長庚大學 電子工程學系
Department of Electronic Engineering

Dr. Siddheswar Maikap

Dr. Siddheswar Maikap (麥凱)

Associate Professor

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LAB: Thin Film Nano Tech. Lab (E0809)

Educations:

1. Ph.D., Indian Institute of Technology, Kharagpur, India (1998/01~2003/02)
2. M. Sc., Vidyasagar University, Midnapore, West Bengal, India (1993-1995)

Experiences:

1. Associate Professor, Department of Electronic Engineering, Chang Gung University, Taiwan, R.O.C. (2009/08-till date)
2. Assistant Professor, Department of Electronic Engineering, Chang Gung University, Taiwan, R.O.C. (2006/06-2009/07)
3. Engineer, Electronics and Opto-Electronics Research Lab., Industrial Technology Research Institute, Hsinchu, Taiwan, R.O.C. (2004/08-2006/06)
4. Postdoc, Department of Electrical Engineering, National Taiwan University, Taiwan, R.O.C. (2003/02-2004/07)
5. Researcher, Center for Microstructure Science of Materials, Seoul National University, South Korea (2001/09-2002/12)
6. Research Assistant, Indian Institute of Technology, Kharagpur, India (1995~1997/12)

Courses:

Solid-State Device Physics

Advanced Memory Devices

Nanoscale Device Physics

Nanostructure Materials and Nanotechnology

Fundamentals of Complex Analysis

Introduction to Engineering

High-k Gate Dielectrics and Its Applications

Basic Electronic Circuit Experimental

Specializations:

Flash and Resistive Switching Memory Devices

Biosensor Devices

High-k Dielectrics

Nanocrystals

Si and Ge nanowire Devices

Biography:

S. Maikap was born in Contai, Midnapore, West Bengal, India on 28th October, 1968. He received the Ph. D degree in Physics & Meteorology, Indian Institute of Technology (IIT), Kharagpur, India, in Feb. 2003. He developed low temperature oxides on strained SeGe layers for high mobility MOSFET applications. He received the B. Sc. (Contai P. K. College) and M. Sc. degrees in Physics from the Vidyasagar University, West Bengal, India, in 1993 and 1995, respectively. He focused in his M. Sc. thesis on electronic transport through multi-level quantum wells. He was a Research Assistant in Cryogenic Engineering and Department of Electrical and Electronic Communication Engineering, IIT, Kharagpur, from 1995 to 1997. He developed low temperature polymer material thermal conductivity and metal-oxide-semiconductor capacitors. From 2001 to 2002, he was a Researcher in Center for Microstructure Science of Materials, Seoul National University, South Korea. In this period 2001-2002, his research topic was Cu charged cluster formation in physical vapor deposition. He has developed also Ge nanocrystal for flash memory and high-k gate dielectrics on strained SiGe layers for nanoscal high mobility MOSFET applications. From 2003 to July 2004, he was working as a Post-doctoral Fellow with the Department of Electrical Engineering, National Taiwan University, Taiwan. He developed strained Si CMOS in EOL/ITRI, Hsinchu, Taiwan. He was an Engineer in EOL/ITRI, Hsinchu, Taiwan from 2004-2006. He developed Atomic Layer Deposited (ALD) metal nanocrystal, high-k multi-layers for high-performance

flash memory applications. He joined as an Assistant Professor in Department of Electronic Engineering, Chang Gung University, Tao-Yuan since July 2006. He was an Associate Professor in the same University from 2009-till date. His current research interests include the fabrication and characterization of nanoscale nonvolatile memory devices and Biosensors .

International Journal Papers:

1. S. Maikap, L. K. Bera, S. K. Ray and C. K. Maiti, "NO/O_2/NO plasma grown oxynitride films on strained-$Si_{1-x}Ge_x$", Electron. Lett., vol. 35, pp. 1202-1203, 1999. (SCI Impact Factor=1.004)
2. S. Maikap, L. K. Bera, S. K. Ray, S. John, S. K. Banerjee and C. K. Maiti, "Electrical characterization of Si/ $Si_{1-x}Ge_x$/Si quantum well heterostuctures using a MOS capacitor", Solid-State. Electron., vol. 44, pp. 1029-1034, 2000. (SCI Impact Factor=1.440)
3. S. Maikap, S. K. Ray, S. John, S. K. Banerjee and C. K. Maiti, "Electrical characterization of ultrathin gate oxides on Si/SiGeC/Si quantum well heterostructures", Semicond. Sci. Technol., vol. 15, pp. 761-765, 2000. (SCI Impact Factor= 1.333)
4. L. K. Bera, B. Senapati, S. Maikap and C. K. Maiti, "Effects of O_2/N_2O-plasma treatment on nitride films on strained-Si", Solid-State Electron., vol. 44, pp. 1533-1536, 2000. (SCI Impact Factor=1.440)
5. B. Senapati, S. Samanta, S. Maikap, L. K. Bera and C. K. Maiti, "Effects of NO-plasma treatment on the electrical properties of TEOS-deposited silicon dioxides on strained- $Si_{1-x}Ge_x$ layers", Appl. Phys. Lett., vol. 77, pp. 1840-1842, 2000. (SCI Impact Factor=3.841)
6. C. K. Maiti, L. K. Bera, S. Maikap, S. K. Ray, R. Kesavan, V. Kumar and N. B. Chakrabarti, "Growth of silicon-germanium alloy layers", Defence Scence Journal, vol. 50, pp. 299-315, 2000. (SCI Impact Factor=0.304)
7. G. S. Kar, S. Maikap, A. Dhar and S. K. Ray, "Schottky diode on Si/SiGeC quantum well heterostructures for long wavelength IR detector", Proc. of SPIE Int. Soc, Opt. Eng, vol. 4417, pp. 366-371, 2001. (SCI Impact Factor=0.754)
8. S. Maikap, B. Senapati and C. K. Maiti, "Technology CAD of SiGe-HFETs", Defence Science Journal, vol. 51, pp. 195-197, 2001. (SCI Impact Factor=

0.304)

9. S. Maikap, S. K. Ray, S. K. Banerjee and C. K. Maiti, "Electrical properties of O_2/NO-plasma grown oxynitride films on partially strain compensated Si/$Si_{1-x-y}Ge_xC_y$/Si heterolayers", Semicond. Sci. Technol., vol. 16, pp. 160-163, 2001. (SCI Impact Factor= 1.333)

10. L. K. Bera, B. Senapati, S. Maikap and C. K. Maiti, "Determination of density and distribution of high-voltage stress-induced traps in O_2-, NO- and NO/O_2/NO-plasma grown oxides on strained Si", Solid-State Electron., vol. 45, pp. 379-383, 2001. (SCI Impact Factor=1.440)

11. S. K. Ray, S. Maikap, S. K. Samanta, S. K. Banerjee and C. K. Maiti, "Charge trapping characteristics of ultrathin oxynitrides on Si/$Si_{1-x-y}Ge_xC_y$/Si heterolayers", Solid-State Electron., vol. 45, pp. 1951-1955, 2001. (SCI Impact Factor=1.440)

12. S. K. Samanta, S. Maikap, L. K. Bera, H. D. Banerjee and C. K. Maiti, "Effect of post-oxidation annealing on the electrical properties of deposited oxide and oxynitride films on strained-$Si_{0.82}Ge_{0.18}$ layers", Semicond. Sci. Technol., vol. 16, pp. 704-707, 2001. (SCI Impact Factor=1.333)

13. G. S. Kar, S. Maikap, S. K. Ray, S. K. Banerjee and N. B. Chakrabarti, "Effective mobility and alloy scattering in strain compensated SiGeC inversion layer", Semicond. Sci. Technol., vol. 17, pp. 471-475, 2002. (SCI Impact Factor=1.333)

14. G. S. Kar, S. Maikap, S. K. Banerjee and S. K. Ray, "Hole velocity overshoot in partially strain compensated $Si_{0.793}Ge_{0.2}C_{0.007}$ inversion layers", Electron. Lett., vol. 38, pp. 141-142, 2002. (SCI Impact Factor=1.004)

15. R. Mahapatra, S. Maikap, G. S. Kar and S. K. Ray, "Electrical properties of plasma grown gate oxides on tensile strained $Si_{1-y}C_y$ layers", Electron. Lett. vol. 38, pp. 1000-1001, 2002. (SCI Impact Factor=1.004)

16. G. S. Kar, S. Maikap, S. K. Banerjee, S. K. Ray, "Series resistance and mobility degradation factor in C incorporated SiGe heterostructure p MOSFETs", Semicond. Sci. Technol. vol. 17, pp. 938-941, 2002. (SCI Impact Factor=1.333)

17. S. Nandi, Won-Kook Choi, Young S. Noh, Min S. Oh, S. Maikap, Nong M. Hwang, Doh-Y. Kim, S. Chatterjee, S. Samanta, and C. K. Maiti, "Investigations on Ta_2O_5/ZnO insulator-semiconductor interfaces", Electron. Lett. vol. 38, pp. 1390-1392, 2002. (SCI Impact Factor=1.004)

18. S. K. Samanta, S. Maikap, S.Chatterjee, C.K.Maiti, "Minority carrier

lifetime and diffusion length in $Si_{1-x-y}Ge_xC_y$ heterolayers", Solid-State Electron. vol. 47, pp. 893-897, 2002. (SCI Impact Factor=1.440)

19. S. Chatterjee, S. Nandi, S. Maikap, S. K. Samanta and C. K. Maiti, "Electrical properties of deposited ZrO_2 films on ZnO/n-Si substrates", Semicond. Sci. Technol, vol. 18, pp.1-5, 2003. (SCI Impact Factor=1.333)

20. S. K. Samanta, S. Chatterjee, S. Maikap, L. K. Bera, H. D. Banerjee and C. K. Maiti, "films grown on strained- $Si_{1-x}Ge_x$ substrates", J. Appl. Phys., vol. 93, pp. 2464-2471, 2003. (SCI Impact Factor=2.079)

21. Y. S. Noh, S. Chatterjee, S. Nandi, S. K. Samanta, C.K. Maiti, S. Maikap, W.-K. Choi, "Characteristics of MIS capacitors using Ta_2O_5 films deposited on ZnO/p-Si, Microelectron. Engg. vol. 66, pp. 637-642, 2003. (SCI Impact Factor=1.575)

22. R. Mahapatra, Je Hun Lee, S. Maikap, G. S. Kar, A. Dhar, N. M. Hwang, D. Y. Kim, B. K. Mathur and S. K. Ray, "Electrical and interfacial characteristics of ultra-thin ZrO_2 gate dielectrics on strain compensated SiGeC/Si heterostructure", Appl. Phys. Lett. vol. 82, pp. 2320-2322, 2003. (SCI Impact Factor=3.841)

23. R. Mahapatra, S. Maikap, Je Hun Lee, G. S. Kar, A. Dhar, B. K. Mathur, N. M. Hwang, D. Y. Kim and S. K. Ray, "Effects of interfacial nitrogen on the structural and electrical properties of ultra thin ZrO_2 gate dielectrics on partially strain compensated SiGeC/Si heterolayers", Appl. Phys. Lett, vol. 82, pp. 4331-4333, 2003. (SCI Impact Factor=3.841)

24. Je-Hun Lee, S. Maikap, Doh. Y. Kim, R. Mahapatra, S. K. Ray, Y. S. Noh and W.-K. Choi, "Characteristics of ultra-thin HfO_2 gate dielectrics on strained-$Si_{0.74}Ge_{0.26}$ layers", Appl. Phys. Lett, vol. 83, pp. 779-781, 2003. (SCI Impact Factor=3.841)

25. R. Mahapatra, S. Maikap, Je Hun Lee, G. S. Kar, A. Dhar, Doh Y. Kim, D. Bhattacharya and S. K. Ray, "Structural and electrical characteristics of the interfacial layer of ultra-thin ZrO_2 films on partially strain compensated $Si_{0.69}Ge_{0.3}C_{0.01}$ layers", J. Vac. Sci. Technol. A, vol. 21(5), pp.1758-1764, 2003. (SCI Impact Factor=1.291)

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27. K. Das, S. Maikap, A. Dhar, B. K. Mathur and S. K. Ray, "Metal-oxide-semiconductor structure with Ge nanocrystals for memory device applications", Electron. Lett., vol. 39, pp. 1865-1866, 2003. (SCI Impact

Factor=1.004)

28. R. Mahapatra, G. S. Kar, S. K. Ray, and S. Maikap, "Effect of temperature on the electrical properties of plasma grown oxides on $Si_{0.993}C_{0.007}$ layers", J. Mat. Sci.: Mat. Electron, vol. 15, pp. 43-46, 2004. (SCI Impact Factor=0.927)

29. S. K. Samanta, S Chatterjee, S. Maikap and C. K. Maiti, "Ultrathin oxynitride films on strained SiGe layers by a three-step $NO/O_2/NO$ process", Solid-State Electron, vol. 48, pp. 91-97, 2004. (SCI Impact Factor=1.440)

30. S. Maikap, Je Hun Lee and Doh Y. Kim, R. Mahapatra, S. K. Ray, Jae Hoon Song, Y. S. No and Won Kook Choi, "Physical and electrical properties of ultrathin $HfO_2/HfSi_xO_y$ stacked gate dielectrics on compressively strained $Si_{0.74}Ge_{0.26}$/Si heterolayers", J. Vac. Sci. Technol. B, vol. B 22(1), pp. 52-56, 2004. (SCI Impact Factor=1.271)

31. S. Maikap, C.-Y. Yu, S.-R. Jan, M. H. Lee, and C. W. Liu, "Mechanically strained strained-Si NMOSFETs," IEEE Electron Dev. Lett., vol. 25, pp. 40-42, 2004. (SCI Impact Factor=2.719)

32. K. Das, M. NandaGoswami, R. Mahapatra, G. S. Kar, A Dhar, H. N. Acharya, S. Maikap, Je-Hun Lee and S. K. Ray, "Charge storage and photoluminescence characteristics of silicon oxide embedded Ge nanocrystals trilayer structure," Appl. Phys. Lett., vol. 84, pp. 1386-1388, 2004. (SCI Impact Factor=3.841)

33. F. Yuan, S. R. Jan, S. Maikap, Y. H. Liu, C. S. Liang, and C. W. Liu, " Mechanically strained Si/SiGe HBTs", IEEE Electron Dev. Lett., vol. 25, pp. 483-485, 2004. (SCI Impact Factor=2.719)

34. W. C. Hua, M. H. Lee, P. S. Chen, S. Maikap, C. W. Liu and K. M. Chen, "Ge outdiffusion effect on flicker noise in strained-Si NMOSFETs", IEEE Electron Dev. Lett., vol. 25, pp. 693-695, 2004. (SCI Impact Factor=2.719)

35. C. W. Liu, M. H. Lee, Y. C. Lee, P. S. Chen, C. Y. Yu, J. Y. Wei, S. Maikap, "Evidence of Si/ SiGe heterojunction roughness scattering," Appl. Phys. Lett., vol. 85, pp. 4947-4949, 2004. (SCI Impact Factor=3.841)

36. S. K. Ray, R. Mahapatra, S. Maikap, A. Dhar, D. Bhattacharya, and J. H. Lee, "Ultrathin HfO_2 gate dielectrics on partially strain compensated SiGeC/Si heterostructure", Materials Science in Semiconductor Processing, vol. 7, pp. 203-208, 2004. (SCI Impact Factor= 0.650)

37. R. Mahapatra, S. Maikap, A. Dhar, B. K. Mathur, and S. K. Ray,

"Characteristics of high-k ZrO_2 gate dielectrics on O_2/N_2O plasma treated $Si_{0.69}Ge_{0.3}C_{0.01}$/Si heterolayers", Ferroelectrics, vol. 329, pp. 101-105, 2005. (SCI Impact Factor= 0.512)

38. R. Mahapatra, S. Maikap, G. S. Kar and S. K. Ray, "Ultrathin oxynitride films grown on $Si_{0.74}Ge_{0.26}$/Si heterolayers using low energy plasma source nitrogen implantation", Solid-State Electron., vol. 49, pp. 449-452, 2005. (SCI Impact Factor=1.440)

39. S. Maikap, J. H. Lee, R. Mahapatra, S. Pal, Y. S. No, W. K. Choi, S. K. Ray, and D. Y. Kim, "Effects of interfacial NH_3/N_2O plasma treatment on the structural and electrical properties of ultrathin HfO_2 gate dielectrics on p-Si substrates", Solid-State Electron., vol. 49, pp. 524-528, 2005. (SCI Impact Factor=1.440)

40. "Invited review paper" C. W. Liu, S. Maikap, and C. -Y. Yu, "Mobility-enhancement technologies", IEEE Circuits and Devices Magazine, vol. 21 (3), pp. 21-36, 2005. (SCI Impact Factor=1.18)

41. K. C. Liu, S. Maikap, and P. S. Chen, "Characteristics of ultrathin Hf silicate gate dielectrics on $Si_{0.9954}C_{0.0046}$/Si heterolayers", Jpn. J. Appl. Phys., vol. 44, pp. 2447-2449, 2005. (SCI Impact Factor=1.024)

42. P. J. Tzeng, S. Maikap, C. S. Liang, P. S. Chen, and L. S. Lee, "Physical and reliability characteristics of Hf based gate dielectrics on strained SiGe MOS devices", IEEE Trans. Device and Material Reliability, vol. 5, pp. 168-176, 2005. (SCI Impact Factor=1.503)

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44. W. C. Lee, Y. J. Lee, Y.D. Wu, P. Chang, Y.L. Huang, Y.L. Hsu, J.P. Mannaerts, R.L. Lo, F.R. Chen, S. Maikap, L.S. Lee, W.Y. Hsieh, M.J. Tsai, S.Y. Lin, T. Gustffson, M. Hong, J. Kwo, "MBE-grown high-k gate dielectrics of HfO_2 and $(Hf–Al)O_2$ for Si and III–V semiconductors nano-electronics", J. Crystal. Growth, vol. 278, pp. 619-623, 2005. (SCI Impact Factor= 1.746)

45. M. H. Liao, S. T. Chang, M. H. Lee, S. Maikap, and C. W. Liu, "Abnormal hole mobility of biaxial strained-Si", J. Appl. Phys., vol. 98, pp. 066104-1 to 3, 2005. (SCI Impact Factor=2.079)

46. C. H. Lin, Z. Pei, S. Maikap, C. C. Wang, C. S. Lu, L. S. Lee and M. J. Tsai, "The effect of strain on p channel metal oxide semiconductor field effect transistor current enhancement using stress modulation silicon nitride

films", Appl. Phys. Lett., vol. 87, 262109, 2005. (SCI Impact Factor=3.841)

47. J. Y. Wei, S. Maikap, M. H. Lee, C. C. Lee and C. W. Liu, "Hole confinement at Si/SiGe heterojunction of strained-Si N- and PMOS devices", Solid-State Electron., vol. 50, pp. 109-113, 2006. (SCI Impact Factor=1.440)

48. R. Mahapatra, S. Maikap, Je Hun Lee and S. K. Ray, "Characteristics of ZrO_2 gate dielectrics on O_2 and N_2O plasma treated partially strain compensated $Si_{0.69}Ge_{0.3}C_{0.01}$ layers", J. Appl. Phys., vol.100, 034105, 2006. (SCI Impact Factor=2.079)

49. "Invited review paper" S. K. Ray, R. Mahapatra, and S. Maikap, "High-κ gate oxide for silicon heterostructure MOSFET devices", J. Mater. Sci.: Mater. Electron., vol. 17. pp. 689-710, 2006. (SCI Impact Factor=0.927)

50. R. Mahapatra, S. Maikap, and S. K. Ray, " Electrical properties of ultrathin HfO_2 gate dielectrics on partially strain compensated SiGeC/Si heterostructures", J. Electroceram., vol. 16, pp. 545-548, 2006. (SCI, Impact Factor=0.676).

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52. S. Maikap, M. H. Lee, S. T. Chang, and C. W. Liu, "Characteristics of strained germanium p-and n channel field effect transistors on Si (111) substrate", Semicond. Sci. Technol., vol. 22, pp. 342-347, 2007. (SCI Impact Factor=1.333)

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61. S. Maikap, T. Y. Wang, P. J. Tzeng, H. Y. Lee, C. H. Lin, C. C. Wang, L. S. Lee, J. R. Yang, and M. J. Tsai, "Low voltage operation of high κ $HfO_2/TiO_2/Al_2O_3$ single quantum well for nanoscale flash memory device applications", Jpn. J. Appl. Phys., vol. 47, No. 3, pp. 1818-1821, 2008. (SCI Impact Factor=1.024) (Financial supported by NSC-96-2221-E-182-047)

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Invited Talks:

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Awards:

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