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# SiGe and Ge: Materials, Processing, and Devices

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<i>V. Carron, M. Ribeiro, P. Besson, G. Rolland, J. Hartmann, V. Loup, S. Minoret, L. Clavelier, C. Leroyer and T. Billon (CEA-DRT-LETI - CEA/GRE)</i>	
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<i>R. Wittmann, S. Uppal, A. Hoessinger, J. Cervenka and S. Selberherr (University of Vienna)</i>	
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## Chapter 11 Ge FETs and e-SiGe Devices

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<i>H. Shang, J. O. Chu, S. W. Bedell and J. Ott (IBM)</i>	
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<i>P. Verheyen, S. Severi, G. Eneman, R. Loo, D. Shamiryan, R. Rooyackers, M. Demand, A. Veloso, A. Lauwers, K. De Meyer, P. Absil, M. Jurczak and S. Biesemans (IMEC, KULeuven, The Fund for Scientific Research)</i>	

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*T. Kammler, I. Peidous, A. Wei, C. Reichel, S. Heinemann, K. Romero and H. Engelmann (AMD)*

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*A. Wei, T. Kammler, I. Cayrefourcq, J. Höntschel, A. Mowry, H. Bierstedt, A. Hellmich, K. Hempel, J. Rinderknecht, B. Trui, R. Otterbach, M. Horstmann, F. Metral, M. Kennard and E. Guiot (AMD, Parc technologique des Fontaines)*

Coffee Break 3:15 – 3:30 PM

## Chapter 12 SiGe and Ge Optoelectronics

Wednesday PM  
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 Co-Chair: L. Colace

(12.1) 3:30 – 4:00 PM  
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*J. A. Carlin, C. Andre, O. Kwon, M. Gonzalez, M. Lueck, E. Fitzgerald, D. Wilt and S. Ringel (Ohio State University, Air Force Research Laboratory, Akso Nobel Chemical LLC, Lumileds, MIT)*

(12.2) 4:00 – 4:30 PM  
 Stimulated THz Emission of Strained p-Ge and SiGe/Si Quantum-Well Structures Doped with Shallow Acceptors. \* 745  
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*F. X. Kaertner, H. Byun, F. Grawert, J. Gopinath, H. Shen, E. Ippen, S. Akiyama, J. Liu, K. Wada and L. Kimerling (MIT)*

(12.4) 5:00 – 5:20 PM  
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*J. Fedeli, J. Damlencourt, L. El Melhaoui, Y. Le Cunff, V. Mazzochi, L. Vivien, D. Marris Morini, M. Rouvière, D. Pascal, X. Le Roux, E. Cassan, S. Laval, P. Grosse and S. Poncet (CEA-DRT/LETI, Paris-South University, STMicroelectronics)*

(12.5) 5:20 – 5:40 PM	
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<i>L. Colace, G. Masini and G. Assanto (University Roma Tre)</i>	

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### Chapter 13 Workshop on Germanium for CMOS

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Workshop Mixer	
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<i>S. W. Bedell, K. Fogel, A. Reznicek, J. Ott and D. Sadana (IBM)</i>	
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<i>K. Saraswat (Stanford University)</i>	
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<i>S. Takagi, N. Taoka, S. Nakaharai, K. Ikeda, T. Tezuka, Y. Yamashita, Y. Moriyama, T. Maeda and N. Sugiyama (MIRAI-AIST, MIRAI-ASET, The University of Tokyo)</i>	

Thursday November 2, 2006

**Chapter 14**  
**Advanced SiGe Deposition Processes**

Thursday AM

Session Chair: R. Loo

Co-Chair: J.-M. Hartmann

(14.1) 8:00 – 8:30 AM

Advanced Applications of Semiconductor Epitaxy for Cutting Edge Integrated Circuit Technology \* 833

*D. Sadana, M. Yang, S. W. Bedell, A. Reznicek, J. P. de Souza and H. J. Hovel (IBM)*

(14.2) 8:30 – 9:00 AM

Development of High-Throughput Batch-Type Epitaxial Reactor \* 841

*Y. Kunii, Y. Inokuchi, J. Wang, K. Yamamoto, A. Moriya, Y. Hashiba, H. Kurokawa and J. Murota (Hitachi Kokusai Electric, and Tohoku University)*

(14.3) 9:00 – 9:20 AM

The Deposition of Polycrystalline SiGe with Different Ge Precursors 849

*X. Shi, M. Schaekers, F. Leys, R. Loo, M. R. Caymax, S. Brus, C. Zhao, B. Lamare, E. Woelk and D. Shenai (IMEC, Rohm and Haas Electronic Materials)*

(14.4) 9:20 – 9:40 AM

A Study on B Atomic Layer Formation for B-Doped Si<sub>1-x</sub>Ge<sub>x</sub>(100) Epitaxial Growth Using Ultraclean LPCVD System 861

*K. Ishibashi, M. Sakuraba, J. Murota, Y. Inokuchi, Y. Kunii and H. Kurokawa (Res. Inst. Electr. Comm., Tohoku University)*

(14.5) 9:40 – 10:00 AM

Development of Novel Germanium Compounds for Use in SiGe Epitaxy 867

*D. Shenai, R. DiCarlo, M. Power, A. Amamchyan, R. Goyette, E. Woelk and I. Sagnes (Rohm & Haas Electronic Materials, and CNRS-LPN)*

Coffee Break 10:00 – 10:15 AM

**Chapter 15**  
**SiGe HBT Applications**

Thursday AM

Session Chair: A. Chantre

Co-Chair: M. Ostling

(15.1) 10:15 – 10:45 AM

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*G. Meinhardt, J. Kraft and H. Zimmermann (Austriamicrosystems, Vienna University of Technology)*



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	<i>J. D. Cressler (Georgia Tech)</i>	
(15.3) 11:15 – 11:35 AM		
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	<i>S. Jouan, A. Talbot, S. Haendler, P. Mans, A. Perrotin and A. Monroy (STMicroelectronics)</i>	
(15.4) 11:35 – 11:55 AM		
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(15.5) 11:55 AM – 12:15 PM		
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	<i>Z. Feng, G. Niu, C. Zhu, L. Najafzadeh and J. D. Cressler (Auburn University, Georgia Tech)</i>	
(15.6) 12:15 – 12:35 PM		
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	<i>Y. Borokhovych and H. Gustat (IHP)</i>	
Lunch Break 12:35 – 1:50 PM		

## Chapter 16 Si/SiGe Hetero-Layer FETs and Device Physics

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(16.1) 1:50 – 2:20 PM		
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	<i>T. P. Ernst, F. Andrieu, O. Weber, J. Hartmann, C. Dupre, O. Faynot, J. Barbe, J. Eymery, S. Barraud, F. Ducroquet, G. Ghibaudo and S. Deleonibus (CEA-LETI)</i>	
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	<i>C. Ni Chleirigh, O. Olubuyide and J. L. Hoyt (MIT)</i>	
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	<i>K. Fujinaga (Hokkaido Institute of Technology)</i>	

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<i>H. Yuan, N. Jiang, E. Croke and Z. Ma (University of Wisconsin-Madison, HRL Laboratories)</i>		
(16.5) 3:20 – 3:40 PM		
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<i>M. Enciso-Aguilar, N. Zerounian, T. Hackbarth, H. Herzog and F. Aniel (Paris-South University, Instituto Politecnico Nacional, DCAG)</i>		
(16.6) 3:40 – 4:00 PM		
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<i>L. Yan, S. H. Olsen, M. Kanoun, M. Al-Arjami, R. Agaiby, G. Dalapati and A. O'Neill (University of Newcastle)</i>		
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## Chapter 17 Substrate Technology

Thursday PM		
Session Chair:	D. Houghton	
Co-Chair:	I. Cayrefourcq	
(17.1) 4:15 – 4:45 PM		
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<i>N. Sugiyama, T. Tezuka, T. Irisawa, K. Usuda, Y. Moriyama, S. Nakaharai, N. Hirashita and S. Takagi (MIRAI-ASET, MIRAI-AIST, The University of Tokyo)</i>		
(17.2) 4:45 – 5:05 PM		
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<i>V. Terzieva, M. R. Caymax, L. Souriau, M. M. Meuris, F. Clemente and A. Benedetti (IMEC)</i>		
(17.3) 5:05 – 5:25 PM		
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<i>T. Shimura, M. Shimizu, S. Horiuchi, H. Watanabe and K. Yasutake (Osaka University)</i>		
(17.4) 5:25 – 5:55 PM		
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<i>M. Luysberg, N. Hueging, D. Buca, H. Trinkaus and S. Mantl (Research Centre Juelich)</i>		
(17.5) 5:55 – 6:15 PM		
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<i>S. Mantl, D. Buca, B. Holländer, S. Lenk, N. Hueging, M. Luysberg, R. Carius, R. Loo, M. R. Caymax, H. Schäfer, I. Radu, M. Reiche, S. Christiansen and U. Goesele (Institut für Schichten und Grenzflächen, Center of Nanoelectronic Systems for Information Technology, Institut für Festkörperforschung, Institut für Photovoltaik, IMEC, Infineon, Max Planck Institute of Microstructure Physics)</i>		

(17.6) 6:15 – 6:35 PM  
Dislocation Pile-Up Quantification Using Automated Room Temperature Photoluminescence Mapping 1057  
*A. Buczkowski, N. Laurent, A. Shachaf, T. Walker, S. Hummel, C. Berne and M. Kennard (Accent Optical Technologies, SOITEC)*

### Friday November 3, 2006

### Chapter 18 SiGe and Ge Processing II

Friday AM  
Session Chair: B. Tillack  
Co-Chair: M. Miyao

(18.1) 8:00 – 8:30 AM  
Dopant Diffusion in SiGeC Alloys \* 1069  
*H. Rucker, B. Heinemann, R. Kurps and Y. Yamamoto (IHP)*

(18.2) 8:30 – 9:00 AM  
Thin Germanium-Carbon Layers on Silicon for MOS Applications \* 1077  
*D. Q. Kelly, I. Wiedmann, D. Garcia-Gutierrez, M. Jose-Yacamán and S. K. Banerjee (University of Texas at Austin)*

(18.3) 9:00 – 9:20 AM  
Thermal Redistribution of Oxygen and Carbon in Sub-50 NM Strained Layers of Boron Doped SiGeC 1087  
*D. Enicks and G. Oleszek (ATMEL Corp., and University of Colorado)*

(18.4) 9:20 – 9:40 AM  
Ge Diffusion in Strained Si / Relaxed SiGe Heterostructures 1099  
*Y. Bogumilowicz, J. Barnes, P. Holliger, D. Rouchon, N. Daval, J. Hartmann, A. Abbadie, F. Lallemand, E. Guiot, T. Akatsu, C. Deguet and N. Kernevez (CEA-LETI/3DSi, SOITEC)*

(18.5) 9:40 AM – 10:00 AM  
Characterization of Ge Implanted with Ni and Hf Ions 1109  
*S. Sioncke, E. R. Simoen, T. Janssens, M. M. Meuris, P. W. Mertens, S. Forment, P. Clauws and A. Theuwis (IMEC, Ghent University, Umicore)*

Coffee Break 10:00 – 10:15 AM

## Chapter 19 Emerging Materials, Devices and Applications

Friday PM		
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Co-Chair:	M. Reiche	
(19.1) 10:15 – 10:45 AM		
Integration of SiGe to MEMS Applications *		1123
<i>M. Reiche (Max-Planck-Institut für Mikrostrukturphysik)</i>		
(19.2) 10:45 – 11:05 AM		
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<i>C. W. Low, T. King Liu and R. T. Howe (University of California at Berkeley, Stanford University)</i>		
(19.3) 11:05 – 11:35 AM		
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<i>Y. Yeo (National University of Singapore)</i>		
(19.4) 11:35 – 11:55 AM		
Power Output Improvement of Silicon-Germanium Thermoelectric Generators		1151
<i>M. Wagner, G. Span, S. Holzer, O. Triebel, T. Grasser and V. Palankovski (University of Vienna)</i>		
(19.5) 11:55 AM – 12:15 PM		
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<i>R. R. Ward, W. Dawson, L. Zhu, R. Kirschman, G. Niu, M. Nelms, O. Mueller, M. Hennessy, E. Mueller, R. Patterson, J. Dickman and A. Hammoud (GPD Optoelectronics Corp., Auburn University, LTE-Low Temperature Electronics, MTECH Laboratories, MASA Glenn Research Center, QSS Group Inc.)</i>		
(19.6) 12:55 – 12:35 PM		
Halide Passivation of Germanium Nanowires		1175
<i>H. Jagannathan, J. Kim, M. Deal, M. Kelly and Y. Nishi (Stanford University)</i>		
Lunch Break 12:35 – 1:50 PM		

## Chapter 20 Surface Treatment and MIS Characterization

Friday PM		
Session Chair:	M. Heyns	
Co-Chair:	S. Miyazaki	
(20.1) 1:50 – 2:10 PM		
Study of the Surface Cleaning of GOI and SGOI Substrates for Ge Epitaxial Growth		1183
<i>Y. Moriyama, N. Hirashita, E. Toyoda, K. Usuda, S. Nakaharai, N. Sugiyama and S. Takagi (MIRAI-ASET, Toshiba Ceramics, MIRAI-AIST, University of Tokyo)</i>		
(20.2) 2:10 – 2:30 PM		
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<i>J. Kim, J. McVittie, K. Saraswat, Y. Nishi, S. Liu and S. Tan (Stanford University)</i>		
(20.3) 2:30 – 2:50 PM		
Scanning Tunneling Microscopy Study on the Reaction of Oxygen with Clean Ge(001) Surfaces		1197
<i>A. Sakai, Y. Wakazono, O. Nakatsuka, S. Zaima and M. Ogawa (Nagoya University)</i>		
(20.4) 2:50 – 3:10 PM		
Atomic-Order Thermal Nitridation of $\text{Si}_{1-x}\text{Ge}_x(100)$ at Low Temperatures by $\text{NH}_3$		1205
<i>N. Akiyama, M. Sakuraba and J. Murota (Tohoku University)</i>		
(20.5) 3:10 – 3:30 PM		
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<i>J. Liao, M. Canonico, M. Robinson and D. Schroder (Arizona State University)</i>		
(20.6) 3:30 – 3:50 PM		
Comparison of Electrical and Structural Properties of $\text{HfO}_2$ Thin Films on Strained and Relaxed $\text{Si}_{1-x}\text{Ge}_x$		1223
<i>T. Park, J. Kim and C. Hwang (Seoul National University)</i>		
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Dielectric Relaxation and Defect Generation Under Pulsed and Constant Voltage Stressing of Ultrathin $\text{TiO}_2$ Films on Strained-Si/ $\text{Si}_{0.8}\text{Ge}_{0.2}$		1229
<i>M. K. Bera, S. Saha and C. Maiti (Indian Institute of Technology, Vidyasagar University)</i>		

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