

Curriculum Vitae

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Educational background :

1993 ; Toyohashi University of Technology, Dept. Electrical and Electronic Engineering, B.E.

1995 ; Toyohashi University of Technology, Dept. Electrical and Electronic Engineering, M.E.

1998 ; Toyohashi University of Technology, Dept. Electronic and Information Engineering, Ph. D.

Research career :

98.04–99.03. ; JSPS (Japan Society for the Promotion of Science) Research Fellow

99.04–05.03. ; Research Associate, Department of Electrical and Electronic Engineering, Faculty of Engineering, Toyohashi University of Technology.

05.03–Present; Associate Professor, Intelligent Sensing System Research Center, Toyohashi University of Technology.

Research areas :

- (1) Silicon Smart Tactile Image Sensing Devices.
- (2) Physical Sensors with CMOS/MEMS Technology.
- (3) CMOS/MEMS Integration Technologies.
- (4) Integrated Circuits for High Performance Smart Sensing Systems (Low-Noise/Robust).
- (5) Integrated Micro Blood Test System.
- (6) Micro Pneumatic Analog Integrated Circuits with MEMS Technology.

Journal publications (previous 10 years):

1. M. Sudou, **H. Takao**, K. Sawada, M. Ishida, “A Novel RF Induced Power Supply System for Monolithically Integrated Ubiquitous Micro Sensor Nodes,” *Sensors and Actuators A: Physical*, in press, 2007.
2. Radhakrishna V., **H. Takao**, K. Sawada, M. Ishida, “Effect of High Drain Voltage on Stress Sensitivity in nMOSFETs,” *Sensors and Actuators A: Physical*, Vol. 140, pp.89-93, 2007.
3. W. H. Lee, Y. T. Lee, **H. Takao**, K. Sawada, M. Ishida, “Fabrication of Thermoelectric Sensor Using Silicon-on-Insulator Structure,” *Japanese Journal of Applied Physics*, Vol. 46, No. 11, pp. 7232-7236, 2007.
4. M. Sudou, **H. Takao**, K. Sawada, and M. Ishida, “Wafer-level integration technique of surface mount devices on a Si-wafer with vibration energy and gravity force, *IEEE Transactions on Components and Packaging Technologies*, Vol. 30, No. 3, pp. 457-463, Sept. 2007.
5. J. W. Kim, **H. Takao**, K. Sawada, and M. Ishida, “Evaluation of Monolithically Integrated Antennas and RF Transmitters for Silicon Smart Micro Sensors with Wireless-Communication Ability,” *IEEJ Transactions on Electrical and Electronic Engineering*, Vol. 2, No. 3, pp. 365-371, 2007

6. **H. Takao** and M. Ishida, "Pneumatic MEMS In-Channel Microvalves with In-Plane Control Ports for Micro Fluidic Systems Integrated on a Chip Surface," *Sensors and Materials*, Vol. 19, No. 1, pp. 19-34, 2007.
7. K. Sawada, C. Oda, **H. Takao**, and M. Ishida, "Smart Microfluidic Electrochemical DNA Sensors with Signal Processing Circuits," *Japanese Journal of Applied Physics*, Vol. 46, No. 5A, pp. 3135-3138, 2007.
8. T. Hizawa, K. Sawada, **H. Takao**, M. Ishida, "Characteristics of Highly Sensitive pH Sensors with Charge Accumulation Operation," *Japanese Journal of Applied Physics*, Vol. 45, No. 12, pp. 9259-9263, 2006.
9. **H. Takao**, K. Sawada, and M. Ishida, "Monolithic Silicon Smart Tactile Image Sensor with Integrated Strain Sensor Array on Pneumatically Swollen Single Diaphragm Structure", *IEEE Transactions on Electron Devices*, Vol. 53, No. 5, pp. 1250-1259, 2006.
10. T. Noda, **H. Takao**, K. Yoshioka, N. Oku, M. Ashiki, K. Sawada, K. Matsumoto, and M. Ishida, "Performance of Absorption Photometry Microchip for Blood Hemoglobin Measurement Integrated with Processing Circuits and Si (110) 45°-Mirrors", *Sensors and Actuators B Chemical*, in print, 2006.
11. T. Hizawa, K. Sawada, **H. Takao** and M. Ishida, "Fabrication of a two-dimensional pH image sensor using a charge transfer technique", *Sensors and Actuators B: Chemical Volume 117*, pp. 509-515, 2006.
12. Y. Maruyama, K. Sawada, **H. Takao**, and M. Ishida, "A Novel Filterless Fluorescence Detection Sensor for DNA Analysis", *IEEE Transactions on Electron Devices*, Vol. 53, No. 3, pp. 553-558, 2006.
13. Y. Maruyama, K. Sawada, **H. Takao**, M. Ishida, "The fabrication of filter-less fluorescence detection sensor array using CMOS image Sensor technique", *SENSORS AND ACTUATORS A (PHYSICAL)*, 128, pp. 66-70, 2006.
14. Y. Kato, **H. Takao**, K. Sawada, and M. Ishida, "Improvement of MOS Interface Characteristics in CMOS on Si(111) by Combination of Fluorine Implantation and Long-Time Hydrogen Annealing", *Japanese Journal of Applied Physics, Part 2 Letter*, Vol. 45, No. 04, pp. L108-L110, 2006.
15. Md. Shofiqu Islam, H. Ishino, T. Kawano, **H. Takao**, K. Sawada, and M. Ishida, "Realization of *In Situ* Doped n-Type and p-Type Si-Microprobe Array by Selective Vapor-Liquid-Solid (VLS) Growth Method", *Japanese Journal of Applied Physics*, Vol. 44, No. 4B, pp. 2161-2165, 2005.
16. Y. Lee, **H. Takao**, and M. Ishida, "Fabrication of a High-Temperature Silicon Pressure Sensor Using SDB-SOI Technology", *Sensors and Materials*, Vol. 17, No. 5, pp. 269-276, 2005.
17. K. Lee, M. M. Nayak, **H. Takao**, K. Sawada, and M. Ishida, "MEMS based high dose radiation resistant SOI pressure sensor for aerospace applications", *Sensors and Materials*, Vol. 17, No. 5, pp. 237-247, 2005.
18. **H. Takao**, K. Miyamura, M. Ashiki, H. Ebi, K. Sawada, and M. Ishida, "A MEMS Microvalve with PDMS Diaphragm and Two Chamber Configuration of Thermo-Pneumatic Actuator for Integrated Blood Test System on Silicon", *Sensors and Actuators A Physical*, Vol. 119, pp. 468-475, 2005.
19. K. Sawada, T. Ohshina, T. Hizawa, **H. Takao**, and M. Ishida, "A novel fused sensor for photo- and ion-sensing", *Sensors and Actuators B*, Vol. 106, pp. 614-618, 2005.
20. Y. Kato, **H. Takao**, K. Sawada, and M. Ishida, "The Characteristic Improvement of Si (111) MOSFET by Long-Time Hydrogen Annealing", *Japanese Journal of Applied Physics*, Vol. 43, No. 10, pp. 6848-6853, 2004.
21. Y. Kato, T. Hashimoto, L. Y. Ching, **H. Takao**, K. Sawada, M. Ishida, "Fabrication of JFET Device on Si (111) for Sensor Interface Array Circuit", *IEICE Electronics Express*, in print, 2004.
22. **H. Takao**, F. Ina, T. Douzaka, K. Sawada, and M. Ishida, "SOI-CMOS Precision Front-End Amplifier for Wide Range and High Temperature (200°C) Operation of Smart Microsensors", *Sensors and Actuators A Physical*, Vol. 112, No. 2-3, pp. 388-394, 2004.
23. D. Takamuro, **H. Takao**, K. Sawada, and M. Ishida, "Improvement of an Infrared Light Sensitivity in PZT Photosensitive Field Emitter", *Sensors and Actuators A Physical*, Vol. 114, pp. 230-235, 2004.
24. M. Ishida, T. Kawano, M. Futagawa, Y. Arai, **H. Takao**, K. Sawada, "A Si Nano-Micro-Wire Array on a Si(111) Substrate and Field Emission Device Applications", *Superlattices and Microstructures*, Vol. 34, pp. 567-575, 2004.
25. D. Takamuro, **H. Takao**, K. Sawada, and M. Ishida, "Electron Emission Characteristics from a Single Crystalline Ferroelectric Material by an Infrared Light Irradiation", *Journal of Vacuum Science & Technology B*, Vol. 22, No. 3, May/June 2004.
26. T. Noda, **H. Takao**, M. Ashiki, H. Ebi, K. Sawada, M. Ishida, "Characteristics of High-Resolution Hemoglobin Measurement Microchip Integrated with Signal Processing Circuit", *Japanese Journal of Applied Physics*, Vol. 43, No. 4B, pp. 2392-2396, 2004.
27. K. Sawada, T. Shimada, T. Ohshina, **H. Takao**, M. Ishida, "Highly sensitive ion sensors using charge transfer technique", *Sensors and Actuators B Chemical*, Vol. 98, pp. 69-72, 2004.
28. T. Kawano, Y. Kato, R. Tani, **H. Takao**, K. Sawada, and M. Ishida, "Silicon Devices - Selective Vapor-

- Liquid-Solid Epitaxial Growth of Micro-Si Probe Electrode Area with On-Chip MOSFETs on Si (111) Substrates”, IEEE Transactions on Electron Devices, Vol. 51, No. 3, pp. 415-420, 2004.
29. M. Ishida and **H. Takao**, “Microsensor Systems for High Temperature Environment Based on SOI Technology”, Journal of The Surface Finishing Society of Japan, Vol. 55, No. 1, pp. 10-16, 2004.
30. K. Lee, **H. Takao**, K. Sawada, and M. Ishida, “Analysis of Thermal Drift of A Constant Temperature Control Type Three-Axis Accelerometer for High Temperatures”, IEEJ Transactions on Sensors and Micromachines, Vol. 123, No. 12, pp. 583-587, 2003.
31. **H. Takao** and M. Ishida, “Micro Fluidic Integrated Circuits for Signal Processing Using Analogous Relationship between Pneumatic Microvalve and MOSFET”, IEEE/ASME Journal of Microelectromechanical Systems, Vol. 12, No. 4, pp. 497-505, August 2003.
32. D. Takamuro, **H. Takao**, K. Sawada, and M. Ishida, “Electron Emission Characteristic from Pb(Zr,Ti)O₃ Thin Plate by Infrared Light Irradiation”, Japanese Journal of Applied Physics, Vol. 42, Part 1, No. 9A, pp. 5741-5746, Sept. 2003.
33. **H. Takao**, R. Asaoka, K. Sawada, S. Kawahito, M. Ishida, “A JFET-CMOS technology for low-noise sensor interface circuits”, IEEJ Transactions on Sensors and Micromachines, Vol. 123, No. 10, pp. 422-428, 2003.
34. Y. Kato, T. Kawano, Y. Ito, **H. Takao**, K. Sawada, M. Ishida, “Signal Conditioning CMOS Circuits Integrated on Si(111) for Image-Recording Sensor of Neural Activity”, IEEJ Transactions on Sensors and Micromachines, Vol. 123, no. 9, 2003.
35. T. Ono, K. Sawada, Y.-C. Jung, Y. Moriyasu, **H. Takao**, and M. Ishida, “Back-Irradiation Type Photo-Detector Arrays Using Field Emitter Device”, IEICE Transactions on Electronics, vol. E86-C, no. 9, pp. 1805-1809, Sept. 2003.
36. T. Kawano, **H. Takao**, K. Sawada, M. Ishida, “Multichannel 5X5-Site 3-Dimensional Si Microprobe Electrode Array for Neural Activity Recording System”, Japanese Journal of Applied Physics, Vol. 42, Part 1, No. 4B, pp. 2473-2477, April 2003.
37. K. Lee, **H. Takao**, K. Sawada, M. Ishida, “Low Temperature Dependence Three-Axis Accelerometer for High Temperature Environments with Temperature Control of SOI Piezoresistors”, Sensors and Actuators, A Physical, vol. 104, pp. 53-60, 2003.
38. M. Ishida and **H. Takao**, “Silicon Microsensors for Severe Environment Using SOI Technology”, IEEJ Transactions on Sensors and Micromachines, vol. 123, no. 2, pp. 31 - 36, Feb. 2003.
39. **H. Takao**, M. Ishida, and K. Sawada, “A Pneumatically Actuated Full In-Channel Microvalve with MOSFET-Like Function in Fluid Channel Networks”, IEEE/ASME Journal of Microelectromechanical Systems, vol. 11, no. 5, pp. 421-426, Oct. 2002.
40. **H. Takao**, F. Ina, K. Sawada, and M. Ishida, “Clock Feedthrough Reduction of CMOS Autozeroed Operational Amplifiers by Two-Stage Self-Compensation”, IEICE Transactions on Electronics, vol. E85-C, no. 7, pp. 1499-1505, July 2002.
41. M. Akiyama, M. Hanada, **H. Takao**, K. Sawada, and M. Ishida, “Excess Noise Characteristics of Hydrogenated Amorphous Silicon p-i-n Photodiode Films”, Japanese Journal of Applied Physics, vol. 41, pp. 2552-2555, 2002.
42. D. Satake, H. Ebi, N. Oku, K. Matsuda, **H. Takao**, M. Ashiki, and M. Ishida, “A sensor for blood cell counter using MEMS technology”, Sensors and Actuators B Chemical, vol. 83, pp. 77-81, 2002.
43. T. Kawano, Y. Kato, M. Futagawa, **H. Takao**, K. Sawada, and M. Ishida, “Fabrication and Properties of Ultra Small Si Wire Arrays with Circuits by Vapor-Liquid-Solid Growth”, Sensors & Actuators A Physical, vol. 97-98, pp. 709-715, 2002.
44. **H. Takao**, H. Fukumoto, and M. Ishida, “A CMOS Integrated Three-Axis Accelerometer Fabricated with Commercial Sub-micron CMOS Technology and Bulk-Micromachining”, IEEE Transactions on Electron Devices, Vol. 48, no. 9, pp. 1961-1968, 2001.
45. **H. Takao**, C.C. Yong, K. Rajanna, and M. Ishida, “Shape Deterioration of Mesa Structures in Post-CMOS Anisotropic Etching of Silicon Microsensors: An Experimental Study”, Sensors and Actuators A Physical, vol. 86, no. 1-2, pp. 115-121, 2000.
46. K. Sawada, M. Akiyama, **H. Takao**, and M. Ishida, “Excess Noise Characteristics of Hydrogenated Amorphous Silicon Avalanche Photodiode Films Using Functionally Graded Structure”, Japanese Journal of Applied Physics, vol. 39, Part 1, No. 4B, pp. 204-208, April 2000.
47. **H. Takao**, Y. Matsumoto, and M. Ishida, “An integrated Three-axis Accelerometer Using CMOS Compatible Stress-Sensitive Differential Amplifiers”, IEEE Transactions on Electron Devices, vol. 46, no. 1, pp. 109-116, 1999.
48. **H. Takao**, Y. Matsumoto, and M. Ishida, “Stress Sensitive Differential Amplifiers Using Piezoresistive

Effects of MOSFETs and Their Application to Three-axial Accelerometers”, Sensors and Actuators A Physical, vol. 65, no. 1, pp. 61-68, 1998.

49. **H. Takao**, Y. Matsumoto, H. Seo, M. Ishida, and T. Nakamura, “Analysis and design considerations of three-dimensional vector accelerometer using SOI structure for wide temperature range”, Sensors and Actuators A Physical, No. 55 - 2, pp. 91-97, 1996.

Conference PROCEEDINGS (previous 10 years) :

1. **H. Takao**, M. Yawata, R. Kodama, K. Sawada, and M. Ishida, “Multi-functional Monolithic-MEMS Tactile Imager Using Flexible Deformation of Silicon IC,” Proceedings of IEEE 2007 Custom Integrated Circuits Conference (IEEE CICC2007), pp. 131-134, September 16-19, San Jose, USA, 2007.

2. **H. Takao**, K. Hayama, N. Tanaka, H. Ohyama, and M. Ishida, ”Radiation Resistance of ‘MOSFET-Like MEMS Microvalve’ for Highly Reliable Microfluidic Integrated Circuits,” Volume of Abstracts of 1st International Congress on Microreliability and Nanoreliability in Key Technology Applications (Micro Nano Reliability 2007), p. 245, Berlin, Germany, September 2-5, 2007.

3. **H. Takao**, M. Yawata, K. Sawada, and M. Ishida, “ A Robust and Sensitive Silicon-MEMS Tactile-Imager with Scratch Resistant Surface and Over-Range Protection,” Digest of Technical papers of the 14th International Conference on Sensors, Actuators, and Microsystems (Transducers’ 07), pp. 1465-1468, June 10-14, Lyon, France, 2007.

4. T. Noda, N. Hirokubo, **H. Takao**, K. Miyamura, N. Oku, K. Matsumoto, K. Sawada, and M. Ishida

5. “Novel Absorption Photometry Microchip with No Reference Solution,” Digest of Technical papers of the 14th International Conference on Sensors, Actuators, and Microsystems (Transducers’07), pp. 2143-2146, June 10-14, Lyon, France, 2007.

6. Y. Maruyama, K. Sawada, **H. Takao**, and M. Ishida, “ On-Chip Multi Wavelength Detection Sensor for Real Time Monitoring of Fluorescence and Opacity,” Digest of Technical papers of the 14th International Conference on Sensors, Actuators, and Microsystems (Transducers’ 07), pp. 1971-1974, June 10-14, Lyon, France, 2007.

7. J. Matsuo, T. Hizawa, K. Sawada, **H. Takao**, and M. Ishida, “Charge Transfer Type pH Sensor with Super High Sensitivity,” Digest of Technical papers of the 14th International Conference on Sensors, Actuators, and Microsystems (Transducers’07), pp. 1881-1884, June 10-14, Lyon, France, 2007.

8. K. Takei, T. Kawashima, **H. Takao**, K. Sawada, and M. Ishida, “Si Micro Probe and SiO₂ Micro Tube Array Integrated with nMOSFETs,” Digest of Technical papers of the 14th International Conference on Sensors, Actuators, and Microsystems (Transducers’07), pp. 1381-1384, June 10-14, Lyon, France, 2007.

9. T. Hizawa, J. Matsuo, T. Ishida, **H. Takao**, H. Abe, K. Sawada, and M. Ishida, “32×32 pH Image Sensor for Real Time Observation of Biochemical Phenomena,” Digest of Technical papers of the 14th International Conference on Sensors, Actuators, and Microsystems (Transducers’07), pp. 1311-1314, June 10-14, Lyon, France, 2007.

10. M. Sudou, **H. Takao**, K. Sawada, and M. Ishida, “A Novel RF Induced DC Power Supply System for Integrated Ubiquitous Micro Sensor Devices,” Digest of Technical papers of the 14th International Conference on Sensors, Actuators, and Microsystems (Transducers’07), pp. 907-910, June 10-14, Lyon, France, 2007.

11. S. R. Lee, T. Hizawa, K. Sawada, **H. Takao**, and M. Ishida, “ High Performance Blood Glucose Sensor Using Charge Transfer Technique,” Digest of Technical papers of the 14th International Conference on Sensors, Actuators, and Microsystems (Transducers’ 07), pp. 855-858, June 10-14, Lyon, France, 2007.

12. **H. Takao**, S. Kizuna, K. Sawada, M. Sudou, M. Ishida, “RF-Powered Silicon-MEMS Microsensors for Distributed and Embedded Sensing Applications,” Proceedings of International Networked Sensing Systems 2007 (INSS2007), pp. 35-42, Braunschweig, Germany, June 6-8, 2007

13. Y. Maruyama, K. Sawada, **H. Takao**, M. Ishida, “Quantitative Evaluation of Concentration of Double Stranded DNA Using by Filter Less Fluorescence Detection Sensor,” 2006 Joint International Meeting /210th Meeting of The Electrochemical Society, Cancun, Mexico, October 29-November 3, 2006.

14. J. W. Kim, **H. Takao**, K. Sawada, M. Ishida, “Evaluation of Monolithically Integrated Antennas and RF

Transmitters for Silicon Smart Micro Sensors with Wireless-Communication Ability,” IEEE Sensors2006, Daegu, Korea, October 22-25, 2006

15. **H. Takao**, T. Douzaka, K. Sakurano, K. Sawada, and M. Ishida, “ A SELF-COMPENSATED FULLY DIFFERENTIAL SOI-CMOS OPERATIONAL AMPLIFIER FOR WIDE TEMPERATURE OPERATION OF SILICON SMART SENSORS UP TO 275°C” , Asia-Pacific Conference of Transducers and Micro-Nano Technology (APCOT 2006), pp.146, Singapore, 25-28 June, 2006.

16. R. Vatedka, **H. Takao**, K. Sawada and M. Ishida, “ EFFECT OF HIGH DRAIN BIAS ON STRESS SENSITIVITY IN MOSFETS” , Asia-Pacific Conference of Transducers and Micro-Nano Technology (APCOT 2006), pp.145, Singapore, 25-28 June, 2006.

17. Y. Maruyama, K. Sawada, **H. Takao**, M. Ishida, “A WIDE DYNAMIC RANGE PHOTOGATE TYPE IMAGE SENSOR BASED ON SELF SUPPRESSION PRINCIPLE” Asia-Pacific Conference of Transducers and Micro-Nano Technology (APCOT 2006) , pp.153, Singapore, 25-28 June, 2006.

18. M. S. Islam, **H. Takao**, K. Sawada, M. Ishida, “A FABRICATION OF P-N JUNCTION USING SI-MICRO-PROBE ARRAY BY IN-SITU DOPING VLS GROWTH”, Asia-Pacific Conference of Transducers and Micro-Nano Technology (APCOT 2006) , pp.132, Singapore, 25-28 June, 2006.

19. K. Takei, T. Kawashima, **H. Takao**, K. Sawada, M. Ishida, “MICRO SiO₂ TUBE ARRAY ON Si(111) SUBSTRATES FOR INTELLIGENT DEVICES USING VAPOR-LIQUID-SOLID METHOD AND SELECTIVE SI ETCHING BY XeF₂ GAS”, Asia-Pacific Conference of Transducers and Micro-Nano Technology (APCOT 2006) , pp.272, Singapore, 25-28 June, 2006.

20. M. Aono, **H. Takao**, K. Sawada, M. Kitazaki, A. Wakahara, S. Ichikawa, S. Nakauchi, S. Kuriyama, T. Hirotsu, K. Katsurada, S. Shinohara, Y. Sekiguchi, Y. Yasuda, Y. Iribe, T. Nitta, and M. Ishida, “ HIBALIS: a Prototype System for Intelligent Human Sensing” , International Symposium on LifeChips 2006, CA, 2006.

21. **H. Takao**, J. W. Kim, T. Noda, M. Sudou, K. Sawada, and M. Ishida, “Integrated Smart Micro Sensors with Short-Distance RF-Communication Unit for Life-Related Sensing Applications”, International Symposium on LifeChips 2006, CA, 2006.

22. **H. Takao**, M. Yawata, K. Sawada, and M. Ishida, “Two-Dimensional Silicon Smart Tactile Image-Sensor with Single Sensing Diaphragm Actuated by Vibrating Pressure for Simultaneous Detection of Force and Object Hardness Distributions”, Proceedings of The 19th IEEE International Conference on Micro Electro Mechanical Systems (IEEE MEMS 2006), pp. 602-605, Istanbul, Turkey, Jan. 22-26, 2006.

23. **H. Takao**, Y. Edo, Y. Ito, K. Sawada, and M. Ishida, “Ultimate 1/f noise reduction in JFET-based Operational Amplifiers for High-Performance CMOS Integrated Smart Microsensors”, Conference Proceedings of The International Conference on Electrical Engineering 2005 (ICEE2005), DM1-10, ICEE-F0144, July 10-14, Kunming, China, 2005.

24. K. I. Lee, **H. Takao**, K. Sawada, H. D. Seo, and M. Ishida, “Fabrication of Temperature Controlled Precise Three-Axis Accelerometer with Stabilized Temperature Characteristics over a Wide Temperature Range”, Conference Proceedings of The International Conference on Electrical Engineering 2005 (ICEE2005), PS2-46, ICEE-F0411, July 10-14, Kunming, China, 2005.

25. **H. Takao**, K. Sawada, M. Ishida, “Multifunctional Smart Tactile-Image Sensor with Integrated Arrays of Strain and Temperature Sensors on Single Air-Pressurized Silicon Diaphragm”, Digest of Technical papers of the 13th International Conference on Sensors, Actuators, and Microsystems (Transducers’05), pp. 45-48, June 5-9, Seoul Korea, 2005.

26. K. Sawada, C. Oda, **H. Takao**, and M. Ishida, “Smart Microfluidic Electrochemical DNA Sensors Integrated Signal Processing Circuits”, Digest of Technical papers of the 13th International Conference on Sensors, Actuators, and Microsystems (Transducers’05), pp. 279-282, June 5-9, Seoul Korea, 2005.

27. D. Takamuro, **H. Takao**, K. Sawada, and M. Ishida, “Highly Sensitive Electron-Emission-Type Infrared Sensor Using a Single Crystalline LiNbO₃”, Digest of Technical papers of the 13th International Conference on Sensors, Actuators, and Microsystems (Transducers’05), pp. 581-584, June 5-9, Seoul Korea, 2005.

28. K. Lee, **H. Takao**, K. Sawada, H.D.Seo, and M. Ishida, “Improvement of thermal Response in Temperature Controlled Precise Three-Axis Accelerometer with Stabilized Characteristics over a Wide Temperature Range”, Digest of Technical papers of the 13th International Conference on Sensors, Actuators, and Microsystems (Transducers’05), pp. 800-803, June 5-9, Seoul Korea, 2005.

29. V. Radhakrishna, Y. Kato, **H. Takao**, K. Sawada, and M. Ishida, “Performance and Reliability Study of Si(111) CMOS Subjected to High Mechanical Stress for Smart Sensor Application”, Digest of Technical papers of the 13th International Conference on Sensors, Actuators, and Microsystems (Transducers’05), pp.

871-874, June 5-9, Seoul Korea, 2005.

30. Y. Maruyama, K. Sawada, **H. Takao**, and M. Ishida, "The Fabrication of Filter-less Fluorescence Detection Sensor Array Using CMOS Image Sensor Technique", Digest of Technical papers of the 13th International Conference on Sensors, Actuators, and Microsystems (Transducers'05), pp. 1026-1029, June 5-9, Seoul Korea, 2005.

31. T. Hizawa, K. Sawada, **H. Takao**, and M. Ishida, "Fabrication of Two-Dimensional pH CMOS Image Sensors and Real Time Imaging of Chemical Reaction", Digest of Technical papers of the 13th International Conference on Sensors, Actuators, and Microsystems (Transducers'05), pp. 1138-1141, June 5-9, Seoul Korea, 2005.

32. T. Kawano, A. Ishihara, T. Harimoto, T. Kawashima, **H. Takao**, K. Sawada, S. Usui, and M. Ishida, "Neural Recording with Low-Invasive Si Microprobe Array", Digest of Technical papers of the 13th International Conference on Sensors, Actuators, and Microsystems (Transducers'05), pp. 1222-1225, June 5-9, Seoul Korea, 2005.

33. M. Sudou, **H. Takao**, K. Sawada, and M. Ishida, "Wafer-Level Integration Technology of Surface Mount Devices Using Automatic Parts Alignment Technology with Vibration", Digest of Technical papers of the 13th International Conference on Sensors, Actuators, and Microsystems (Transducers'05), pp. 1322-1325, June 5-9, Seoul Korea, 2005.

34. T. Noda, **H. Takao**, K. Yoshioka, N. Oku, M. Ashiki, K. Sawada, K. Matsumoto, and M. Ishida, "Evaluation of Novel Blood-Hemoglobin Measurement Microsystem with Integrated Processing Circuits and Si(110) 45°-Mirrors", Digest of Technical papers of the 13th International Conference on Sensors, Actuators, and Microsystems (Transducers'05), pp. 2007-2010, June 5-9, Seoul Korea, 2005.

35. T. Kawano, A. Ishihara, T. Harimoto, **H. Takao**, K. Sawada, S. Usui, and M. Ishida, "Three-dimensional multichannel Si microprobe electrode array chip for analysis of the nervous system", 2004 International Electron Device Meeting (IEEE IEDM2004), pp. 1013-1016, San Francisco, USA, 2004

36. Y. Maruyama, K. Sawada, **H. Takao**, and M. Ishida, "Novel Filter Less Fluorescence Detection Sensor Array for DNA Micro Chip", Proceedings of 8th International Conference on Miniaturized Systems for Chemistry and Life Sciences, pp. 491-493, Malmo, Sweden, Sept. 2004.

37. T. Hizawa, K. Sawada, **H. Takao**, and M. Ishida, "Fabrication of pH CMOS Image Sensor for Chemical Reaction Imaging", Proceedings of 8th International Conference on Miniaturized Systems for Chemistry and Life Sciences, pp. 440-442, Malmo, Sweden, Sept. 2004.

38. T. Kawano, **H. Takao**, K. Sawada, M. Ishida, "Neural Recording Chip with Penetrating Si Microprobe Electrode Array by Selective Vapor-Liquid-Solid Growth Method", Proceedings of the 26th Annual International Conference of the IEEE Eng. Med. Biological Society (IEEE EMBS), pp. 2066-2069, San Francisco, USA, 2004.

39. Md. Shofiqu Islam, H. Ishino, T. Kawano, **H. Takao**, K. Sawada, and M. Ishida, "Realization of n-Type and p-Type Si-Microprobe Array Using *In-Situ* Doping with Selective Vapor-Liquid-Solid (VLS) Growth Method", Extended Abstracts of the 2004 International Conference on Solid State Devices and Materials (SSDM2004), pp. 176-177, Tokyo, Japan, 2004.

40. **H. Takao**, Y. Ito, K. Serge, K. Sawada, and M. Ishida, "Low-Noise Fully Differential Amplifiers for High Resolution Smart Sensors Using JFET-CMOS Technology", Proceedings of Asia-Pacific Conference of Transducers and Micro-Nano Technology (APCOT MNT 2004), pp.20-25, Sapporo, Japan, July 4-7, 2004.

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Patents :

19 patents

Awards :

1. **LSI Design IP Award**, "Two-Dimensional Multifunctional Tactile Imaging LSI," IP Award Organization Committee, April 2007.

2. **IEEE System LSI Design Award**, "Flexible Silicon Tactile Image Sensor with MEMS Technology," IEEE Solid-State Circuits Society Japan Chapter, November 2006.

3. **Best Presentation Award**, "SOI-CMOS Precise Operational Amplifier for Microsensor Operation under High-Temperature Environments," IEE Japan, March 2002.

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