

SELECTED RECENT PUBLICATIONS

Review Articles, Monographs and Book Chapters:

1. "Improved CMOS Performance via Enhanced Carrier Mobility", P.M. Mooney, *Interface* (Special Issue: Silicon Based Electronics: A Series of Perspectives) **14**, 35 (2005).
2. "Electronic Structure and Microstructure of Strain-Relaxed SiGe Films", P.M. Mooney and Kai Shum, in *SiGeC Alloys*, Eds. Sokrates Pantelides and Stefan Zollner, (Gordon and Breach Science Publishers, New York, 2002) pp. 167-193.
3. "SiGe Technology: Heteroepitaxy and High-Speed Microelectronics" P.M. Mooney and J.O. Chu, *Annual Reviews of Materials Science* **30**, 335-362 (2000).
4. "Grazing Incidence Reciprocal Space Mapping of Partially Relaxed SiGe Films", P.M. Mooney, *J. Mat. Sci.: Mat. in Electron.* **10**, 209 (1999).
5. "Defect Identification Using Capacitance Spectroscopy", P.M. Mooney, in *Identification of Defects in Semiconductors.*, Ed. M. Stavola, in the series *Semiconductors and Semimetals* (Academic Press, San Diego, 1999) pp. 93-152.
6. "Strain Relaxation and Dislocations in SiGe/Si Structures", P.M. Mooney, *Materials Science and Engineering Reports*, **R17**, 105 (1996).

Publications in Refereed Journals and Conference Proceedings:

1. "N-channel MOSFETS fabricated on He-implanted and annealed SiGe buffer layers", P.M. Mooney, K. Rim, S.H. Christiansen, K.K. Chan, J.O. Chu, J. Cai, H. Chen, J.L. Jordan-Sweet, Y.Y. Yang and D.C. Boyd, *Solid-State Electronics* **49**, 1669 (2005).
2. "Dislocation-free strained silicon-on-silicon by in-place bonding", G.M. Cohen, P.M. Mooney, V. K. Paruchuri and H.J. Hovel, to appear in *Appl. Phys. Lett.* **86**, 251902 (2005).
3. "Comparison of large-scale layer-relaxation simulations with experiment", K. Schwarz, J. Cai and P.M. Mooney, *Appl. Phys. Lett.* **85**, 2238 (2004).
4. "Elastic strain relaxation in free-standing SiGe/Si structures", P.M. Mooney, G.M. Cohen and J.O. Chu, *Appl. Phys. Lett.* **84**, 1093 (2004).
5. "Influence of He implantation conditions on strain relaxation and threading dislocations density in Si_{0.8}Ge_{0.2} virtual substrates", J. Cai, P.M. Mooney, S.H. Christiansen, H. Chen, J.O. Chu and J.A. Ott, *Mat. Res. Soc. Symp. Proc.* **809**, 51 (2004).
6. "Strained Si-on-Insulator Fabricated from Elastically-Relaxed Si/SiGe Structures", P.M. Mooney, G.M. Cohen, H. Chen, J.O. Chu and N. Klymko, *Mat. Res. Soc. Symp. Proc.* **809**, 27 (2004).
7. "Strain relaxation and threading dislocation density in helium-implanted and annealed Si_{1-x}Ge_x/Si (001) heterostructures", J. Cai, P.M. Mooney, S.H. Christiansen, H. Chen, J.O. Chu and J.A. Ott, *J. Appl. Phys.* **95**, 5347 (2004).
8. "Probing strain fields about thin film structures using x-ray microdiffraction", C.E. Murray, I.C. Noyan, P.M. Mooney, B. Lai and Z. Cai, *Mat. Res. Soc. Symp. Proc.* **795**, 289 (2004).

9. "Mapping of strain fields about thin film structures using x ray microdiffraction", C.E. Murray, I.C. Noyan, P.M. Mooney, B. Lai and Z. Cai, *Appl. Phys. Lett.* **83**, 4163 (2003) and *Virtual Journal of Nanoscience and Technology*, 11/24/2003.
10. "High-Quality Crystalline Layer Transfer from a Silicon-on-Insulator Substrate onto a Sapphire Substrate Using Wafer Bonding", D.V. Singh, L. Shi, K.W. Guarini, P.M. Mooney, S.J. Koester and A. Grill, *J. Electron. Mater.* **32**, 1339 (2003).
11. "Free standing silicon as a compliant substrate for SiGe", G.M. Cohen, P.M. Mooney and J.O. Chu, *Mat. Res. Soc. Symp. Proc.* **768**, 9 (2003).
12. "Characterization of Si/SiGe Heterostructures for Strained Si CMOS", P.M. Mooney, S.J. Koester, H.J. Hovel, J.O. Chu, K.K. Chan, J.L. Jordan-Sweet, J.A. Ott, N. Klymko and D.M. Mocuta, CP683, *Characterization and Metrology for ULSI Technology: 2003 International Conference*, Eds. D.G. Seilor, A.C. Diebold, T.J. Schaffner, R. McDonald, S. Zollner, R.P. Khosla and E.M. Secula (American Institute of Physics, Mellville, NY, 2003) pp. 213-222.
13. "High-resolution x-ray diffraction for characterization and monitoring of silicon-on-insulator fabrication processes", G.M. Cohen, P.M. Mooney, H. Park, C. Cabral, Jr. and E.C. Jones, *J. Applied. Phys.* **93**, 245 (2003).
14. "Characterization and monitoring of silicon-on-insulator fabrication processes by high-resolution x-ray diffraction", G.M. Cohen, P.M. Mooney, H. Park, C. Cabral, Jr. and E.C. Jones, *Mat. Res. Soc. Symp. Proc.* **717**, 89 (2002).
15. "Materials for Strained Silicon Devices", P.M. Mooney, *International Journal of High Speed Electronics and Systems*, **12**, 305 (2002); and in *Frontiers in Electronics; Future Chips (proceedings of the 2002 Workshop on Frontiers in Electronics (WOFE-02))*, Eds. Yoon Soon Park, Michael S. Shur and William Tang, (World Scientific, New Jersey, 2002) pp. 99-108.
16. "Thermal Stability of Strained Si on Relaxed SiGe Buffer Layers", P.M. Mooney, S.J. Koester, J.A. Ott, J.L. Jordan-Sweet, J.O. Chu and K.K. Chan, *Mat. Res. Soc. Symp. Proc.* **686**, 3-8 (2002).
17. "Strain relaxation mechanisms in He⁺-implanted and annealed SiGe layers on Si(001) substrates", S.H. Christiansen, P.M. Mooney, J.O. Chu and A. Grill, *Mat. Res. Soc. Symp. Proc.* **686**, 27-32 (2002).
18. "Observation of columnar microstructure in step-graded SiGe/Si films using high resolution x-ray microdiffraction, D.E. Eastman, C.B. Stagarescu, G. Xu, P.M. Mooney, J.L. Jordan-Sweet, B. Lai and Z. Cai., *Phys. Rev. Lett.* **88**, 156101 (2002).
19. "Scanning x-ray microtopographs of misfit dislocations at SiGe/Si interfaces", P.M. Mooney, J.L. Jordan-Sweet and S.H. Christiansen, *Appl. Phys. Lett.* **79**, 2363 (2001).
20. "Effect of thermal processing on strain relaxation and interdiffusion in Si/SiGe heterostructures studies using Raman spectroscopy", S.J. Koester, K. Rim, J.O. Chu, P.M. Mooney, J.A. Ott and M.A. Hargrove, *Appl. Phys. Lett.* **79**, 2148 (2001).
21. "SiGe MOSFET Structures on Silicon-on-Sapphire Substrates Grown by Ultra-High Vacuum Chemical Vapor Deposition", P.M. Mooney, J.O. Chu and J.A. Ott, *J. Electron. Mater.* **29**, 921 (2000).

22. "Quantum indistinguishability effects of confined polyexcitons", K. Shum, P.M. Mooney, and J.O. Chu, *Phys. Rev. B* **60**, 5786 (1999).
23. "Images of Local Tilted Regions in Strain-Relaxed SiGe Layers" P.M. Mooney, J.L. Jordan-Sweet, I.C. Noyan, S.K. Kaldor, and P.-C. Wang, *Physica B* **273-274**, 608 (1999).
24. "Characterization of the silicon on insulator (SOI) film in bonded wafers by high resolution x-ray diffraction ", G.M. Cohen, P.M. Mooney, E.C. Jones, K.K. Chan, P.M. Solomon and H-S.P. Wong, *Appl. Phys. Lett.* **69**, 1247 (1999).
25. "Observation of Local Tilted Regions in Strain-Relaxed SiGe/Si Buffer Using X-Ray Microdiffraction", P.M. Mooney, J.L. Jordan-Sweet, I.C. Noyan, S.K. Kaldor and P.-C. Wang, *Appl. Phys. Lett.* **74**, 726 (1999).
26. "High Resolution X-Ray Diffraction Applied to Strain Relaxation of Lattice Mismatched Semiconductor Films", P.M. Mooney and J.L. Jordan-Sweet, *Advances in X-Ray Analysis* **41**, Proceedings of the 46th Annual Conference on Applications of X-ray Analysis, August 4-8, 1997, Steamboat Springs, CO (International Centre for Diffraction Data, CD-ROM, 1999).
27. "X-Ray Diffraction Analysis of SiGe/Si Heterostructures on Sapphire Substrates", P.M. Mooney, J.A. Ott, J.O. Chu and J.L. Jordan-Sweet, *Appl. Phys. Lett.* **73**, 924 (1998).
28. "Analysis of SiGe FET Structures on Silicon-on-Sapphire Substrates by X-Ray Diffraction", P.M. Mooney, J.O. Chu, J.A. Ott, J.L. Jordan-Sweet, W.B. Dubbelday, K.L. Kavanagh, I. Lagnado and B.S. Meyerson, *Mat. Res. Soc. Symp. Proc.* **533**, 55 (1998).
29. "Dislocation-Related Electronic States in Strain-Relaxed Si_{1-x}Ge_x /Si Epitaxial Layers Grown at Low Temperature", P.M. Mooney and Kai Shum, *Defects in Semiconductors ICDS-19*, *Mat. Sci Forum* **258-263**, 151 (1997).
30. "Dislocation-related photoluminescence peak shift due to atomic interdiffusion in SiGe/Si", Kai Shum, P.M. Mooney and J.O. Chu, *Appl. Phys. Lett.* **71**, 1074 (1997).
31. "Defect States in Relaxed SiGe Layers", P.M. Mooney, L. Tilly, C.P. D'Emic, J.O. Chu, F. Cardone and F.K. LeGoues, *J. Appl. Phys.* **82**, 688 (1997).
32. "Quantum Confined Biexcitons in SiGe grown on Si", Kai Shum, P.M. Mooney, L.P. Tilly, and J.O. Chu, *Phys. Rev. B* **55**, 13058 (1997).
33. "Dislocation-Related Photoluminescence in Strain-Relaxed SiGe Buffer Layer Structures", Kai Shum, P.M. Mooney and J.O. Chu, *Mat. Res. Soc. Conf. Proc.* **442**, 325 (1997).
34. "Unique X-Ray Diffraction Pattern at Grazing-Incidence from Misfit Dislocations in SiGe Thin Films", J.L. Jordan-Sweet, P.M. Mooney, M.A. Lutz, R.M. Feenstra, J.O. Chu and F.K. LeGoues, *J. Appl. Phys.* **80**, 89 (1996).
35. "Near Band-Edge Photoluminescence in Relaxed Si_{1-x}Ge_x Layers, L.P. Tilly, P.M. Mooney, J.O. Chu, and F.K. LeGoues, *Appl. Phys. Lett.* **67**, 2488 (1995).
36. "Relaxed Si_{0.7}Ge_{0.3} Buffer Layers for High-Mobility Devices", P.M. Mooney, J.L. Jordan-Sweet, K. Ismail, J.O. Chu, R.M. Feenstra and F.K. LeGoues, *Appl. Phys. Lett.* **67**, 2373 (1995).
37. "High Resolution X-Ray Diffraction Measurements of Strain Relaxed SiGe/Si Structures", P.M. Mooney, J.L. Jordan-Sweet, G.B. Stephenson, F.K. LeGoues, and J.O. Chu, in *Advances in X-Ray Analysis*, **38**, 181 (1995).

38. "Evolution of Strain Relaxation in Step-Graded SiGe/Si Structures", P.M. Mooney, J.L. Jordan-Sweet, J.O. Chu, and F.K. LeGoues, *Appl. Phys. Lett.* **66**, 3542 (1995).
39. "High-Resolution X-Ray Diffraction Measurements of SiGe/Si Structures", J.L. Jordan-Sweet, P.M. Mooney and G.B. Stephenson, *Mat. Res. Soc. Symp. Proc.* **375**, 201 (1995).