

Cambridge University Press

978-1-605-11276-3 - Materials Research Society Symposium Proceedings Volume 1299:

Microelectromechanical Systems—Materials and Devices IV

Editors Frank W. DelRio, Maarten P. de Boer, Christoph Eberl and Evgeni Gusev

Table of Contents

[More information](#)

CONTENTS

Preface ix

Materials Research Society Symposium Proceedings xi

MATERIAL DEVELOPMENT AND OPTIMIZATION

Biodegradable Microfluidic Scaffolds with Tunable Degradation Properties from Amino Alcohol-Based Poly(ester Amide) Elastomers 3

Jane Wang, Tatiana Kniazeva, Carly F. Campbell,
Robert Langer, Jeffrey S. Ustin, and Jeffrey T. Borenstein

Measurements of Resonance Frequency of Parylene Microspring Arrays Using Atomic Force Microscopy 9

C. Gaire, M. He, A. Zandiatashbar, P.-I. Wang,
R.C. Picu, G.-C. Wang, and T.-M. Lu

Gold in Flux-less Bonding: Noble or Not Noble 15

Marco Balucani, Paolo Nenzi, Fabrizio Palma,
Hanna Bandarenka, Leonid Dolgyi,
and Aliksandr Shapel

Giant Piezoresistive Variation of Metal Particles Dispersed in PDMS Matrix 21

Stefano Stassi, Giancarlo Canavese,
Mariangela Lombardi, Andrea Guerriero,
and Candido Fabrizio Pirri

Characterization of Group III-Nitride Based Surface Acoustic Wave Devices for High Temperature Applications 29

J. Justice, L.E. Rodak, V. Narang, K. Lee,
L.A. Hornak, and D. Korakakis

Transport Model for Microfluidic Device for Cell Culture and Tissue Development 35

Niraj Inamdar, Linda Griffith, and Jeffrey T. Borenstein

Refractive Index Memory Effect of Ferroelectric Materials by Domain Control 41

Kazuhiko Inoue and Takeshi Morita

Cambridge University Press

978-1-605-11276-3 - Materials Research Society Symposium Proceedings Volume 1299:

Microelectromechanical Systems—Materials and Devices IV

Editors Frank W. DelRio, Maarten P. de Boer, Christoph Eberl and Evgeni Gusev

Table of Contents

[More information](#)

**Synthesis and Control of ZnS Nanodots and Nanorods
with Different Crystalline Structure from an Identical Raw
Material Solution and the Excitonic UV Emission47**
Masato Uehara, Satoshi Sasaki, Yusuke Nakamura,
Changi Lee, Hiroyuki Nakamura, and Hideaki Maeda

**Improving PZT Thin Film Texture through Pt Metallization
and Seed Layers53**
L.M. Sanchez, D.M. Potrepka, G.R. Fox,
I. Takeuchi, and R.G. Polcawich

PROCESS INTEGRATION

**Patterning Nanomaterials on Fragile Micromachined
Structures Using Electron Beam Lithography61**
Kaushik Das, Pascal Hubert, and Srikar Vengallatore

**Pt/TiO₂ Growth Templates for Enhanced PZT Films
and MEMS Devices67**
Daniel M. Potrepka, Glen R. Fox,
Luz M. Sanchez, and Ronald G. Polcawich

**Contact Resistivity of Laser Annealed SiGe for MEMS
Structural Layers Deposited at 210°C73**
Joumana El-Rifai, Ann Witvrouw, Ahmed Abdel Aziz,
Robert Puers, Chris Van Hoof, and Sherif Sedky

**PZT Thick Films for 100 MHz Ultrasonic Transducers
Fabricated Using Chemical Solution Deposition Process79**
Naoto Kochi, Takashi Iijima,
Takashi Nakajima, and Soichiro Okamura

**Reliability and Stability of Thin-Film Amorphous Silicon MEMS
on Glass Substrates85**
P.M. Sousa, V. Chu, and J.P. Conde

High Yield Polymer MEMS Process for CMOS/MEMS Integration91
Prasenjit Ray, V. Seenaa, Prakash R. Apte,
and Ramgopal Rao

**Characterization of Textured PZT Thin Films Prepared
by Sol-Gel Method onto Stainless Steel Substrates97**
Xuelian Zhao, Xufang Yu,
Shengwen Yu, and Jinrong Cheng

Cambridge University Press

978-1-605-11276-3 - Materials Research Society Symposium Proceedings Volume 1299:

Microelectromechanical Systems—Materials and Devices IV

Editors Frank W. DelRio, Maarten P. de Boer, Christoph Eberl and Evgeni Gusev

Table of Contents

[More information](#)*MICRO- AND NANOSENSORS*

- A Picowatt Energy Harvester** 105
Joe Evans, Johannes Smits, Carl Montross,
and Gerald Salazar
- Mechanical and Material Characterization of Bilayer
Microcantilever-Based IR detectors** 111
I-Kuan Lin, Ping Du, Yanhang Zhang, and Xin Zhang
- Film Conductivity Controlled Variation of the Amplitude
Distribution of High-Temperature Resonators** 117
Silja Schmidtchen, Denny Richter,
Han Xia, and Holger Fritze
- Ultrafine Silicon Nano-Wall Hollow Needles and Applications
in Inclination Sensor and Gas Transport** 123
Z. Sanaee, S. Mohajerzadeh,
M. Mehran, and M. Araghchini
- Development of a Robust Design of a Wet Etched
Co-Integrated Pressure Sensor** 129
Wolfgang Schreiber-Prillwitz, Mikko Saukoski,
Gerhard Chmiel, and Reinhart Job
- SU8 / Modified MWNT Composite for Piezoresistive Sensor
Application** 135
Prasenjit Ray, V. Seenaa, Rupesh A. Khare,
Arup R. Bhattacharyya, Prakash R. Apte,
and Ramgopal Rao
- Thin Film Amorphous Silicon Bulk-Mode Disk Resonators
Fabricated on Glass Substrates** 141
A. Gualdino, V. Chu, and J.P. Conde
- Fabrication and Characterization of MEMS-Based Structures
from a Bio-Inspired, Chemo-Responsive Polymer Nanocomposite** 147
Allison E. Hess and Christian A. Zorman

MATERIAL AND DEVICE RELIABILITY

- Characterizing the Effect of Uniaxial Strain on the Surface
Roughness of Si Nanowire MEMS-Based Microstructures** 155
E. Escobedo-Cousin, S.H. Olsen,
T. Pardoen, U. Bhaskar, and J.-P. Raskin

Cambridge University Press

978-1-605-11276-3 - Materials Research Society Symposium Proceedings Volume 1299:

Microelectromechanical Systems—Materials and Devices IV

Editors Frank W. DelRio, Maarten P. de Boer, Christoph Eberl and Evgeni Gusev

Table of Contents

[More information](#)

Mechanism of Hole Inlet Closure in Shape Transformation of Hole Arrays on Si(001) Substrates by Hydrogen Annealing	161
Reiko Hiruta, Hitoshi Kuribayashi, Koichi Sudoh, and Ryosuke Shimizu	
Characterization of Hydrophobic Forces for in Liquid Self-Assembly of Micron-Sized Functional Building Blocks.	167
M.R. Gullo, L. Jacot-Descombes, L. Aeschmann, and J. Brugger	
Nanoindentation Characterization of PECVD Silicon Nitride on Silicon Subjected to Mechanical Fatigue Loading.	173
Z.-K. Huang, K.-S. Ou, and K.-S. Chen	
Effect of Phosphorus Doping on the Young's Modulus and Stress of Polysilicon Thin Films.	179
Elena Bassiachvili and Patricia Nieva	
Residual Stress in Sputtered Silicon Oxycarbide Thin Films.	185
Ping Du, I-Kuan Lin, Yunfei Yan, and Xin Zhang	
Solid Bridging during Pattern Collapse (Stiction) Studied on Silicon Nanoparticles.	191
Daniel Peter, Michael Dalmer, Andriy Lotnyk, Lorenz Kienle, Alfred Lechner, and Wolfgang Bensch	
Fabrication and Characterization of Two Compliant Electrical Contacts for MEMS: Gallium Microdroplets and Carbon Nanotube Turfs.	197
Y. Kim, A. Qiu, J.A. Reid, R.D. Johnson, and D.F. Bahr	
Author Index	205
Subject Index	207