

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 Chandrashekhara 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
V. K. Khanna, R. Mukhiya, R. Sharma, P. K. Khanna, S. Kumar, D. K. Kharbanda, P. C. Panchariya and A. H. Kiranmayee	

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	

Materials for Embedded Capacitors, Inductors, Nonreciprocal Devices, and Solid Oxide Fuel Cells in Low Temperature Co-fired Ceramic	285
Vivek Rane, Varsha Chaware, Shrikant Kulkarni, Siddharth Dutttagupta and Girish Phatak	

Smart Materials for Energy Harvesting, Energy Storage, and Energy Efficient Solid-State Electronic Refrigeration	303
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
Kunal D. Patil, Sreenath Balakrishnan, C. S. Jog and G. K. Ananthasuresh	

Structural Health Monitoring: Nonlinear Effects in the Prognostic Analysis of Crack Growth in Structural Joints	375
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

ISBN: 978-81-322-1912-5