SiGe, Ge, and Related Compounds 3: Materials, Processing, and Devices

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(12.3) 4:50 – 5:10 PM
Fixed-Oxide-Charge Characterization by Photoreflec-tance Spectroscopy in HfO_2 on Ge treated by Fluorine 699
T. Kanashima, H. Lee, Y. Mori, H. Imajo, and M. Okuyama (Osaka University, Japan)

(12.4) 5:10 – 5:30 PM
Enhanced Ge MOS Device Performance Through a Novel Post-gate CF_4-plasma Treatment Process 707
R. Xie, M. Thamarai, Z. Sun, M. Yu, D. M. Lai, L. Chan, and C. Zhu (National University of Singapore, Singapore)

(12.5) 5:30 – 5:50 PM
Formation of Ge_3N_4/Ge Structures Using Nitrogen Radicals and Their Thermal Stability 717
H. Kondo, S. Oda, M. Ogawa, and S. Zaima (Graduate School of Engineering, Nagoya University, Japan)

5:50 – 7:00 PM
Short Dinner Break

Chapter 13
Workshop on Nanotechnology

Wednesday PM
Session Chair: Steven Koester

7:00 – 7:30 PM
Workshop Mixer

(13.0) 7:30 – 7:35 PM
Nanowire Panel Introduction
S. Koester (IBM, USA)

(13.1) 7:35 – 7:45 PM
Nanowires to Replace Planar CMOS? 725
A. Thean (Freescale Semiconductor, USA)

(13.2) 7:45 – 7:55 PM
Gate-All-Around Silicon Nanowire Devices: Are These the Future of CMOS? 729
G. P. Lo, N. Singh, S. Rustagi, K. D. Buddharaju, N. Balasubramanian, and D. Kwong (Institute of Microelectronics, Singapore)

(13.3) 7:55 – 8:05 PM
Prospects for Top-Down Fabricated Uniaxial Strained Nanowire MOSFETs 731
J. Hoyt, P. Hashemi, and L. Gomez (Massachusetts Institute Of Technology, USA)

(13.4) 8:05 – 8:15 PM
Opportunities for Group IV Nanowire Devices in Si CMOS Technology 735
E. Tutuc, S. Banerjee, J. Nah, K. Varahramyan, N. Jain, and D. Ferrer (The University of Texas at Austin, USA)

(13.5) 8:15 – 8:25 PM
III/V Nanowire FETs for CMOS? 741
L. Wernersson (Lund University, Sweden)

(13.6) 8:25 – 9:30 PM
Discussion

Chapter 14
Surfaces and Interfaces II: Metal Contacts and High-*k* / Semiconductor Interfaces

Thursday AM
Session Chair: Shigeaki Zaima
Session Co-Chair: Kenji Shiraishi

(14.1) 8:00 – 8:30 AM
Novel Metal-Germinade Schottky Barrier Contacts for Si-Photonics Application * 747
G. P. Lo, K. Ang, M. Yu, and D. Kwong (Institute of Microelectronics, Singapore)

(14.2) 8:30 – 8:50 AM
Schottky Barrier Height Extraction in Ohmic Regime: Contacts on Fully-Processed 200mm GeOI Substrates 755
L. Hutin, C. Le Royer, C. Tabone, V. Carron, V. Delaye, F. Nemouchi, F. Aussenac, L. Clavelier, and S. Deleonibus (CEA-LETI/MINATEC, France)

(14.3) 8:50 – 9:10 AM
Very High-k Tetragonal ZrO_2 on Ge with GeO_2 Passivating Interfacial Layer 767
P. Tsipas, G. Mavrou, S. Volkos, A. Sotiropoulos, S. Galata, Y. Panayiotatos and A. Dimoulas (National Center for Scientific Research, Demokritos, Greece)

(14.4) 9:10 – 9:40 AM
Generation of Realistic Amorphous Al_2O_3 And ZrO_2 Samples By Hybrid Classical and First-Principle Molecular Dynamics Simulations 773
E. Chagarov and A. C. Kummel (University of California San Diego, USA)

(14.5) 9:40 – 10:00 AM
Why and How Atom Intermixing Proceeds at Metal/Si Interfaces; Silicide Formation vs. Random Mixing 787
T. Nakayama, S. Shinji, and S. Sotome (Chiba University, Japan)

10:00 – 10:15 AM
Coffee Break

Chapter 15
Epitaxy III: IV:IV Alloys Growth and Alternative Precursors

Thursday AM
Session Chair: Masao Sakuraba
Session Co-Chair: Yihwan Kim

(15.1) 10:15 – 10:45 AM
Chemical Vapor Deposition Epitaxy of Silicon-based Materials using Neopentasilane * 799
J. C. Sturm and K. Chung (Princeton University, USA)

(15.2) 10:45 – 11:15 AM
Nanosynthesis of Si-Ge-Sn Semiconductors and Devices via Purpose-built Hydride Compounds * 807
J. Kouvetakis, J. Tolle, R. Roucka, V. R. D'Costa, Y. Fang, A. V. Chizmeshya, and J. Menendez (Arizona State University, USA)

(15.3) 11:15 – 11:35 AM
Defect Reduction of Ge on Si by Selective Epitaxy and Hydrogen Annealing 823
H. Yu, J. Park, A. Okyay and K. Saraswat (Stanford University, USA)

(15.4) 11:35 – 11:55 AM
Selective Epitaxial Growth of Germanium on Si Wafers with Shallow Trench Isolation: An Approach for Ge Virtual Substrates 829
G. Wang, F. E. Leys, L. Souriau, R. Loo, M. Caymax, D. Brunco, J. Geypen, H. Bender, M. Meuris, W. Vandervorst, and M. Heyns (IMEC, Belgium)

(15.5) 11:55 AM – 12:15 PM
Selective Epitaxial Growth of Ge-on-Si for Photodiode Applications 837
M. Kim, O. Olubuyide, J. Yoon, and J. Hoyt (Massachusetts Institute of Technology, USA)

12:15 – 1:30 PM
Lunch Break

Chapter 16
Optoelectronics II: Emitters / Modulators / QW

Thursday PM
Session Chair: Gianlorenzo Masini

(16.1) 1:30 – 2:00 PM
Ge Quantum Well Modulators on Si * 851
D. Miller, R. K. Schaevitz, J. E. Roth, S. Ren, and O. Fidaner (Stanford University, USA)

(16.2) 2:00 – 2:30 PM
Ge dots in Optical Microcavities--A Possible Direction for Silicon-based Light Emitting Devices * 857
J. Xia, R. Tominaga, S. Iwamoto, N. Usami, Y. Aragawa, and Y. Shiraki (Musashi Institute of Technology, Japan)

(16.3) 2:30 – 3:00 PM
Si/SiGe Bound-to-Continuum Quantum Cascade Emitters * 865
D. J. Paul, G. Matmon, L. Lever, Z. Ikonic, R. Kelsall, D. Chrastina, G. Isella, H. von Känel, E. Müller, and A. Neels (University of Glasgow, Scotland)

(16.4) 3:00 – 3:20 PM
Photocurrent of SiGe/Si Strained Multiple Quantum-Wells Grown by UHV-CVD 875
T. Kim, S. Choi, T. Jeong, S. Kang, and K. Shim (Chonbuk National University, S Korea)

(16.5) 3:20 – 3:40 PM
Optical Bleaching of Thin Film Ge on Si 881
X. Sun, J. Liu, L. Kimerling, and J. Michel (Massachusetts Institute of Technology, USA)

3:40 – 3:55 PM
Coffee Break

Chapter 17
Processing II: Processing of Si, SiGe, Ge, and Related Compounds

Thursday PM
Session Chair: Bernd Tillack
Session Co-Chair: Erwin Hijzen

(17.1) 3:55 – 3:25 PM
High Ge Content SiGe alloys: Doping and Contact Formation 893
E. Kasper, M. Oehme, and J. Lupaca-Schomber (University of Stuttgart, Germany)

(17.2) 4:25 – 4:55 PM
New Heating Method for Polycrystallization of Amorphous Si Using Microwave Plasma Irradiation 905
K. Nakagawa (University of Yamanashi, Japan)

(17.3) 4:55 – 5:15) PM
Low Temperature Boron Activation in Amorphous Germanium for Three Dimensional Integrated Circuits (3D-ICs) using Ni-induced Crystallization 909
J. Park, M. Tada, H. Yu, D. Kuzum, Y. Na, and K. Saraswat (Stanford University, USA)

(17.4) 5:15 – 5:35 PM
Photoluminescence of Selectively Grown Epitaxial SiGe:C/Si Layers 917
J. Bouvier, G. Bremond, B. Vandelle, F. Brossard, and D. Dutartre (STMicroelectronics, France)

(17.5) 5:35 – 5:55 PM
Dry Etch Challenges in Gate All Around Devices for sub 32 nm Applications 923
S. Barnola, C. Vizioz, N. Vulliet, C. Dupré, T. Ernst, P. Gautier, C. Arvet, B. Guillaumot, E. Bernard, S. Pauliac-Vaujeour, C. Comboroure, J. Hartmann, S. Borel, T. Chevolleau, V. Maffini-Alvaro, and S. Becu (CEA-LETI-Minatec, France)

5:55 PM
Dinner

Chapter 18
Emerging Applications: Novel Devices

Friday AM
Session Chair: Emanuel Tutuc

(18.1) 8:30 – 9:00 AM
Spin-Polarized Electron Transport in Silicon * 937
I. Appelbaum (University of Maryland, USA)

(18.2) 9:00 – 9:20 AM
Formation of Si- and Ge-based Full-Heusler Alloy Thin Films using SOI and GOI Substrates for the Half-metallic Source and Drain of Spin Transistors 945
Y. Takamura, A. Nishijima, Y. Nagahama, R. Nakane, and S. Sugahara (Tokyo Institute of Technology, Japan)

(18.3) 9:20 – 9:40 AM
Germanium-Based Ferromagnetic Semiconductor $Ge_{1-x}Fe_x$ for Silicon Spintronics * 953
Y. Shuto, M. Tanaka, and S. Sugahara (The University of Tokyo, Japan)

(18.4) 9:40 – 10:10 AM
SiGe Tunnel Field Effect Transistors * 961
I. Eisele, H. Lochner, and M. Schlosser (Institute of Physics, Germany)

(18.5) 10:10 – 10:30 AM
Electrodeposition of Nanoscale Si_xGe_{1-x} from an Air- and Water Stable Ionic Liquid 975
R. Al Salman, S. Zein El Abedin, and F. Endres (Institute of Particle Technology, Germany)

(18.6) 10:30 – 10:50 AM
Phonon Transport and Thermoelectricity in Silicon Nanostructures 983
H. Ryu, C. Ritz, L. Klein, H. Hamann, M. G. Lagally, and M. Eriksson (University of Wisconsin-Madison, IBM, USA)

(18.7) 10:50 – 11:10 AM
Enhanced Ferromagnetic Fe-rich Germanide Film Grown using Magnetron Sputtering Employing a Post-deposition Anneal 989
A. S. Wong, G. Ho, and D. Chi (Materials Growth Group, Institute of Materials Research and Engineering, Singapore)

11:10 – 11:25 AM
Coffee Break

Chapter 19
Related Materials: SiC, Ge Compounds, and III-V Integration

Friday AM
Session Chair: Alexander Reznicek
Session Co-Chair: Matthias Bauer

(19.1) 11:25 – 11:55 AM
SiCP Selective Epitaxial Growth in Recessed Source/Drain Regions Yielding to Drive Current Enhancement in n-channel MOSFET * 1001
M. Bauer, V. Machkaoutsan, Y. Zhang, D. Weeks, J. Spear, S. Thomas, P. Verheyen, C. Kerner, F. Clemente, H. Bender, D. Shamiryan, R. Loo, A. Hikavyy, T. Hoffmann, P. Absil, and S. Biesemans (ASM America, USA, IMEC, Belgium)

(19.2) 11:55 – 12:25 AM
Monolithic III-V/Si Integration * 1015
E. A. Fitzgerald, M. T. Bulsara, Y. Bai, C. Cheng, W. K. Liu, D. Lubyshev, J. M. Fastenau, Y. Wu, M. Urtega, W. Ha, J. Bergman, B. Brar, C. Drazek, N. Daval, F. Leterte, W. E. Hoke, J. R. LaRoche, K. J. Herrick, and T. E. Kazior (Massachusetts Institute Of Technology, USA)

(19.3) 12:25 – 12:45 PM
Strain Loss in Epitaxial Si:C Films Induced by Phosphorus Diffusion 1021
B. Yang, J. De Souza, K. Saenger, S. Bedell, A. Reznicek, T. N. Adam, M. Hopstaken, and D. Sadana (Advanced Micro Devices, Inc. USA, IBM, USA)

(19.4) 12:45 – 1:05 PM
Ge Interface Passivation Techniques and Their Thermal Stability 1025
D. Kuzum, T. Krishnamohan, A. Pethe, Y. Oshima, Y. Sun, J. McVittie, P. McIntyre, P. Pianetta, and K. Saraswat (Stanford University, USA)

(19.5) 1:05 – 1:25 PM
Solid-Phase Epitaxial Regrowth of Phosphorus Implanted Amorphized Germanium 1031
E. R. Simoen, A. Brugere, A. Satta, B. Van Daele, B. Brijs, O. Richard, J. Geypen, M. Meuris, and W. Vandervorst (IMEC, Belgium)

1:25 – 2:40 PM
Lunch Break

Chapter 20
HBT: New Techniques, Performance Levels, and Applications

Friday PM
Session Chair: Mikael Ostling
Session Co-Chair: Katsuyoshi Washio

(20.1) 2:40 – 3:10 PM
SiGe:C BiCMOS Technologies for Automotive Radar Applications * 1041
G. G. Fischer and S. Glisic (IHP, Germany)

(20.2) 3:10 – 3:40 PM
3D Integration Techniques Applied to SiGe Power Amplifiers * 1053
R. M. Malladi, A. Joseph, P. Lindgren, W. Ni, D. Wang, H. Ding, M. Erturk, and R. Previti-Kelly (IBM, USA)

(20.3) 3:40 – 4:00 PM
SiGe HBT featuring fT > 600GHz at Cryogenic Temperature 1069
N. Zerounian, E. Ramirez Garcia, F. Aniel, P. Chevalier, B. Geynet, and A. Chantre (IEF, Universite Paris-Sud, France)

(20.4) 4:00 – 4:20 PM
3-D Regional Transit Time Analysis of SiGe HBTs on Thin-Film SOI 1079
M. Bellini, J. Cressler, M. Turowski, G. Avenier, A. Chantre, and P. Chevalier (Georgia Institute of Technology, USA)

(20.5) 4:20 – 4:40 PM
Ultra-Low-Power SiGe HBTs using High-Precision RT-CVD Epitaxial Growth 1089
K. Oda, M. Miura, H. Shimamoto, and K. Washio (Hitachi Ltd., Japan)

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