivetti 2, 20041 Agrate Brianza, Italy, IBM Research Laboratories, Zü;rich, Switzerland, IBM T.J. Watson Research Center, Yorktown Heights NY 10598, USA

C/P14-C/P24: Other front-end processes and materials

C/P14 OBSERVATION OF DISLOCATIONS IN STRAIN-RELAXED SILICON-GERMANIUM THIN FILMS WITH FLAT SURFACES GROWN ON ION-IMPLANTED SILICON SUBSTRATES
J. Yamanaka(a), K. Sawano(b), K. Suzuki(a), Y. Ozawa(c), K. Nakagawa(a), S. Koh(b), Y. Shiraki(b), T. Hattori(c), (a)University of Yamanashi, Miyamae-cho, Kofu 400-8511, Japan, (b)The University of Tokyo, Hongoh, Bunkyo-ku, Tokyo 113-8656, Japan, (c)Musashi Institute of Technology, Tamadutuni, Setagaya-ku, Tokyo 158-8557, Japan

C/P15 INFLUENCE OF ULTRASOUND ON MECHANICAL STRESSES RELAXATION IN Si_xGe_{1-x}/Si SYSTEM AT He^+ IONS IMPLANTATION
V.P. Kladko, V.P. Melnik, Ya.M. Olikh, V.G. Popov, B.N. Romanyuk, A.A. Evtukh, Institute of Semiconductor Physics, National Academy of Science of Ukraine, 45 prospect Nauki, 03028, Kiev, Ukraine

C/P16 FREE-CARRIER CONCENTRATION CONTROLLED BY NANOCLUSTERS IN PROTON-IMPLANTED SILICON
Kh.A. Abdullin, Yu.V. Gorelkinskii, B.N. Mukashev, A.S. Serikkanov Institute of Physics and Technology, Kazakhstan Ministry of Education and Science, 480082 Almaty, Kazakhstan

C/P17 THE STRUCTURES PREPARED BY IMPLANTATION OF SILICON WITH NITROGEN AND ANNEALING UNDER HIGH HYDROSTATIC PRESSURE
Andrzej Misiuk and Jacek Ratajczak, Institute of Electron Technology, Al. Lotnikow 46, 02-668 Warsaw, Poland, Barbara Surma and Grzegorz Gawlik, Institute of Electronic Materials Technology, Wolczynska 133, 01-919 Warsaw, Poland; Jadwiga Bak-Misiuk, Institute of Physics, PAS, Al. Lotnikow 32/46, 02-668 Warsaw, Poland

C/P18 PHOTOLUMINESCENCE STUDIES OF THE DEFECTS CREATED IN NITROGEN-DOPED SILICON DURING ANNEALING UNDER ENHANCED PRESSURE
Barbara Surma, Institute of Electronic Materials Technology, Wólczynska 133, 01-019 Warsaw, Poland, Andrzej Misiuk Institute of Electron Technology, Al. Lotników 46, 02-668 Warsaw, Poland, Artur Wnuk, Institute of Electronic Materials Technology Wólczynska 133, 01-919 Warsaw, Poland, Deren Yang, Zhejiang University, Stete Key Lab of Silicon Materials (ZJU), Zhe Da LA 38, Hangzhou 10027, China, Andrzej Bukowski, Institute of Electronic Materials Technology Wólczynska 133,1-919 Warsaw, Poland: Silicon CEMAT Wólczynska 133, 01-919 Warsaw, Poland

C/P19 STUDY OF THE EFFECT OF RAPID THERMAL ANNEALING ON THE INTERACTION BETWEEN A Cr THIN FILM AND Si MONOCRYSTALLINE
S. Bouzid, Laboratory of Thin Films and Interfaces, Faculty of Sciences, University of Constantine, Algeria, H. Benkherbeche, R. Mezouar, A. Merabet, Département d'Optique et de Mécanique de Précision, Université de Sétif, Algérie and R. Halimi, Laboratoire Couches Minces et Interfaces, Université Mentouri, 25000 Constantine, Agérie

C/P20 THE EFFECT OF SILICON ION IMPLANTATION ON THE STRUCTURE OF TANTALUM-SILICON CONTACTS

M. Peikert(a), R. Bhandari(a,b), E. Wieser(a), C. Wenzel(b), D. Lipp(b), H. Reuther(a), A. Mücklich(a), (a)Forschungszentrum Rossendorf, Institute of Ion Beam Physics and Materials Research, P.O.B. 510119, 01314 Dresden, Germany, (b)Technische Universität Dresden, Institute of Semiconductor and Microsystems Technology, 01062 Dresden, Germany

C/P21 EFFECT OF Sb+ IMPLANTATION ON COPPER SILICIDES FORMATION AND MORPHOLOGY AFTER ANNEALING OF Cu/Si STRUCTURES
M. Benkerri, Département de Physique, Université de Sétif, 19000 Sétif, Algérie, R. Halimi, A. Bouabellou, Laboratoire Couches Minces et Interfaces, Université Mentouri, 25000 Contantine, Algérie and N. Benouattas, Département de Physique, Université Ferhat Abbas, 19000 Sétif, Algérie

C/P22 HIGH STRAINED SiGe LAYER GROWN ON ULTRA-THIN SILICON-ON-INSULATOR SUBSTRATE
Zengfeng Di(a,b), Miao Zhang (a), Weili Liu (a), Chenglu Lin (a), and Paul K Chu (b), (a) The Research Center of Semiconductor Functional Film Engineering Technology & State Key Laboratory of Functional Materials for Informatics, Shanghai Institute of Microsystem and Information Technology (SIMIT), Chinese Academy of Sciences (CAS), Shanghai 200050, People's Republic of China, (b) Department of Physics and Material Science, City University of Hong Kong, Tat Chee Avenue, Kowloon, Hong Kong, China

C/P23 BORON SURFACTANT-ENHANCED GROWTH OF Si FILMS ON CaF_2/Si
C. R. Wang, B. H. Müller, M. Bierkandt, T.Wietler, E. Bugiel, K. R. Hofmann, Institut für Halbleiterbauelemente und Werkstoffe, Universität Hannover, Appelstr. 11A, 30167 Hannover, Germany and P. Zaumseil, IHP, Im Technologiepark 25, D-15236 Frankfurt (Oder), Germany

C/P24 ENHANCED MAGNETORESISTANCE RATIO and IMPROVED THERMAL STABILITY of SPECULAR SPIN VALVE with CAPPING LAYERS
S.Y. Yoon, D.H. Lee, D.H. Yoon and S.J. Suh, Advanced Materials and Process Research Center for IT, Sungkyunkwan University, 300 Chunchun–dong, Jangan-gu, Suwon, Gyunggi-do, 440-746, Korea

C/P25-C/P30: Back-end processes and materials

C/P25 ATOMIC LAYER CHEMICAL VAPOUR DEPOSITION OF COPPER
A. U. Mane and S. A. Shivashankar, Materials Research Centre, Indian Institute of Science, Bangalore 560012, India

C/P26 EVOLUTION UNDER ANNEALING OF STRUCTURAL PROPERTIES OF W-SI-N SPUTTERED DIFFUSION BARRIERS
A. Vomiero(a), E. Boscolo Marchi(b), S. Frabboni(c), R. Tonini(c), A. Quaranta(d), G. Della Mea(d), G. Mariotto(b), G. Ottaviani(c), (a)Dipartimento di Fisica, Università di Padova, Via Marzolo 8, 35131 Padova, Italy, (b)Dipartimento di Fisica, Università di Trento, Via Sommarive 14, 38050 Povo (TN), Italy, (c)Dipartimento di Fisica, Università di Modena e Reggio Emilia, Via Campi 213 a, 41100 Modena, Italy, (d)Dipartimento di Ingegneria dei Materiali e Tecnologie Industriali, Università di Trento, Via Mesiano 77, 38050 Trento, Italy

C/P27 VIBRATIONAL SPECTROSCOPY CHARACTERISATION OF LOW-DIELECTRIC CONSTANT Si-O-C:H FILMS PREPARED BY PECVD TECHNIQUE
G. Das(a), G. Mariotto(a), A. Quaranta(b), (a)INFM and Dipartimento di Fisica, Università di Trento, 38050 Povo (Trento), Italy, (b)Dipartimento di Ingegneria dei materiali e delle Tecnologie Industriali, Università di Trento, via Mesiano 77, 38050 Povo (TN), Italy

C/P28 MATERIAL MICROSTRUCTURAL INFLUENCE ON SPIRAL THIN FILM INDUCTORS
Kuang-Yuan Hsu, Chuan-Pu Liu, Department of Materials Science and Engineering, National Cheng Kung University, Tainan, Taiwan

C/P29 CHALCOGENIDE THIN FILMS FOR DIRECT RESISTORS FABRICATION AND TRIMMING
G. Lullo, A. Castiglia, G. Carini and C. Arnone, Dipartimento di Ingegneria Elettrica, Universita' di Palermo, Viale delle Scienze - Edif.9, 90128 Palermo, Italy

C/P30 CHEMICAL AND ELECTRICAL CHARACTERIZATIONS OF DEPOSITS ELABORATED BY FIB ASSISTED CVD
M. Prestigiacomo, F. Bedu, D. Tonneau, H. Dallaporta, S. Safarov, CRMC-N, CNRS UPR 7251, Case 901, 163 Avenue de Luminy, 13288 Marseille Cedex 9, France, A. Houël, L. Roussel, A. Gressier, P. Sudraud, ORSAY PHYSICS, Z.A. Saint Charles, Chemin des Michels, 13710 Fuveau, France

C/P31-C/P32: Plastic substrates

C/P31 STUDY ON CRYSTALLIZATION OF AMORPHOUS SILICON USING CEO2 SEED LAYER PATTERNED ON THE PLASTIC SUBSTRATE
Myung Suk Shim, Do Young Kim, Chang Ki Seo and Junsin Yi, Sungkyunkwan University, Korea

C/P32 STRESS-ASSISTED LATERAL GROWTH OF POLY-GERMANIUM FOR FABRICATION OF THIN-FILM TUNNELING TRANSISTORS ON FLEXIBLE PLASTIC SUBSTRATES
B. Hekmatshoar, D. Shahrjerdi, S. Mohajerzadeh and E. Asl Soleimani, Department of Electrical and Computer Engineering, Thin Film Laboratory, University of Tehran, Tehran, Iran

C/P33-C/P35: Devices

C/P33 LOW TEMPERATURE FABRICATION OF POLY-GERMANIUM TRANSISTORS SUITABLE FOR REALIZATION OF SIMPLE INVERTERS ON FLEXIBLE PET SUBSTRATES
D. Shahrjerdi(a), B. Hekmatshoar(a), S. Mohajerzadeh(a) and M.D. Robertson(b), (a)Thin-Film Laboratory, Department of Electrical and Computer Engineering, University of Tehran, Tehran, Iran, (b)Department of Physics, Acadia University, Wolfville, NS, B4P 2R6, Canada

C/P34 LOW LEAKAGE AND HIGH PERFORMANCE OF NMOSFET USING SiGe LAYER AS A DIFFUSION BARRIER
Bongki Mheen(a,b), Young-Joo Song(a), Jin-Young Kang(a), Songcheol Hong(b) and Kyu-Hwan Shim(a), (a)High-speed SoC Research Department, Electronics and Telecommunications Research Institute, 161 Kajeong-Dong, Yuseong-Gu, Daejeon, Republic of Korea, (b)Dept. of EECS, Korea Advanced Institute Science and Technology, Daejeon, Republic of Korea

C/P35 FABRICATION OF P-WELL RESONANT TUNNELING DIODE BASED ON SiGe/Si AND ITS DC PARAMETERS EXTRACTION
Yan Wang, Chenrong Xiong, Peiyi Chen, Zhiping Yu,Institute of Microelectronics, Tsinghua University, Beijing 100084, P.R.China

C/P36-C/P44: Optoelectronics

C/P36 PHOTOACTIVE HYBRID POLYMER FOR PHOTONIC WAVE GUIDE APPLICATION
Nguyen Thanh Huong(a), Tran Duc Quyen(a), Nguyen Tat Thanh(a), Nguyen Thanh Binh(a), Michel Dumont(b) and Le Quoc Minh(a), (a)Lab. Photochem and Optronics, Ins. Materials Science, NCST of Vienam, 18 Hoang Quoc Viet Hanoi, Vietnam, (b)Lab. de Photonique Quantique et Moleculaire, UMR 8537, CNRS, ENS, 94235 Cachan, France

C/P37 GROWTH AND OPTICAL PROPERTIES OF ZINC OXIDE THIN FILMS PREPARED BY PLASMA IMMERSION ION IMPLANTATION
Y.F. Mei, Ricky K.Y. Fu, G.G. Siu and Paul K. Chu, City University of Hong Kong, Kowloon, Hong Kong

C/P38 POLYCRYSTALLINE SILICON THIN FILMS MADE BY METAL INDUCED CRYSTALLIZATION FOR SOLAR CELL APPLICATION
Do Young Kim, Chang Ki Seo, Myung Suk Shim, Junsin Yin Sungkyunkwan University, Korea

C/P39 EFFECT OF PRESSURE ON SURFACE PASSIVATION OF SILICON SOLAR CELL BY FORMING GAS ANNEALING
Suresh Kumar Dhungel, Jinsu Yoo, Kyounghae Kim, D. Mangalraj, Junsin Yi, Sungkyunkwan University, Korea

C/P40 EXCLUSION of CHARGE CARRIERS in ELECTRONIC POLYCRYSTALLINE SILICON
H. Khlyap, State Pedagogical University, 24 Franko str., Drohobych 82100, Ukraine

C/P41 THE STUDY OF THE DENSITY OF LOCALISED GAP STATES IN AMORPHOUS SILICON MATERIAL USING SPACE CHARGE LIMITED CURRENTS TECHNIQUE
S. Guessasma(a),M. Chahdi(b), (a)LERMPS-UTBM, Belfort, France, (a)Semiconductor Characterization Laboratory, Batna University, Algeria

C/P42 GETTERING BY HEAT THERMAL PROCESSING: APPLICATION IN CRYSTALLINE SILICON SOLAR CELLS
N. Khehdher, A. Ben Gaballah, M. Hassen, M. Hajji, M.F. Boujmil, B. Bessaïs, H. Ezzaouia, R. Bennaceur, Tunisia

C/P43 OPTICAL CHARACTERIZATION OF β-FeSi2 LAYERS FORMED BY ION BEAM SYNTHESIS
R. Ayache, Pharmacy Department, University of Batna, Algeria, A. Bouabellou, Laboratoire des Couches Minces et Interfaces, Université de Constantine, Route de Ain El-Bey, Algeria, E. Richter, Forschungszentrum Rossendorf, Institut für Ionenstrahlphysik und Materialforschung.Postfach 510119, 01314 Dresden, Germany

C/P44 SYNTHESIS AND CHARACTERIZATION OF NEW OPAL BASED MATERIALS
F. Marquez and R. Roque-Malherbe, School of Science, Turabo University, PO Box 3030, Gurabo, PR, 00778-3030, USA

Thursday, May 27, 2004 Morning

Session VII: High-k dielectrics III
Session chairs: A.J. McKerrow

C-VII.1 08:30 -INVITED-
EPITAXIAL GATE DIELECTRICS: COMPLEX OXIDES TECHNOLOGY TO MEET SILICON'S FUTURE
J. Fompeyrine, G. Norga, C. Marchiori, A. Guiller, D. Halley, J.W. Seo, H. Siegwart, D. Caimi, D.J. Webb, C. Rossel, R. Germann and J.-P. Locquet, IBM Research Division, Zurich Lab, Saeumerstr. 4, 8803 Rueschlikon, Switzerland

C-VII.2 09:10
A GRAZING INCIDENCE X-RAY DIFFRACTION STUDY OF ULTRA-THIN PRASEODYMIUM OXIDE LAYERS ON Si(001): FROM PSEUDOMORPHISM TO BULK BEHAVIOUR
Thomas Schroeder, Tien Lin Lee, Laure Libralesso and Jörg Zegenhagen, E.S.R.F., Beamline ID 32, 6, Rue Jules Horowitz, 38043 Grenoble, France, Christian Wenger, Peter Zaumseil and H.-J. Müssig IHP, Im Technologiepark 25, 15236 Frankfurt (Oder), Germany

09:30 **BREAK**

Session VIII: Atomic layer growth
Session chairs: A. Paccagnella

C-VIII.1 09:40 -INVITED-
MOCVD BASED DEPOSITION TECHNOLOGIES FOR ATOMIC LEVEL GROWTH OF NEW MATERIALS AND THE CHALLENGES FOR THEIR INTRODUCTION INTO MAIN STREAM SEMICONDUCTOR DEVICES
M. Schumacher, P.K. Baumann, J. Lindner, T. McEntee, AIXTRON AG, Kackertstr 15-17, 52072 Aachen, Germany

C-VIII.2 10:20
INFLUENCE OF OXYGEN PRECURSORS (H2O or O3) ON THE PROPERTIES OF AS GROWN AND ANNEALED HfO2 FILMS GROWN BY ATOMIC LAYER DEPOSITION FROM HfCl4, Hf(mmp)4, AND Hf(OtBu)2(mmp)2
G. Scarel, C. Wiemer, S. Spiga, G. Tallarida, S. Baldovino, E. Bonera, S. Ferrari and M. Fanciulli Laboratorio MDM-INFM, Via C. Olivetti 2, 20041 Agrate Brianza (MI), Italy

10:40 **BREAK**

Session IX: Front End of Line I
Session chairs: M. Specht

C-IX.1 11:00 -INVITED-
UNDERSTANDING AND MODELLING BORON DEACTIVATION / ACTIVATION IN LOW-RESISTANCE ION-IMPLANTED ULTRASHALLOW JUNCTIONS
N.E.B. Cowern, B. Colombeau, A.J. Smith, K. Kirkby, Advanced Technology Institute, University of Surrey, Guildford GU2 7XH, U.K., B. Pawlak, R. Duffy, Philips Research Leuven, Kapeldreef 75, 2001 Leuven, Belgium, S.B. Felch, H. Graoui, A. Mayur, M.A. Foad, Front End Products, Applied Materials Inc., 974 E. Arques Avenue, Sunnyvale CA 94086, USA and N. Zographos, C. Zechner, ISE Integrated Systems Engineering, Balgriststrasse 102, 8008 Zürich, Switzerland

C-IX.2 11:40
TEMPERATURE SCALING FOR 35 NM GATE LENGTH HIGH-PERFORMANCE CMOS
Th. Feudel, M. Horstmann, M.G erhardt, M. Herden, L. Herrmann, D. Gehre, Ch. Krueger, D. Greenlaw and M. Raab, AMD Saxony LLC & Co. KG, Wilschdorfer Landstrasse 101, 01109 Dresden, Germany

12:00 **LUNCH**

Thursday, May 27, 2004 Afternoon

Session X: Front End of Line II
Session chairs: N.E.B. Cowern

C-X.1 14:00

DETECTION OF N INCORPORATION IN NM-THIN HFO2 LAYERS ON (100)Si BY ELECTRON SPIN RESONANCE

A. Stesmans and V. Afanas'ev, Department of Physics, University of Leuven, 3001 Leuven, Belgium and F. Chen and S.A. Campbell, Department of Electrical and Computer Engineering, University of Minnesota, Minneapolis, USA

C-X.2 14:20

COMPATIBILITY OF ORGANIC LAYERS GRAFTED ON SILICON WITH MICROELECTRONICS

A. Faucheux(a,b), J.-N. Chazalviel(a), F. Ozanam(a), (a)LPMC, CNRS-Ecole Polytechnique, 91128 Palaiseau Cedex, France, (b)STMicroelectronics, 850 rue Jean Monnet, 38926 Crolles Cedex, France

C-X.3 14:40

ULTRATHIN HfO2 GATE DIELECTRIC ON PARTIALLY STRAIN COMPENSATED SiGeC/Si HETEROSTRUCTURES

S.K. Ray, R. Mahapatra, S. Maikap and A. Dhar, Department of Physics & Meteorology IIT Kharagpur 721 302, India

C-X.4 15:00

MICROSTRUCTURE INVESTIGATION OF BaxSr1-xTiO3 THIN FILM GROWN ON POROUS SILICON SUBSTRATE

Weili Liu(a,c), Su Xing(a), J. Lian(b), Lumin Wang(b), Zhitang Song(a), Chenglu Lin(a) and Paul K. Chu(c), (a)Research Center of Semiconductor Functional Thin Film Engineering & Technology, State Key Laboratory of Functional Materials for Informatics, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, 200050 Shanghai, China, (b)Department of Nuclear Engineering and Radiological Sciences, College of Engineering, University of Michigan, Am Arbor MI 48109-2104, USA, (c)Department of Physics and Materials Science, City University of Hong Kong, 83 Tat Chee Avenue, Kowloon, Hong Kong

C-X.5 15:20

MOSFET DRAIN CURRENT REDUCTION UNDER FOWLER-NORDHEIM AND CHANNEL HOT CARRIER INJECTION BEFORE GATE OXIDE BREAKDOWN

S. Gerardin(a), A. Cester(a,b), A. Paccagnella(a,b), G. Ghidini(c), (a)DEI – Università di Padova, via Gradenigo 6B, 35131 Padova, Italy, (c)INFM, Sezione di Padova, via Marzolo 8, 35131 Padova, Italy, (c)ST Microelectronics, via Olivetti 2, 20041 Agrate Brianza, Italy

C-X.6 15:40

ANTICIPATION OF OXYNITRIDE ELECTRICAL THICKNESS BASED ON XPS MEASUREMENT

J. Bienacel(a), D. Barge(b), M. Bidaud(b), N. Emonet(a), D. Roy(a), I. Pouilloux(b), K. Barla(a), (a)ST Microelectronics, 850 rue Jean Monnet, 38926 Crolles, France, (b)Phillips R&D Crolles, 850 rue Jean Monnet, 38926 Crolles, France

16:00 **BREAK**

16:30 **POSTER SESSION II**

see poster session I Wednesday afternoon

Friday, May 28, 2004 Morning

Session XI: Back End of Line I
Session chairs: S. Deleonibus

C-XI.1 08:30 -INVITED- SELECTED CHALLENGES OF ADVANCED INTERCONNECT SYSTEMS
T. Gessner(a,b) and S.E. Schulz(a), TU Chemnitz, Center for Microtechnologies(a); FhG-IZM, Department Micro Devices and Equipment(b), Chemnitz, Germany

C-XI.2 09:10 METALORGANIC CHEMICAL VAPOR DEPOSITION OF SILVER THIN FILMS BY DIRECT LIQUID INJECTION SYSTEM FOR FUTURE INTERCONNECTS
L. Gao(a), P. Haerter(b), Ch. Linsmeier(c), J. Gstoettner(a), R. Emling(a), D. Schmitt-Landsiedel(a), (a)Institute for Technical Electronics, Technical University Munich, Munich, Germany, (b)Institute for Inorganic Chemistry, Technical University Munich, Munich, Germany, (c)Max-Planck-Institut für Plasmaphysik, EURATOM Association, Garching, Germany

09:30 **BREAK**

Session XII: Back End of Line II
Session chairs: G. Ghibaudo

C-XII.1 09:40 -INVITED- ANALYSES OF INTERFACIAL REACTIONS AT DIFFERENT LEVELS OF INTERCONNECTION
T. Laurila and J.K. Kivilahti, Lab. of Electronics Production Technology, Helsinki University of Technology, P.O. Box 3000, 02015 HUT, Finland

C-XII.2 10:20 MECHANICAL STRESS IN PECVD a-SiC:H: AGING AND PLASMA TREATMENTS EFFECTS
V. Jousseaume(a), N. Rochat(a), L. Favennec(b), O. Renault(a) and G. Passemard(b), (a)CEA-DRT - LETI/D2NT - CEA/GRE, 17 rue des Martyrs, 38054 Grenoble cedex 9, (b)STMicroelectronics, 850 rue Jean Monnet, 38920 Crolles, France

10:40 **BREAK**

Session XIII: Back End of Line III
Session chairs: M. Schumacher

C-XIII.1 11:00 -INVITED- LOW-K MATERIALS AS A SUBSTITUTE FOR TRADITIONAL BEOL DIELECTRICS
Andrew J. McKerrow, Silicon Technology Development, Texas Instruments Inc., Dallas TX 75243, USA

C-XIII.2 11:40 POROUS EXTREME LOW K (ELK) DIELECTRICS USING A PECVD POROGEN APPROACH
L. Favennec(a), V. Jousseaume(b), V. Rouessac(c), F. Fusalba(a), J. Durand(c)and G. Passemard(a), (a)STMicroelectronics 850 rue Jean Monnet, 38920 Crolles, France, (b)CEA/Leti 17 rue des Martyrs, 38054 Grenoble Cedex 9, France, (c) Institut Européen des Membranes /UM 2-CC047 Place Eugène Bataillon 34095 Montpellier Cedex 5, France

12:00 **LUNCH**

Friday, May 28, 2004 Afternoon

Session XIV: Materials challenges processes and materials II
Session chairs: T. Gessner

C-XIV.1 14:00

EXPANDING THERMAL PLASMA FOR LOW-K DIELECTRICS: ENGINEERING THE FILM CHEMISTRY BY MEANS OF SPECIFIC DISSOCIATION PATHS IN THE PLASMA
M. Creatore, W.M.M. Kessels, Y. Barrell, M.C.M. van de Sanden, Department of Applied Physics, Eindhoven University of Technology, Den Dolech 2, 5600 MB Eindhoven, The Netherlands

C-XIV.2 14:20

DEPTH PROFILED POROSITY AND MICRO-STRUCTURE EVOLUTION STUDIED BY POSITRON ANNIHILATION AND RAMAN SPECTROSCOPY IN SIOCH LOW-K FILMS
C. Macchi, G. Mariotto, A. Zecca, M. Bettonte and R.S. Brusa, Dipartimento di Fisica, Università di Trento and INFM, 38050 Povo (TN), Italy

C-XIV.3 14:40

NITROREN DOPED SILICON: PROSPECTS FOR PERFECT MATERIAL DESIGN
V.G. Litovchenko, A.A. Efremov, A.V. Sarikov, Institute of Semiconductor Physics, 45 Nauki av., Kiev 03028, Ukraine and H. Richter, IHP/BTU Joint Lab, Universitatsplatz 3-4, 03044 Cottbus, Germany

C-XIV.4 15:00

SIMULTANEOUS OPTICAL MEASUREMENT OF GE CONTENT AND BORON DOPING IN STRAINED EPITAXIAL SIGE FILMS USING A NOVEL DATA-ANALYSIS TECHNIQUE
S.J. Morris and P. Fougeres, Therma-Wave Inc., 1250 Reliance Way, Fremont CA94539, USA, S. Bozzo-Escoubas, Laboratoire TECSEN, FST de St Jérôme, 13397 Marseille, France and S. Gaillard, Atmel Fab 7, Z.I. de Rousset, 13106 Rousset, France

C-XIV.5 15:20

ENABLING SOI INSPECTION FOR THE 65NM TECHNOLOGY NODE AND BEYOND
Wayne McMillan, Surfscan Division, KLA-Tencor, USA

C-XIV.6 15:40

DESIGN, FABRICATION AND OPTICAL CHARACTERIZATION OF THIN 2-DIMENSIONAL Si3N4 WAVEGUIDES
N. Daldosso, M. Melchiorri, F. Riboli, F. Sbrana, L. Pavesi, INFM and Department of Physics, Università di Trento, Via Sommarive 14, 38050 Povo (Trento), Italy, G. Pucker, C. Kompocholis, M. Crivellari, P. Bellutti, A. Lui, Istituto Trentino di Cultura, Centro per la Ricerca Scientifica e Tecnologica, Microsystem Division, Via Sommarive 18, 38050 Povo (Trento), Italy