Strasbourg (France)

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

SYMPOSIUM B

Materials science issues in advanced CMOS source-drain engineering

Symposium Organizers:

Giovanni Mannino, CNR-IMM, Catania, Italy

Thomas Feudel, AMD Saxony LLC & Co. KG, Dresden, Germany

Peter Pichler, Fraunhofer IISB, Erlangen, Germany

Marco Servidori, CNR-IMM, Bologna, Italy

Papers will be published in **Materials Science and Engineering B**

E-MRS 2004 SPRING MEETING

SYMPOSIUM B

Tuesday, May 25, 2004 Morning

08:50 WELCOME **G. Mannino** (CNR-IMM Catania, Italy)

Session I: Future trends in electronics
Session chair: G. Mannino (CNR-IMM Catania, Italy)

B-I.1 09:10 -Invited- AMBIENT INTELLIGENCE : ENABLING PROCESS TECHNOLOGY
C. J. van der Poel, Philips Research Leuven, Belgium

B-I.2 09:50 -Invited- SUB-50NM GATE LENGTH SOI TRANSISTOR DEVELOPMENT FOR HIGH PERFORMANCE MICROPROCESSORS
M. Horstmann, T. Feudel, A. Wei, M. Gerhardt, K. Frohberg, C. Schwan, M. Lenski, R. Stephan, K. Wieczorek, G. Burbach, A. Sultan, J. Cheek, D. Greenlaw and M. Raab; AMD Saxony LLC & Co. KG, Dresden, Germany

10:30 **BREAK**

Session II: Advanced devices
Session chair: P. Pichler (IISB-FHG, Germany)

B-II.1 10:50 -Invited- NEW PHYSICS MECHANISMS ENABLED BY ADVANCED SOI CMOS ENGINEERING
S. Cristoloveanu, IMEP (UMR CNRS, INPG & UJF), Grenoble, France

B-II.2 11:30 OPTIMIZATION AND UNDERSTANDING OF THRESHOLD VOLTAGE ROLL-OFF BEHAVIOR OF 65-nm TECHNOLOGY NODE nMOS AND pMOS BULK AND SOI MISFETs
A. Erlebach(a), A. Schenk(b), T. Feudel(c) and C. Zechner (a); (a) ISE AG, Zurich, Switzerland, (b) ETH Zurich, Switzerland, (c) AMD Saxony LLC and Co. KG, Dresden, Germany

B-II.3 11:50 DAMAGE AND RECOVERY IN DOPED SOI LAYERS AFTER HIGH ENERGY IMPLANTATION
M. Ferri, S. Solmi, A. Armigliato, M. Bianconi, G. Lulli and D. Nobili; CNR-IMM Bologna, Italy

B-II.4 12:30 FORMATION OF ULTRA-SHALLOW P+/N JUNCTIONS IN SILICON-ON-INSULATOR (SOI) SUBSTRATE USING LASER ANNEALING
K. K. Ong(a), K. L. Pey(a), P. S. Lee(b), K. L. Yeo (c), A. T. S. Wee, (c), Y. F. Chong(d) and X. C. Wang(e); (a) School of EEE, Nanyang Technology University, Singapore, (b) School of Materials Engineering, Nanyang Technological University, Singapore (c) Department of Physics, National University of Singapore, Singapore (d) Chartered Semiconductor Manufacturing Ltd, Singapore (e) Singapore Institute of Manufacturing Technology, Singapore

B-II.5 12:30 SOURCE-DRAIN ENGINEERING CHALLENGES IN FINFET DEVICE FABRICATION
D. Pham(a), H.-J. Li(b), B. Nguyen, G. Gebara, D. Larison, B. Sassman, B. Foran and L. Larson, International SEMATECH Austin TX U. S. A., (a) Motorola Assignee, (b) Infineon Assignee

12:50 **LUNCH**

Tuesday, May 25, 2004 Afternoon

Session III: Silicides I
Session chair: T. Metzger (ESRF, France)

B-III.1 14:10 -Invited- NI-BASED SILICIDES FOR 45 NM CMOS AND BEYOND
A. Lauwers(a), J. A. Kittl(b), M. Van Dal(c), O. Chamirian(a), M. A. Pawlak(a), M. de Potter(a), R. Lindsay(a), X. Pages(d) and K. Maex(a); (a) IMEC, Leuven, Belgium, (b) Affiliate researcher at IMEC from Texas Instruments, (c) Philips Research Leuven, Belgium, (d) ASM Belgium, IMEC

B-III.2 14:50 THIN NICKEL SILICIDE LAYER FORMATION ON SILICON ON INSULATOR (SOI) MATERIAL
A. Alberti(a), B. Cafra(a), G. Mannino(a), M. Servidori(b), T. Kammler(c) and T. Feudel(c); (a) CNR-IMM Catania, Italy, (b) CNR-IMM Bologna, Italy, (c) AMD Saxony LLC & Co. KG, Dresden, Germany

B-III.3 15:10 THE STUDY OF THERMAL STABILITY OF Ni(Si1-xGex) FILM WITH THE Ge CONTENTS
J.-S. Kim(a), D. Lee(a), K. Do(a), D.-H. Ko(a), J.-H. Ku(b), S. Choi(b) and C.-W. Yang(c); (a) Yonsei Univ. Dept. of Ceramic Engineering, Seoul, Korea, (b) Process Development Team, Semiconductor R&D Division, Samsung Electronics Ltd. Korea, (c) Sungkyunkwan Univ. School of Metallurgical and Materials Engineering, Suwon, Korea

B-III.4 15:30 NICKEL SILICIDES IN SEMICONDUCTOR PROCESSING: THERMAL BUDGET CONSIDERATIONS
S. Ramamurthy(a), B. Ramachandran(a), A. Hunter(a), R. Thompson(b) and C. B. Carter(b); (a) Front End Products Group, Applied Materials Inc., Sunnyvale CA, U. S. A., (b) Department of Chemical Engineering & Materials Science, University of Minnesota, Minneapolis MN, U. S. A.

15:50 **BREAK**

16:10 POSTER SESSION I

B/PI.01 AUGER AND XPS CHARACTERIZATION OF A MULTI LAYERED Ti-Co-Si SYSTEM FOR SELF ALIGNED SILICIDES PURPOSES: A STOICHIOMETRY AND CHEMICAL INVESTIGATION
S. G. Alberici, A. Giussani and E. Ravizza, STMicroelectronics, Physics and Material Characterization Lab., Central R&D Division, Agrate Brianza, Italy

B/PI.02 STUDY OF THE COSI2 DEFECTS INDUCED BY 300MM SOFT SPUTTER ETCH PROCESS BEFORE COBALT DEPOSITION
A. Humbert(a), C. Regnier(b) and G. Braeckelmann(c); (a) Crolles2 Alliance –Philips, (b) Crolles2 Alliance –ST Microelectronics, (c) Crolles2 Alliance –Motorola, Crolles, France

B/PI.03 THE EFECT OF THE RAPID THERMAL ANNEALING ON THE INTERDIFFUSION AND THE REACTION AT THE INTERFACE OF THE BINARY SYSTEME Cr/Si
A. Merabet and R. Mezouar, Laboratoire Physique et Mécanique des Matériaux Métalliques, Faculté des Sciences de l'Ingénieur, Université de Sétif, Algérie

B/PI.04 ELECTRICAL CHARACTERIZATION OF TiSi/Si-Ge-C SCHOTTKY DIODES
A. R. Saha(a), S. Chattopadhyay(b) and C. K. Maiti(a); (a) Department of Electronics & ECE, IIT Kharagpur, India, (b) School of Electrical, Electronics and Computer Eng., Univ. of New Castle upon Tyne, U. K.

B/PI.05 THERMAL STABILITY OF NICKEL GERMANOSILICIDE ON ION-IMPLANTED SI0.8GE0.2
T.-H. Yang(a), E. Y. Chang(a), S.-L. Hsu(b), T.-Y. Yang(c), G.-L. Luo(d), H.-C. Tseng(e) and C.-Y. Chang(a); (a) Department of Materials Science and Engineering, National Chiao Tung University, Hsinchu, Taiwan, R. O. C., (b) National Nano Device Laboratories, Hsinchu, Taiwan, R. O. C., (c) Department of Materials Engineering, Tatung University, Taipei, Taiwan, R. O. C., (d) Microelectronics and Information Systems Research Center, Hsinchu, Taiwan, R. O. C., (e) United Microelectronics Corporation, Hsinchu, Taiwan, R. O. C.

B/PI.06 TUNGSTEN SILICIDE CONTACTS TO POLYCRYSTALLINE SILICON AND SILICON-GERMANIUM ALLOYS
G. Srinivasan, M. F. Bain, S. Bhattacharyya, P. Baine, B. M. Armstrong, H. S. Gamble and D. W. McNeill, Northern Ireland Semiconductor Research Centre, Queen's University, School of Electrical and Electronic Engineering, Belfast, U. K.

B/PI.07 THERMAL STABILITY OF NICKEL SILICIDE ON SILICON ON INSULATOR (SOI) MATERIAL
B. Cafra(a), A. Alberti(a), L. Ottaviano(a), C. Bongiorno(a), G. Mannino(a), T. Kammler(b) and T. Feudel(b); (b) CNR-IMM Catania, Italy, (b) AMD Saxony LLC & Co. KG, Dresden, Germany

B/PI.08 TIME RESOLVED COSI2 REACTION IN PRESENCE OF TI AND TIN CAP LAYERS
A. Alberti(a), R. Fronterré(a,b), F. La Via (a) and E. Rimini(b); (a) CNR-IMM Catania, Italy, (b) Dipartimento di Fisica e Astronomia dell'Università di Catania, Italy

B/PI.09 STRUCTURAL CHARACTERISATION OF NICKEL SILICIDE PERFORMED BY TWO-DIMENSIONAL X-RAY MICRODIFFRACTION
P. Colombi(a), E. Bontempi(a), U. M. Meotto(b), S. Porro(b), G. Richieri(c), L. Merlin(c) and L. E. Depero(a); (a) INSTM and Dipartimento di Ingegneria Meccanica, Università di Brescia, Italy, (b) INFM-Dipartimento di Fisica, Politecnico di Torino, Italy, (c) IRCI-International Rectifier Corporation Italia, Borgaro Torinese, Italy

B/PI.10 CARACTERIZATION OF PTSI SILICIDE FOR A SOI SELF ALIGNED MOSFET NANO-TRANSISTOR
M. Derras(a,b) and A. Kadoun(b); (a) Faculté d'Electronique et d'Informatique - USTHB, Alger, Algeria, (b) Université Djillali Liabès de Sidi Bel Abbès, Algeria

B/PI.11 THE STUDY OF MICROSTRUCTURE OF NiSi FORMED BY Ni1-xTax(x=0.05, 0.1, 0.15 and 0.2) ALLOY
D. Lee(a), K. Do(a), D.-H. Ko(a), S. Choi(b), J.-H. Ku(b) and C.-W. Yang(c); (a) Yonsei Univ., Dept. of Ceramic Engineering, Seoul, Korea, (b) Process Development Team, Semiconductor R&D Division, Samsung Electronics Ltd. Korea, (c) Sungkyunkwan Univ. School of Metallurgical and Materials Engineering, Suwon, Korea

B/PI.12 EFFECT OF P+ IONS ON THE MICROSTRUCTURE AND THE NATURE OF THE FORMED SILICIDE IN THE Cr/Si SYSTEM
K. Mirouh(a), A. Bouabellou(a), R. Halimi(a), A. Karaali(a), A. Mosser(b) and G. Ehret(b); (a) Département de Physique Laboratoire des Couches Minces et Interfaces, Campus Chaab Errassas, Université Mentouri de Constantine, Algeria, (b) IPCMS-GSI, Strasbourg, France

B/PI.13 GRAIN SIZE AND ORIENTATION IN TERNARY Co(1-x)Ni(x)Si2 THIN FILMS ON Si(100): INFLUENCE OF THE Ni CONTENT
D. Smeets(a), C. Drijbooms(b), H. Bender(b) and A. Vantomme(a); (a) Instituut voor Kern- en stralingsfyscia, KU Leuven, Belgium, (b) IMEC, Leuven, Belgium

B/PI.14 INDIUM DIFFUSION PROFILES IN THIN SIMOX SILICON-ON-INSULATOR
P. Chen(a), Z. H. An(b), M. Zhu(a,b), R. K. Y. Fu(a) and P. K. Chu(a); (a) Department of Physics and Materials Science, City University of Hong Kong, China, (b) Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China

B/PI.15 STUDIES ON Al2O3-ZrO2 HIGH K GATE DIELECTRICS ON SILICON-ON-INSULATOR
C. Lin(a), M. Zhu(a,b), W. Liu (a) and P. K. Chu (b); (a) Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, Shanghai, China, (b) Department of Physics and Materials Science, City University of Hong Kong, China

B/PI.16 SiGe-ON-INSULATOR MATERIAL FABRICATION BY OXYGEN IMPLANTATION INTO SiGe/Si HETEROSTRUCTURE AND NOVEL TWO-STEP ANNEALING
M. Zhang(a), Z. An(a), C. Lin(a) and P. K. Chu(b); (a) The Research Center of Semiconductor Functional Film Engineering Technology, Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Sciences, China, (b) Department of Physics and Material Science, City University of Hong Kong, China

B/PI.17 ELECTRICAL ACTIVATION OF B AND AS IMPLANTS IN SILICON ON INSULATOR (SOI) WAFERS
L. Ottaviano(a), G. Mannino(a), V. Privitera(a), M. Herden(b) and T. Feudel(b); (a) CNR-IMM Catania, Italy, (b)AMD Saxony LLC & Co. KG, Dresden, Germany

B/PI.18 INVESTIGATION OF LOCAL STRESS FIELDS IN SI LINES ON SOI SUBSTRATE: FINITE ELEMENT MODELLING AND HIGH RESOLUTION X-RAY DIFFRACTION
A. Loubens(a,b), B. Charlet(c), O. Thomas(a) and R. Fortunier(b); (a) TECSEN UMR CNRS 6122, (b) Ecole Nationale Supérieure des Mines de Saint Etienne, centre SMS, (c) CEA LETI, France

B/PI.19 SIMULATION OF SUPPRESSION OF FLOATING-BODY EFFECT IN PARTIALLY-DEPLETED SOI MOSFET USING A Si(1-x)Ge(x) SOURCE STRUCTURE
M. Zhu(a,b), P. Chen(a), R. K. Y. Fu(a), W. Liu(b), C. Lin(b) and P. K. Chu(a); (a) Department of Physics and Materials Science, City University of Hong Kong, China, (b) State Key Laboratory of Functional Materials for Informatics, Shanghai Institute of Microsystems and Information Technology, Chinese Academy of Sciences, China

B/PI.20 A NEW MODEL OF THE EFFECTIVE MOBILITY IN MOS TRANSISTORS OPERATED FROM HELIUM TO ROOM TEMPERATURE
R. Rmaily and K. Rais, Université Chouaib Doukkali, Morroco

B/PI.21 DEFECT STRUCTURE OF NEAR –SURFACE LAYER OF CdHgTe CRYSTALS AFTER LAW –ENERGY AR IONS MILLING.
L. Dumanski(a), I. Stefaniuk(a), I. S. Virt(a,c) and M. Kuzma(a); (a) Insitute of Physics,University of Rzeszow, Poland, (b) Section of Experimental Physics, Pedagogical University, Drogobych, Ukraine, (c) Insitute of Biotechnology, University of Rzeszow, Poland

B/PI.22 CHARACTERISATION OF SILICON CARBIDE THIN FILMS GROWN ON Si AND SiO2/Si SUBSTRATES
M. Gelfi(a), E. Bontempi(a), R. Roberti(a), C. Ricciardi(b), G. Barucca(c), L. E. Depero(a) and P.Zanola (a); (a) INSTM and Dipartimento di Ingegneria Meccanica, Università di Brescia, Italy, (b) INFM-Dipartimento di Fisica, Politecnico di Torino, Italy, (c) INFM and Dipartimento di Scienze dei Materiali, Università di Ancona, Italy

B/PI.23 PHYSICALL MODELING OF FERMI-LEVEL EFFECTS FOR DECANANO DEVICE PROCESS SIMULATIONS
P. Castrillo, I. Martin-Bragado, R. Pinacho, M. Jaraiz, J. E. Rubio and J. Barbolla, Dpt. of Electronics, University of Valladolid, Spain

B/PI.24 NEW RESIST CHARACTERISATION: STABILITY TO MB SEMI F21-95 CONTAMINANTS
T. Curro(b), F. Cordiano(b), G. Franco(b), G. Mondio(a) and G. Ippedico(b); (a) Dipartimento di Fisica Sez. Fisica della Materia, Università di Messina, Italy, (b) STMicroelectronics, Catania, Italy

Wednesday, May 26, 2004 Afternoon

Session IV: Silicides II
Session chair: T. Clarysse (IMEC, Belgium)

B-IV.1 14:10 -Invited-
FORMATION OF ERBIUM SILICIDE AS SOURCE AND DRAIN FOR DECANANOMETER-SCALE N-TYPE SCHOTTKY BARRIER MOSFETS
M. Jang, Y. Kim, J. Shin and **S. Lee**, Nano-electronic Device Team, Semiconductor and Basic Research Laboratory, Electronics and Telecommunications Research Institute, Daejeon, Korea

B-IV.2 14:50
OPTIMIZING THE FORMATION OF NICKEL SILICIDE
J. Foggiato(a), W. S. Yoo(a), T. Murakami(b) and T. Fukada(b); (a) WaferMasters, Inc., San Jose CA, U. S. A., (b) WaferMasters Service Factory, Kumamoto, Japan

B-IV.3 15:10
NANOMETER SCALE CHARACTERISATION OF CoSi2 AND NiSi INDUCED STRAIN IN SILICON BY CONVERGENT BEAM ELECTRON DIFFRACTION
A. Benedetti, H. Bender, C. Torregiani, M. Van Dal and K. Maex; IMEC, Leuven, Belgium

B-IV.4 15:30
EXPLORING Ni-Si THIN-FILM REACTIONS BY MEANS OF SIMULTANEOUS SYNCHROTRON X-RAYS DIFFRACTION AND SUBSTRATE CURVATURE MEASUREMENTS
C. Rivero(a), P. Gergaud(a), M. Gailhanou(b), B. Froment(b) and O. Thomas(a); (a) TECSEN, Univ. Aix-Marseille III, France, (b) LURE, Univ. Paris Sud, Orsay, France

15:50 **BREAK**

Session V: Laser annealing
Session chair: T. Feudel (AMD, Germany)

B-V.1 16:10 -Invited-
THE EUROPEAN ANSWER TO THE INTEGRATION ISSUES OF EXCIMER LASER ANNEALING IN MOS TECHNOLOGY
V. Privitera(a), A. La Magna(a), G. Fortunato(b), M. Camalleri(c), A. Magrì(c), F. Simon(d) and B. G. Svensson(e); (a) CNR-IMM, Catania, Italy, (b) CNR-IFN, Roma, Italy, STMicroelectronics, Catania, Italy, (d) MicroLas Lasersystem, Gottingen, Germany, (e)Department of Physics, University of Oslo, Norway

B-V.2 16:50
REAL-TIME MODELING OF EXCIMER LASER ANNEALING OF ULTRA-SHALLOW DOPING
J.-Y. Degorce, J.-N. Gillet, Y. Liao and M. Meunier; Laser processing Laboratory, Ecole Polytechnique de Montreal, Canada

B-V.3 17:10
COMPUTATIONAL METHODS FOR THE SIMULATION OF THE EXCIMER LASER ANNEALING IN MOS TECHNOLOGY
A. La Magna(a), P. Alippi(a), V. Privitera(a), G. Fortunato(b), L. Mariucci(b) and M. Camalleri(c); (a) CNR-IMM, Catania, Italy, (b) CNR-IFN, Roma, Italy, (c) STMicroelectronics, Catania, Italy

B-V.4 17:30
LASER THERMAL PROCESSING USING AN OPTICAL COATING FOR ULTRA SHALLOW JUNCTION FORMATION
M. Hernandez(a), J. Venturini(a), G. Kerrien(b), T. Sarnet(b), D. Débarre(b), J. Boulmer(b), C. Laviron(c), D. Camel(c), J.-L. Santailler(c) and H. Akhouayri(d); (a) SOPRA, Bois Colombes, France, (b) IEF, Université Paris-Sud, Orsay, France, (c) CEA-G/LETI, Grenoble, France, (d) Institut Fresnel, Marseille, France

B-V.5 17:50
SURFACE MORPHOLOGIES OF EXCIMER-LASER ANNEALED BF2+ IMPLANTED Si DIODES
A. Burtsev(a), L. K. Nanver(a), A. van Veen(b), H. Schut(b), J. Slabbekoorn(a) and T. L. M. Scholtes(a); (a) Laboratory of Electronic Components, Technology and Materials (ECTM), Delft Institute of Microelectronics and Submicron Technology (DIMES), Delft University of Technology, The Netherlands, (b) Interfaculty Reactor Institute (IRI), Delft University of Technology, The Netherlands

B-V.6 18:10
BORON-ENHANCED DIFFUSION IN EXCIMER LASER ANNEALED Si
E. V. Monakhov(a), B. G. Svensson(a), M. K. Linnarsson(b), A. La Magna(c), C. Spinella(c), C. Bongiorno(c), V. Privitera(c), G. Fortunato(d) and L. Mariucci(d); (a) Department of Physics, Physical Electronics, University of Oslo, Norway, (b) Solid State Electronics, Royal Institute of Technology, Stockholm, Sweden, (c) CNR-IMM, Catania, Italy, (d) CNR-IFN, Roma, Italy

Thursday, May 27, 2004 Morning

Session VI: Silicon processing I
Session chair: V. Privitera (CNR-IMM Catania, Italy)

B-VI.1 08:30 -Invited- ADVANCED FRONT-END PROCESSES FOR THE 45 NM CMOS TECHNOLOGY NODE
E. J. H. Collart(a), S. B. Felch(a), H. Graoui(a), S. Tallavarjula(a), R. Lindsay(b), B. J. Pawlak(c), J. A. Van den Berg(d), N. E. B. Cowern(e) and K. J. Kirkby(e); (a) Front End Products Group, Applied Materials Inc., Sunnyvale CA, U. S. A., (b)IMEC, Leuven, Belgium, (c) Philips Research Leuven, Leuven, Belgium, (d) Joule Physics Laboratory, School of Sciences, University of Salford, U. K., (e) Advanced technology Institute, School of Electronics and Physical Sciences, University of Surrey, U. K.

B-VI.2 09:10 NITROGEN INTERACTION WITH VACANCIES IN SILICON
V. V. Voronkov(a) and R. Falster(b); (a) MEMC Electronic Materials, Merano, Italy, (b) MEMC Electronic Materials, Novara, Italy

B-VI.3 09:30 INDIUM DIFFUSION AND ACTIVATION IN SILICON: EXPERIMENTS AND THEORETICAL INVESTIGATIONS.
P. Alippi, S. Scalese, A. La Magna and V. Privitera, CNR-IMM Catania, Italy

B-VI.4 09:50 THEORY OF NATIVE-DEFECT ASSISTED DIFFUSION OF THE B, Al, Ga, AND In ACCEPTORS IN SILICON
G. Lopez(a), C. Melis(a), P. Schirra(a), P. Alippi(b) and V. Fiorentini(a); (a) Dept. of Physics, University of Cagliari, Italy, (b) IMM-CNR, Catania, Italy

B-VI.5 10:10 COMPREHENSIVE, PHYSICALLY BASED MODELLING OF As IN Si
R. Pinacho, M. Jaraiz, P. Castrillo, J. E. Rubio, I. Martin-Bragado and J. Barbolla, Dpt. of Electronics, University of Valladolid, Spain

10:30 **BREAK**

Session VII: Silicon processing II
Session chair: J. Van den Berg (University of Salford, U.K.)

B-VII.1 10:50 -Invited- MAINSTREAM RAPID THERMAL PROCESSING FOR SOURCE DRAIN ENGINEERING FROM FIRST APPLICATIONS TO LATEST RESULTS
J. Niess, S. Paul, S. Buschbaum and W. Lerch; Mattson Thermal Products GmbH, Dornstadt, Germany

B-VII.2 11:30 PHYSICALLY BASED MODELLING OF DAMAGE, AMORPHIZATION, AND RECRYSTALLIZATION FOR PREDICTIVE DEVICE-SIZE PROCESS SIMULATION
J. E. Rubio, M. Jaraiz, I. Martin-Bragado, R. Pinacho, P. Castrillo and J. Barbolla, Dept. of Electronics, University of Valladolid, Spain

B-VII.3 11:50 MODELING AND CHARACTERIZATION OF ATOMICALLY SHARP "PERFECT" Ge/SiO2 INTERFACES
W. Windl(a), T. Liang(a), S. Lopatin(b) and G. Duscher(b,c); (a) The Ohio State University, Columbus OH, U. S. A., (b) North Carolina State University, Raleigh NC, U. S. A., (c) Oak Ridge National Laboratory, Oak Ridge TN, U. S. A.

B-VII.4 12:10 PHASE FIELD MODEL FOR THE DOPANT REDISTRIBUTION DURING SOLID PHASE EPITAXIAL REGROWTH OF AMORPHIZED SILICON
C. Zechner, D. Matveev and A. Erlebach, ISE Integrated Systems Engineering AG, Zurich, Switzerland

B-VII.5 12:30 MECHANISMS OF BORON-INTERSTITIAL-CLUSTERS FORMATION AND DISSOLUTION AT HIGH B CONCENTRATION
D. De Salvador(a), S. Mirabella(b), E. Napolitani(a), G. Bisognin(a), L. Aldegheri(a), E. Bruno(b), G. Impellizzeri(b), A. V. Drigo(a), M. Berti(a), A. Carnera(a) and F. Priolo(b); (a) INFM and Dipartimento di Fisica, Università di Padova, Italy, (b) MATIS - INFM and Dipartimento di Fisica e Astronomia, Università di Catania, Italy

12:50 **LUNCH**

Thursday, May 27, 2004 Afternoon

Session VIII: Ultra shallow junctions
Session chair: F. Priolo (Università di Catania, Italy)

B-VIII.1 14:10 -Invited- ACCURATE ELECTRICAL ACTIVATION CHARACTERIZATION OF CMOS ULTRA-SHALLOW PROFILES
T. Clarysse(a), F. Dortu(a), R. Loo(a), W. Vandervorst(a,b), B. J. Pawlak (c) and C. Defranoux(d); (a) IMEC, Leuven, Belgium, (b) KU Leuven, Electrical Engineering Dept., INSYS, Leuven, Belgium, (c) Philips Research Leuven, Leuven, Belgium, (d) SOPRA, Bois-Colombes, France

B-VIII.2 14:50 THERMAL STABILITY OF BORON ELECTRICAL ACTIVATION IN PRE-AMORPHISED ULTRA-SHALLOW JUNCTIONS
F. Cristiano(a), N. Cherkashin(a), P. Calvo(a), Y. Lamrani(a), X. Hebras(a), A. Claverie(a) and W. Lerch(b) and S. Paul(b); (a) Pôle Implantation Ionique CEMES/LAAS-CNRS, Toulouse, France, (b) Mattson Thermal Products, Dornstadt, Germany

B-VIII.3 15:10 APPLICATION OF SELECTIVE EPITAXY FOR FORMING OF ULTRA SHALLOW SiGe-BASED JUNCTION
H. Radamson, Royal Institute of Technology (KTH), Department of Microelectronics and Information Technology (IMIT), Kista-Stockholm Sweden

B-VIII.4 15:30 SELECTIVE SiGe EPI FOR ULTRA-SHALLOW JUNCTION FORMATION
A. V. Samoilov and Y. Kim, Applied Materials, Front Ent Business Product Group, U. S. A.

15:50 **BREAK**

16:10 **POSTER SESSION II**

B/PII.01 POINT DEFECTS INTERACTION WITH EXTENDED DEFECTS AND IMPURITIES IN Si AND SiO2
D. Kropman(a), U. Abru(b), T. Kärner(c), Ü. Ugaste(d) and E. Mellikov(e); (a) Estonian Maritime Academy, Tallinn, Estonia, (b) Tondi Electronics, Tallinn, Estonia, (c) Tartu University, Tartu, Estonia, (d) Pedagogical University, Tallinn, Estonia, (e) Technical University, Tallinn, Estonia

B/PII.02 ELECTRICAL FINGERPRINT OF PIPELINE DEFECTS
I. Mica, M. L. Polignano and C. De Marco, STMicroelectronics, Agrate Brianza, Italy

B/PII.03 ELECTRONIC LEVELS OF INTERSTITIAL CARBON AND CARBON-OXYGEN CENTERS IN SIGE ALLOYS
J. Coutinho(a), A. Balsas(a), V. J. B. Torres(a), P. R. Briddon(b) and M. Barroso(c); (a) Department of Physics, University of Aveiro, Portugal, (b) School of Natural Sciences, University of Newcastle upon Tyne, U. K., (c) Department of Physics, University of Aveiro, Portugal

B/PII.04 HIGH RESOLUTION DEEP LEVEL TRANSIENT SPECTROSCOPY AND PROCESS-INDUCED DEFECTS IN SILICON
J. H. Evans-Freeman, D. Emiroglu and K. D. Vernon-Parry, Department of Electrical Engineering and Electronics, UMIST, Manchester, U. K.

B/PII.05 FORMATION OF THERMAL VACANCIES IN HIGHLY N-TYPE SILICON
V. Ranki and K. Saarinen, Laboratory of Physics, Helsinki University of Technology, Finland

B/PII.06 IMPACT OF DOPANT PROFILES ON THE END OF RANGE DEFECTS FOR LOW ENERGY GERMANIUM PREAMORPHIZED SILICON
R. A. Camillo-Castillo(a), M. E. Law(a), K. S. Jones(a) and L. M. Rubin(b); (a) SWAMP Center, Department of Materials Science and Engineering, University of Florida, Gainesville FL, U. S. A., (b) Axcelis Technologies. Beverly MA, U. S. A.

B/PII.07 STUDY OF HIGHLY BORON-DOPED SI/SIGE EPITAXIES BY RTCVD
A. Talbot(a), G. Avenier(a), F. Deleglise(a), C. Fellous(a), G. Vincent(b) and D. Dutartre(a); (a) STMicroelectronics, Crolles, France, (b) UJF, LTM, LETI – DTS, CEA Grenoble, Grenoble, France

B/PII.08 ON THE USE OF DEEP LEVEL TRANSIENT SPECTROSCOPY AND DIFFUSION SIMULATION TO STUDY A PHYSICALS MECHANISMS RELATED TO LOW-ENERGY BORON IMPLANTATION
M. Hanine, J. Marcon and M. Masmoudi, LEMI-University of Rouen, France

B/PII.09 AN RELIABLE PROCEDURE FOR THE ANALYSIS MULTI-EXPONENTIALS TRANSIENTS THAT ARISE IN DEEP LEVEL TRANSIENT SPECTROSCOPY
M. Hanine, M. Masmoudi and J. Marcon, LEMI-University of Rouen, France

B/PII.10 Si SELF-DIFFUSITY USING ISOTOPICALLY PURE 30Si EPITAXIAL LAYERS
S. R. Aid(a), T. Sakaguchi(a), K. Toyonaga(a), Y. Nakabayashi(a), S. Matumoto(a), M. Sakuraba(b), Y. Shimamune(2), Y. Hashiba(b), J. Murota(b), K. Wada(c) and T. Abe(d); (a) Department of Electronics and Electrical Engineering, Keio University, Japan, (b) Research Institute of Electrical Communication, Tohoku University, Japan, (c) Department of Materials Science, MIT, Cambridge MA, U. S. A., (d) Shin-Etsu Handoutai, Isobe, Japan

B/PII.11 DETERMINATION OF SILICON SELF-INTERSTITIAL DIFFUSIVITY USING ISOTOPICALLY PURE 30SILICON MULTILAYERS
S. Seto(a), T. Sakaguchi(a), Y. Nakabayashi(a), S. Matsumoto(a), J. Murota (b), K. Wada(c) and T. Abe(d); (a) Department of Electronics and Electrical Engineering, Keio University, Japan, (b) Research institute of Electrical Communication, Tohoku University, Japan, (c) Department of Materials Science and Engineering, MIT, Cambridge MA, U. S. A., (d) Isobe R&D Center, Shin-Etsu Handotai, Japan

B/PII.12 DIFFUSION MODELS OF BF2+ and B+ IMPLANTED AT LOW ENERGY IN CRYSTALLINE SILICON
L. Ihaddadene-Le Coq, J. Marcon, K. Masmoudi and K. Ketata, Laboratory of Electronic Microtechnology and Instrumentation, University of Rouen, France

B/PII.13 A KINETIC MONTE CARLO ANNEALING ASSESSMENT OF THE DOMINANT FEATURES FROM IMPLANT SIMULATIONS
I. Martin-Bragado, M. Jaraiz, P. Castrillo, R. Pinacho, J. E. Rubio and J. Barbolla, Dpt. of Electronics, University of Valladolid, Spain

B/PII.14 ENHANCED OUT-DIFFUSION OF DOPAND DURING VACUUM RAPID THERMAL ANNEALING OF ION-IMPLANTED Si
V. A. Kagadei(a), and A. B. Markov(b); (a) Research Institute of Semiconductor Devices, Tomsk, Russia, (b) Institute of High Current Electronics, Tomsk, Russia

B/PII.15 ARSENIC DIFFUSION IN Si AND Si1-XGeX ALLOYS AT 1000°C
S. Uppal(a), J. M. Bonar(b), A. F. W. Willoughby(a) and J. Zhang(c); (a) Materials Research Group, School of Engineering Sciences, University of Southampton, U. K., (b) School of Electronics and Computer Science, University of Southampton, U. K., (c) Department of Electrical Engineering, Imperial College, London, U. K.

B/PII.16 EXCIMER LASER ANNEALING OF SHALLOW As AND B DOPED LAYERS
E. V. Monakhov(a), B. G. Svensson(a), M. K. Linnarsson(b), A. La Magna(c), V. Privitera(c), M. Camalleri(d), G. Fortunato(e) and L. Mariucci(e); (a) Department of Physics, Physical Electronics, University of Oslo, Norway, (b) Solid State Electronics, Royal Institute of Technology, Stockholm, Sweden, (c) CNR-IMM, Catania, Italy, (d) STMicroelectronics, Catania, Italy, (e) CNR-IFN, Roma, Italy

B/PII.17 FLASH LAMP PROCESSING FOR BORON IMPLANTED ULTRA SHALLOW JUNCTIONS
W. Skorupa(a), W. Anwand(a), T. Gebel(b) and R. A. Yankov(b); (a) Institute of Ion Beam Physics and Materials Research, Forschungszentrum Rossendorf, Dresden, Germany, (b) Nanoparc GmbH, Dresden, Germany

B/PII.18 A SIMPLE TWO-STEP PHOSPHORUS DOPING PROCESS FOR SHALLOW JUNCTIONS BY APPLYING A CONTROLLED ADSORPTION AND A DIFFUSION IN AN OXIDISING AMBIENT
B. Kalkofen, M. Lisker and E. P. Burte, Institute of Micro and Sensor Systems, Otto-von-Guericke-University, Magdeburg, Germany

B/PII.19 CHARGE TRANSFER DOPING FOR ULTRA-SHALLOW SOURCE/DRAIN EXTENSION
K. Kimoto(a), T. Tada(b) and T. Kanayama(b); (a) MIRAI-ASET and (b) MIRAI-ASRC, AIST, Tsukuba, Japan

B/PII.20 SHALLOW TRENCH ISOLATION DIMENSIONS EFFECTS ON LEAKAGE CURRENT AND DOPING CONCENTRATION OF ADVANCED p-n JUNCTION DIODES
A. Poyai(a), I. Rittaporn(a), E. Simoen(b), R. Rooyackers(b) and C. Claeys(b,c); (a) TMEC, Chachoengsao, Thailand, (b) IMEC, Leuven, Belgium, (c) E. E. Dept., KU Leuven, Belgium

B/PII.21 SOLID PHASE EPITAXIALLY ACTIVATED ANTIMONY ION-IMPLANTED SILICON N+/P JUNCTION FOR SUB-100 nm METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR DEVICES WITH EMERGING OF HIGH-K DIELECTRICS
S. G. Tavakoli, S. Baek, and H. Hwang, Department of Materials Science and Engineering, Kwang-Ju Institute of Science and Technology, Republic of Korea

B/PII.22 LOW TEMPERATURE SOLID PHASE EPITAXIALLY ACTIVATED, SHALLOW p+/n Ga DIRECT ION-IMPLANTED JUNCTION FOR SUb-100 nm TECHNOLOGY NODE
S. G. Tavakoli, K. Lee, S. Baek and H. Hwang, Department of Materials Science and Engineering, Kwang-Ju Institute of Science and Technology, Republic of Korea

B/PII.23 BEHAVIOUR OF LOW ENERGY AS IONS IMPLANTED IN SI THROUGH A THIN OXIDE LAYER
M. Ferri(a), A. Parisini(a), S. Solmi(a), M. Bersani(b), D. Giubertoni(b) and M. Barozzi(b); (a) CNR-IMM Bologna, Italy, (b) ITC-irst, Povo, Italy

B/PII.24 STUDIES OF ULTRA-SHALLOW N+ P JUNCTION CHARACTERISTICS FORMED BY LOW- ENERGY AS-IMPLANTATION
D. Girginoudi(a), N. Georgoulas(a), A. Thanailakis(a) and E. K Polychroniadis(b); (a) Department of Electrical and Computer Engineering, Democritus University of Thrace, Xanthi, Greece, (b) Physics Department, Aristotle University of Thessaloniki Greece

B/PII.25 HIGH RESOLUTION ELASTIC RECOIL DETECTION ANALYSIS OF ULTRA SHALLOW IMPLANTS
G. Dollinger(a), A. Bergmaier(a), J. Fruehauf(a), L. Goergens(a), F. Koch(a), P. Neumaier(a), W. Vandervorst(b), J. Schulze(c) and I. Eisele(c); (a) Physik Department, Technische Universitaet Muenchen, Garching, Germany, (b) IMEC, Leuven, Belgium, (c) Universitaet der Bundeswehr, Neubiberg, Germany

B/PII.26 NON-UNIFORM DEPTH PROFILE OF THE SITE LOCATION OF AS IMPLANTED IN Si AT ULTRA-LOW ENERGIES
S. Milita(a), F. D'Acapito(b), M. Servidori(a), M. Malvestuto(c) and F. Boscherini(c); (a) CNR IMM Bologna, Bologna, Italy, (b) INFM-OGG c/o E. S. R. F. Grenoble, France, (c) INFM and Dipartimento di Fisica, Università di Bologna, Italy

B/PII.27 FUNDAMENTAL CHARACTERIZATION AND MODELING OF THE EFFECT OF DIFFERENT NITRIDE SIDEWALL SPACER PROCESSES ON BORON DOSE LOSS IN ULTRA-SHALLOW JUNCTION FORMATION
P. Kohli(a,b), S. Chakravarthi(b), A. Jain(b), H. Bu(b), M. Mehrotra(b), S. T. Dunham(c) and S. K. Banerjee(a); (a) The University of Texas Austin, U. S. A., (b) Texas Instruments, (c) The University of Washington at Seattle, U. S. A.

Friday, May 28, 2004 Morning

Session VI: Silicon processing III
Session chair: S. Cristoloveanu (CNRS-ENSERG, France)

B-IX.1 08:30 -Invited- CRITICAL DOPING REQUIREMENTS FOR SDE APPLICATIONS IN </= 65 nm DEVICE MANUFACTURING
S. Mehta, U. Jeong and J. Liu, Varian Semiconductor Equipment Associates, Gloucester MA, U. S. A.

B-IX.2 09:10 DOPANT INDUCED DAMAGE IN SILICON AFTER LOW ENERGY ION IMPLANTATION STUDIED BY COMBINED X-RAY SCATTERING TECHNIQUES
L. Capello(a), T. H. Metzger(a) and M. Servidori(b); (a) E. S. R. F., Grenoble, France, (b) CNR-IMM Bologna, Italy

B-IX.3 09:30 ATOMISTIC MODELING OF DEFECT EVOLUTION IN Si FOR AMORPHIZING AND SUBAMORPHIZING IMPLANTS
P. Lopez, L. Pelaz, L. A. Marques, I. Santos, M. Aboy and J. Barbolla Department of Electronics, University of Valladolid, Spain

B-IX.4 09:50 LATTICE STRAIN INDUCED BY BORON-INTERSTITIAL CLUSTERS IN CRYSTALLINE SILICON
G. Bisognin(a), D. De Salvador(a), E. Napolitani(a), L. Aldegheri(a), A. V. Drigo(a), M. Berti(a), A. Carnera(a), S. Mirabella(b), E. Bruno(b), G. Impellizzeri(b) and F. Priolo(b); (a) INFM and Dipartimento di Fisica, Università di Padova, Italy, (b) MATIS - INFM and Dipartimento di Fisica e Astronomia, Università di Catania, Italy

B-IX.5 10:10 DIFFUSE X-RAY SCATTERING AND RUTHERFORD BACKSCATTERING RESPONSES TO SMALL SELF-INTERSTITIAL CLUSTERS IN SELF-ION IRRADIATED SI
S. Milita(a), V. Mocella(b), M. Servidori(a), G. Lulli(a), E. Albertazzi(a), M. Bianconi(a), A. Satta(c), S. Balboni(d) and L. Colombo(c); (a) CNR IMM Bologna, Italy, (b) Sezione di Napoli, Italy, (c) INFM and Dipartimento di Fisica, Università di Cagliari, Italy, (d) CeSIA-Settori Reti e Comunicazioni, Università di Bologna, Italy

10:30 **BREAK**

Session X: Defects in silicon
Session chair: M. Bersani (ITC-irst, Italy)

B-X.1 10:50 -Invited- MODELING OF EXTRINSIC DEFECT EVOLUTION IN ION IMPLANTED SILICON UPON THERMAL ANNEALING
C. J. Ortiz(a), B. Colombeau(b), F. Cristiano(c), A. Claverie(c) and N. E. B. Cowern(b); (a) Fraunhofer IISB, Erlangen, Germany, (b) University of Surrey, Guildford, U. K., (c) Pole Implantation Ionique CEMES/LAAS-CNRS, Toulouse, France

B-X.2 11:30 FLUORINE INFLUENCE ON POINT DEFECT DENSITY IN PREAMORPHIZED SILICON
G. Impellizzeri(a), J. H. R. dos Santos(a), S. Mirabella(a), F. Priolo(a), E. Napolitani(b) and A. Carnera(b); (a) INFM-MATIS and Dipartimento di Fisica e Astronomia, Università di Catania, Italy, (b) INFM and Dipartimento di Fisica, Università di Padova, Italy

B-X.3 11:50 THE ROLE OF SILICON INTERSITIALS IN THE DEACTIVATION AND REACTIVATION OF HIGH CONCENTRATION B PROFILES
M. Aboy(a), L. Pelaz(a), L. A. Marqués(a), J. Barbolla(a), V. C. Venezia(b), R. Duffy(b) and P. B. Griffin(c); (a) University of Valladolid, Spain, (b) Philips Research Leuven, Belgium, (c) Stanford University, U. S. A.

B-X.4 12:10 THE INTERACTION BETWEEN XE AND F IN SI (100) PRE-AMORPHISED WITH 40 KEV XE AND IMPLANTED WITH LOW ENERGY BF2
M. Werner(a), J. A. van den Berg(a), D. G. Armour(a), G. Carter(a), T. Feudel(b), M. Herden(b), M. Bersani(c), D. Giubertoni(c), P. Bailey(d) and T. C. Q. Noakes(d); (a) Joule Physics Laboratory, Institute of Materials Research, University of Salford, U. K., (b) AMD Saxony, Dresden, Germany, (c) ITC IRST, Povo Italy, (d) CCLRC Daresbury Laboratory, Daresbury, U. K.

B-X.5 12:30 ROOM TEMPERATURE MIGRATION OF SUBSTITUTIONAL BORON IN SILICON BY KICK-OUT MECHANISM
E. Napolitani(a), D. De Salvador(a), A. Carnera(a), S. Mirabella(b) and F. Priolo(b); (a) INFM and Dipartimento di Fisica, Università di Padova, Italy, (b) MATIS - INFM and Dipartimento di Fisica e Astronomia, Università di Catania, Italy

12.50 **LUNCH**