Contents

Part I Microsensors

Design, Development, Fabrication, Packaging, and Testing of MEMS Pressure Sensors for Aerospace Applications ............... 3
K. N. Bhat, M. M. Nayak, Vijay Kumar, Linet Thomas, S. Manish, Vijay Thyagarajan, Pandian, Jeyabal, Shyam Gaurav, Gurudat, Navakanta Bhat and Rudra Pratap

MEMS Piezoresistive Accelerometers .................................... 19
Tarun Kanti Bhattacharyya and Anindya Lal Roy

A Handheld Explosives Detector Based on Amplifying Fluorescent Polymer ................................................................. 35
Anil Kumar, Jasmine Sinha, Ashok K. Majji, J. Raviprakash, Sathyadeep Viswanathan, Justin K. Paul, S. Vijay Mohan, Shilpa K. Sanjeeva, Swathi Korrapati and Chandrashekhar B. Nair

Development of a Surface Plasmon Resonance-Based Biosensing System ................................................................. 49
S. Mukherji, Munshi Imran Hossain, T. Kundu and Deepali Chandratre

Design and Development of Ion-Sensitive Field-Effect Transistor and Extended-Gate Field-Effect Transistor Platforms for Chemical and Biological Sensors .......................... 73

Part II Microactuators

RF MEMS Single-Pole-Multi-Throw Switching Circuits ............... 91
Shiban K. Koul and Sukomal Dey
Piezoelectric Actuators in Helicopter Active Vibration Control ..... 111
R. Ganguli and S. R. Viswamurthy

Design and Development of a Piezoelectrically Actuated Micropump for Drug Delivery Application. ................. 127
Paul Braineard Eladi, Dhiman Chatterjee and Amitava DasGupta

Development and Characterization of PZT Multilayered Stacks for Vibration Control .................. 143
P. K. Panda and B. Sahoo

Development of Piezoelectric and Electrostatic RF MEMS Devices ... 155
Abhay Joshi, Abhijeet Kshirsagar, S. DattaGupta, K. Natarajan and S. A. Gangal

Part III Materials and Processes

Nickel–Titanium Shape Memory Alloy Wires for Thermal Actuators .......................................................... 181
S. K. Bhaumik, K. V. Ramaiah and C. N. Saikrishna

Processing and Characterization of Shape Memory Films for Microactuators ........................................ 199
S. Mohan and Sudhir Kumar Sharma

Piezoceramic Coatings for MEMS and Structural Health Monitoring ...................................................... 213
Soma Dutta

Cost-Effective Processing of Polymers and Application to Devices ... 229
Bhoopesh Mahale, Abhay Joshi, Abhijeet Kshirsagar, S. DattaGupta, Dhananjay Bodas and S. A. Gangal

Chemical Synthesis of Nanomaterials and Structures, Including Nanostructured Thin Films, for Different Applications ... 249
S. A. Shivashankar

A Study on Hydrophobicity of Silicon and a Few Dielectric Materials .......................................................... 265
Vijay Kumar and N. N. Sharma
Vivek Rane, Varsha Chaware, Shrikant Kulkarni, Siddharth Duttagupta and Girish Phatak

Jayanta Parui, D. Saranya and S. B. Krupanidhi

Part IV Modeling and Simulation

Vibratory MEMS and Squeeze Film Effects ......................... 319
Rudra Pratap and Anish Roychowdhury

Streaming Potential in Microflows and Nanoflows ................. 339
Jeevanjyoti Chakraborty and Suman Chakraborty

A Simulation Module for Microsystems using Hybrid Finite Elements: An Overview .................................................. 355

B. Dattaguru

Part V Systems and Applications

Smart e-Textile-Based Nanosensors for Cardiac Monitoring with Smart Phone and Wireless Mobile Platform .................. 387
Prashanth Kumar, Pratyush Rai, Sechang Oh, Robert E. Harbaugh and Vijay K. Varadan

Polymer-Based Micro/Nano Cantilever Electro-Mechanical Sensor Systems for Bio/Chemical Sensing Applications .......... 403
Rajul S. Patkar, Manoj Kandpal, Neena Gilda, Prasenjit Ray and V. Ramgopal Rao

Smart Materials Technology for Aerospace Applications ........ 423
S. Gopalakrishnan
Electronic Circuits for Piezoelectric Resonant Sensors ............. 439
M. Umapathy, G. Uma and K. Suresh

A Universal Energy Harvesting Scheme for Operating
Low-Power Wireless Sensor Nodes Using Multiple Energy
Resources ....................................................... 453
K. J. Vinoy and T. V. Prabhakar

RF MEMS True-Time-Delay Phase Shifter .................... 467
Shiban K. Koul and Sukomal Dey

MEMS Sensors for Underwater Applications ................. 487
V. Natarajan, M. Kathiresan, K. A. Thomas, Rajeev R. Ashokan,
G. Suresh, E. Varadarajan and Shiny Nair

Author Index .................................................. 503

Subject Index ................................................... 505
Micro and Smart Devices and Systems
Vinoy, K.J.; Ananthasuresh, G.K.; Pratap, R.; Krupanidhi, S.B. (Eds.)
2014, XXVI, 508 p. 326 illus., Hardcover