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Chapter 1 SiGe, Ge, and Related Compounds Plenary

Monday AM

Session Chair: D. Harnme

(1.0) 9:00 – 9:15 AM

Welcome

D. Harnme (IBM, USA)

(1.1) 9:15 – 10:05 AM

(Invited) Past, Present and Future: SiGe and CMOS Transistor Scaling

K. J. Kuhn, A. Murthy, R. Kotlyar, and M. Kuhn (Intel Corporation, USA)

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(1.2) 10:05 – 10:55 AM

(Invited) Scaling Energy and Form Factor with Germanium Microphotonics

L. C. Kimerling (Massachusetts Institute of Technology, USA)

n/a

10:55 AM – 12:10 PM

Lunch Break

Chapter 2 Joint FET – STRAIN

Monday PM

Session Co-Chairs: S. Bedell and Y. C. Yeo

(2.1) 12:10 – 12:40 PM

(Invited) Strain Scaling and Modeling for FETs

V. Moroz and M. Choi (Synopsys, USA)

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<i>A. Toriumi, C. Lee, T. Nishimura, K. Kita, S. Wang, M. Yoshida, and K. Nagashio</i> (The University of Tokyo, JST-CREST, Japan)	
(2.3) 1:10 – 1:40 PM	
(Invited) Strain Mapping of Layers and Devices Using Electron Holography	47
<i>A. Claverie (CEMES/CNRS and Université de Toulouse, France), N. Cherkashin, F. Hûe,</i> <i>S. Reboh, F. Houdellier, E. Snoeck, and M. Hÿtch (CEMES/CNRS, France)</i>	
(2.4) 1:40 – 2:10 PM	
(Invited) Applications of Epitaxy for Semiconductor Technology	59
<i>D. K. Sadana, S. Bedell, T. N. Adam, A. Reznicek, and H. He (IBM, USA)</i>	
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Monday PM

Session Co-Chairs: T. Krishnamohan and E. Tutuc

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(Invited) Strain Engineering and Junction Design for Tunnel Field-Effect Transistor	77
<i>Y. Yeo, G. Han, Y. Yang, and P. Guo (National University of Singapore, Singapore)</i>	
(3.3) 3:25 – 3:55 PM	
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<i>K. Wang and F. Xiu (University of California at Los Angeles, USA)</i>	
(3.4) 3:55 – 4:25 PM	
(Invited) Novel Electronic and Optoelectronic Devices in Germanium Integrated on Silicon	101
<i>K. C. Saraswat (Stanford University, USA)</i>	

4:25 – 7:00 PM

ECS Plenary and Dinner Break

Chapter 4

Posters – Short Presentations

Monday PM

Session Chair: D. Haramé

NOTE:

The following presentations will also be presented as poster displays on Tuesday, October 12, 2010 in the Evening Poster Session

(4.01) 7:00 – 7:05 PM

Achievement of Excellent C-V Characteristics in GeO₂/Ge System Using Post Metal Deposition Annealing

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*H. Koumo, Y. Suzuki, Y. Oniki, Y. Iwazaki, and T. Ueno
(Tokyo University of Agriculture and Technology, Japan)*

(4.02) 7:05 – 7:10 PM

Comparative Experimental Study between Diamond and Conventional MOSFET

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S. P. Gimenez and D. M. Alati (Centro Universitário da FEI, Brazil)

(4.03) 7:10 – 7:15 PM

Growth of Epitaxial Silicon-on-Insulator Substrates by Solid State Epitaxy

133

E. F. Arkun, G. Vosters, S. Semans, A. Clark, and R. S. Smith (Translucent Inc., USA)

(4.04) 7:15 – 7:20 PM

Laser-Induced Epitaxial Growth (LEG) Technology for Multi-Stacked MOSFETs

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Y. Son (Seoul University, Republic of Korea), K. Hwang, C. Kang (Samsung Electronics, Republic of Korea), and E. Yoon (Seoul University, Republic of Korea)

(4.05) 7:20 – 7:25 PM

Low-Temperature Epitaxial Si, SiGe, and SiC in a 300mm UHV/CVD Reactor

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*T. N. Adam, S. Bedell, A. Reznicek, D. K. Sadana, R. J. Murphy (IBM, USA),
A. Venkateshan, T. Tsunoda (Canon Anelva Corporation, USA), T. Seino, J. Nakatsuru
(Canon Anelva Corporation, Japan), and S. Shinde (Canon Anelva Corporation, USA)*

(4.06) 7:25 – 7:30 PM

Monochlorosilane for Low Temperature Silicon Epitaxy

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P. Tomasini (GaNtec Inc., USA) and K. D. Weeks (ASM America, USA)

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<i>H. Chang (National Central University, Taiwan), C. Lee (National Taiwan University, Taiwan), and S. Lee (National Central University, Taiwan)</i>	
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Chapter 5

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Session Co-Chairs: J. Fiorenza and Y.-H. Xie

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(NCSR DEMOKRITOS, Greece)*

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- 10:00 – 10:15 AM
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 (Invited) Characterizations of Direct Band Gap Photoluminescence and Electroluminescence from epi-Ge on Si
S. Cheng, G. Shambat, J. Lu, H. Yu, K. C. Saraswat, J. Vuckovic, and Y. Nishi (Stanford University, USA)

(11.4) 2:35 – 3:05 PM

(Invited) Si-Ge-Sn Technologies: From Molecules to Materials to Prototype Devices

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J. Kouvetakis, J. Tolle, J. Mathews, R. Roucka, and J. Menéndez

(Arizona State University, USA)

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M. Bauer and S. Thomas (ASM America, USA)

3:35 – 3:50 PM

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Chapter 12 Quantum Dots

Wednesday PM (Concurrent Session)

Session Chair: M. Eriksson

(12.1) 1:25 – 1:55 PM

(Invited) Toward Si/SiGe Quantum Dot Spin Qubits: Gated Si/SiGe Single and Double Quantum Dots

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M. G. Lagally, R. Joynt, M. Friesen, S. Coppersmith, and M. Eriksson

(University of Wisconsin-Madison, USA)

(12.2) 1:55 – 2:15 PM

Surface Orientation Effects on SiGe Quantum Dots and Nanorings Formation

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C. Lee, W. Tu, C. Lin (National Taiwan University, Taiwan), H. Chang, S. Lee

(National Central University, Taiwan), and C. Liu (National Taiwan University and

National Nano Device Laboratories, Taiwan)

(12.3) 2:15 – 2:35 PM

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K. Makihara, M. Ikeda (Hiroshima University, Japan), H. Deki

(Hiroshima Kokusai Gakuin University, Japan), A. Ohta (Hiroshima University, Japan),

and S. Miyazaki (Nagoya University, Japan)

2:35 PM

Break of Concurrent Session

Chapter 13

Nanowire Growth, Processing, and Devices

Wednesday PM

Session Co-Chairs: N. D. Nguyen and B. Tillack

(13.1) 3:50 – 4:20 PM

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(13.2) 4:20 – 4:40 PM

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(13.3) 4:40 – 5:00 PM

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P. Hashemi (MIT Microsystems Technology Laboratories, USA), C. Poweleit, M. Canonico (Arizona State University, USA), and J. Hoyt (MIT Microsystems Technology Laboratories, USA)

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(13.5) 5:20 – 5:40 PM

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Workshop: Group-IV Lasers - Can They Ever Compete With III-Vs?

Wednesday PM

Session Chair: S. Koester

7:25 – 7:55 PM

Workshop Mixer

(14.1) 7:55 – 8:10 PM

(Invited) Practical Strategies for Tuning Optical, Structural and Thermal Properties in Group IV Ternary Semiconductors

717

A. V. Chizmeshya and J. Kouvetakis (Arizona State University, USA)

(14.2) 8:10 – 8:25 PM

(Invited) High Power Waveguide Ge/Si Photodiodes

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*J. E. Bowers, M. Piel, A. Ramaswamy, and T. Yin
(University of California at Santa Barbara, USA)*

(14.3) 8:25 – 8:40 PM

(Invited) Band-Engineered Ge-on-Si Lasers for Integrated Photonics

n/a

J. Liu (Massachusetts Institute of Technology and Dartmouth College, USA)

8:40 – 9:40 PM

Workshop Panel Discussion

Chapter 15

Optoelectronics II: Photodetectors

Thursday AM

Session Co-Chairs: J. Liu and G. Masini

(15.1) 8:00 – 8:30 AM

(Invited) Performance and Reliability of a 25Gb/s Ge Waveguide Photodetector Integrated in a CMOS Process

741

*S. Sahni, D. Song, M. Sharp, D. Kucharski, D. Guckenberger, and G. Masini
(Luxtera Inc., USA)*

(15.2) 8:30 – 9:00 AM

(Invited) Integration of Germanium Avalanche Photodetectors on Silicon for On-Chip Optical Interconnects

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S. Assefa, F. Xia, and Y. Vlasov (IBM, USA)

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(15.4) 9:30 – 9:50 AM	
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Thursday AM (Concurrent Session)	
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<i>T. Liu, C. Ndoye, and M. Orlowski (Virginia Tech, USA)</i>	
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(16.4) 11:25 – 11:45 AM	
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(16.5) 11:45 AM – 12:05 PM

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12:05 – 1:20 PM

Lunch Break

Chapter 17

Epitaxy II: Epitaxy of Alternative Semiconductors on Si Substrates

Thursday AM (Concurrent Session)

Session Chair: M. Caymax

(17.1) 10:05 – 10:35 AM

(Invited) Epitaxial Growth of III-Nitrides on Silicon Substrates

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S. Degroote (EpiGaN bvba, Belgium), M. Leys, K. Cheng, B. Sijmus, J. Derluyn, G. Borghs, and M. Germain (imec, Belgium)

(17.2) 10:35 – 10:55 AM

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P. Sharma, M. T. Bulsara, and E. A. Fitzgerald (Massachusetts Institute of Technology, USA)

(17.3) 10:55 – 11:25 AM

(Invited) Direct Heterointegration of III-V Materials on Group IV Substrates

849

D. A. Ahmari, B. McDermott (EpiWorks, Inc., USA), S. Thomas (ASM America, USA), B. Roof, Q. Hartmann (EpiWorks, Inc., USA), and X. Li (University of Illinois, USA)

(17.4) 11:25 – 11:55 AM

(Invited) Epitaxial Formation of Graphene on Si Substrates: From Heteroepitaxy of 3C-SiC to Si Sublimation

859

M. Suemitsu (CREST/Japan Science and Technology Agency and Tohoku University, Japan), H. Handa, E. Saito, and H. Fukidome (Tohoku University, Japan)

11:55 AM – 1:20 PM

Lunch Break

Chapter 18

Surfaces and Interfaces II: Interface Physics, Characterization, and Device Application

Thursday PM (Concurrent Session)

Session Co-Chairs: S. Miyazaki and S. Zaima

(18.1) 1:20 – 1:40 PM

- Novel SiGe Source/Drain for Reduced Parasitic Resistance in Ge NMOS 871
S. Raghunathan (Stanford University, USA), T. Krishnamohan (Intel, USA), and K. C. Saraswat (Stanford University, USA)

(18.2) 1:40 – 2:00 PM

- Non-Contact and Non-Destructive Measurement of Ge and B Content in Si_{1-x}Ge_x/Si Using 877
 Very High Resolution Multiwavelength Raman Spectroscopy
W. Yoo, T. Ueda, T. Ishigaki, and K. Kang (WaferMasters, Inc., USA)

(18.3) 2:00 – 2:20 PM

- X-ray Microdiffraction Study on Crystallinity of Micron-Sized Ge Films Selectively Grown 887
 on Si(001) Substrates
K. Ebihara, S. Harada, J. Kikkawa, Y. Nakamura, A. Sakai (Osaka University, Japan), G. Wang, M. Caymax (imec, Belgium), Y. Imai, S. Kimura, and O. Sakata (JASRI/SPring-8, Japan)

(18.4) 2:20 – 2:40 PM

- Interface Reaction and Rate Enhancement of SiGe Thermal Oxidation 893
T. Shimura, Y. Okamoto, D. Shimokawa, T. Inoue, T. Hosoi, and H. Watanabe (Osaka University, Japan)

(18.5) 2:40 – 3:00 PM

- Misfit Stress Relaxation Mechanism in GeO₂/Ge Systems: A Classical Molecular Simulation 901
 Study
T. Watanabe, T. Onda, and I. Ohdomari (Waseda University, Japan)

(18.6) 3:00 – 3:20 PM

- Chemical Trend of Schottky-Barrier Change by Segregation Layers at Metal/Si Interfaces: 913
 First-Principles Study
T. Nakayama, Y. Maruta, and K. Kobinata (Chiba University, Japan)

3:20 – 3:35 PM

Coffee Break

Chapter 19 Related Compounds I

Thursday PM (Concurrent Session)

Session Chair: A. Reznicek

- (19.1) 1:20 – 1:50 PM 923
 (Invited) III-V Photovoltaics: Recent Developments and Prospects
N. Sosa, T. Van Kessel, Y. Martin, and H. Hovel (IBM, USA)
- (19.2) 1:50 – 2:20 PM 927
 (Invited) Ge/III-V Heterostructures and Their Applications in Fabricating Engineered Substrates
Y. Bai and E. A. Fitzgerald (Massachusetts Institute of Technology, USA)
- (19.3) 2:20 – 2:50 PM 933
 (Invited) Selective Epitaxial Growth of III-V Semiconductor Heterostructures on Si Substrates for Logic Applications
N. Nguyen (imec and Université de Liège, Belgium), G. Wang, G. Brammertz, M. Leys, N. Waldron, G. Winderickx, K. Lismont, J. Dekoster, R. Loo, M. Meuris (imec, Belgium), S. Degroote (EpiGaN bvba, Belgium), F. Buttitta, B. O'Neil, O. Féron, J. Lindner, F. Schulte, B. Schineller, M. Heuken (AIXTRON AG, Germany), and M. Caymax (imec, Belgium)
- (19.4) 2:50 – 3:10 PM 941
 Growth and Optical Properties of InGaAs via Ge-Based Virtual Substrates: A New Chemistry Based Strategy
R. Beeler, C. Weng, J. Tolle, R. Roucka, J. Mathews (Arizona State University, USA), D. A. Ahmari (EpiWorks, Inc., USA), J. Menéndez, and J. Kouvetakis (Arizona State University, USA)

3:10 – 3:35 PM

Coffee Break

Chapter 20 Processing II: Advances in Structures, Doping, and Annealing

Thursday PM (Concurrent Session)

Session Co-Chairs: J.-M. Hartmann and T. Sadoh

- (20.1) 3:35 – 4:05 PM 953
 (Invited) Graphene FETs: Promises and Challenges
C. Miao, Y. Park, W. Liu, Y. Wang, J. Zhu, B. Huang, J. Woo, and Y. Xie (University of California at Los Angeles, USA)

(20.2) 4:05 – 4:35 PM	
(Invited) Aspect Ratio Trapping: A Unique Technology for Integrating Ge and III-Vs with Silicon CMOS	963
<i>J. G. Fiorenza, J. Park, J. Hydrick, J. Li (AmberWave Systems Corporation, USA), J. Li, M. Curtin, M. Carroll, and A. Lochtefeld (AmberWave Inc., USA)</i>	
(20.3) 4:35 – 4:55 PM	
Epitaxial Growth on High Aspect Ratio Structures	977
<i>S. Chopra, V. Tran, B. Wood, Y. Kim, and S. Kuppurao (Applied Materials, USA)</i>	
(20.4) 4:55 – 5:15 PM	
HCl Selective Etching of SiGe versus Si in Stacks Grown on (110)	985
<i>J. Hartmann, V. Destefanis (CEA-LETI, Minattec, France), G. Rabillé, and S. Monfray (STMicroelectronics, France)</i>	
(20.5) 5:15 – 5:35 PM	
Phosphorus Atomic Layer Doping in Si Using PH ₃	995
<i>Y. Yamamoto (IHP, Germany), J. Murota (Tohoku University, Japan), and B. Tillack (IHP and TU Berlin, Germany)</i>	
(20.6) 5:35 – 5:55 PM	
Non-Contact and Non-Destructive Characterization of Laser Spike Annealed Si _{1-x} Ge _x /Si	1003
Using Very High Resolution Multiwavelength Raman Spectroscopy	
<i>W. Yoo, T. Ueda, T. Ishigaki, and K. Kang (WaferMasters, Inc., USA)</i>	

Chapter 21

Related Compounds II

Thursday PM (Concurrent Session)

Session Chair: A. Reznicek

(21.1) 4:35 – 4:55 PM	
Defect-Induced Surface Morphological Evolution in Epitaxial Germanium Growth on Silicon	1015
<i>Y. Huang, X. Tao, M. Jin, C. Wang, and E. Sanchez (Applied Materials, Inc., USA)</i>	
(21.2) 4:55 – 5:15 PM	
Observation of CMOS Device Channel Strain Using In-line HRXRD	n/a
<i>J. R. Holt, A. Madan, C. Murray (IBM, USA), M. V. Holt (Argonne National Lab, USA), S. Bedell, E. C. Harley, T. N. Adam, T. Pinto, D. Schepis (IBM, USA)</i>	

(21.3) 5:15 – 5:35 PM

Self-Aligned NiGeSi Contacts on Gallium Arsenide for III-V MOSFETs

1021

X. Zhang, H. Guo, H. Chin, X. Gong, P. Lim, and Y. Yeo

(National University of Singapore, Singapore)

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