

Table of Contents

1 Innovation Aspects of MicroNano Integration

Center for Integrated Nanotechnologies (CINT): Science-Base for Future Integrated Systems	3
T. A. Michalske	
An Analysis of the Different MEMS Companies-Business Models	11
E. Mounier	
MicroNano Technology Services Offering New Market Opportunities To Industry	19
P. Salomon, H. van Heeren, L. Paschalidou, A. el-Fataty	
International Country Rankings in Patented Nanotechnology	27
D. Marinova	
Financing of MEMS/MOEMS and Nanotechnology in Germany	37
S. Henke	

2 MicroNano Systems and Devices

Performance Analysis of Low Drift Micro-Machined Gyroscopes for Inertial Navigation Systems	43
T. Link, A. Gaißer, M. Braxmaier, I. Simon, A. Schumacher, D. Mintenbeck, H. Sandmaier	
Nanoscale and Microsystem-Technology: New Approaches for Thermoelectric Devices	55
H. Böttner, J. Nurnus	
Micromixer Module With an Integrated Optical Pressure Gauge	67
T. Pfeifer, U. Aleriano	
Multi-Layer PMMA Microfluidic Systems for Ammonia Detection	77
H. Klank, D. Snakenborg, R. P. H. Nikolajsen, J. P. Kutter	

Nanoscale Materials meet Microsystems-Technology Metal Oxide Semiconductor Chemical Sensors: From a Simple Resistor to a Tunable Microelectronic Device	79
J. Wöllenstein, H. Böttner	

The New Type Of Transducer For Gas And Bio-Sensors	81
V. V. Il'chenko, L. G. Il'chenko, A. Kravchenko, V. T. Grinchenko	

Frequency Changes in the Second Derivative of Current - Voltage Characteristics of SnO₂-Si the Heterostructures During Gas Adsorption for Different Thickness of the Adsorptive Layers	85
V. V. Il'chenko, L. G. Il'chenko, A. Kravchenko, V. M. Telega, V. P. Chehun, A. M. Gaskov, V. T. Grinchenko	

3 MicroNano Devices for Information Technologies

Light Processing with Electrostatically Driven Micro Scanning Mirrors and Micro Mirror Arrays	89
H. Schenk, U. Dauderstädt, P. Dürr, A. Gehner, A. Wolter, H. Lakner	

New Combination of SiGe RF Amplifier ICs with High-Q MEMS Components for Wireless Communication Radio Transceivers	97
H.- J. Strobel, W. Bischof, S. Gerlach, H. Schulz, K.- F. Becker, E. Jung, K.- D. Lang, H. Mokrani, S. Spirkovitch	

Design and Realisation of an Add-Drop Multiplexer Using Digital Micromirror	111
B. Estibals, H. Camon, C. Pisella, F. Verluise	

4 MicroNano Devices for Biomedical Application

4.1 Material Aspects

Functionalization of Cantilever Array Sensors Using InkJet Deposition	115
A. Bietsch, J. Zhang, M. Hegner, H.- P. Lang, C. Gerber	

Optimized Creation of Monolayers for Parallel Readout of Bead-Based Assays	117
M. Grumann, M. Dobmeier, P. Schippers, T. Brenner, R. Zengerle, J. Ducrée, C. Kuhn, M. Fritsche	

Integrating Molecular Structures Into the Macroscopic World by a Combination of Microsystem Technology and Self-Assembly Methods	127
W. Fritzsche, A. Csáki, G. Maubach, R. Möller, K. König, F. Garwe	

4.2 System Aspects

Nanoimprinting-a Key Enabling Technology for BioMEMS and Biomedical Applications	137
R. Eichinger - Heue, T. Glinsner, P. Kettner, P. Lindner, C. Schaefer, S. Dwyer, B. Vratzov	

Coriolis-Induced Flow Control for Micro- and Nanofluidic Lab-on-a-Disk Technologies	147
J. Ducrée, T. Brenner, T. Glatzel, R. Zengerle	

One Dimensional Microarrays for Genetic Testing and Diagnostics	155
C. H. Wang, J. Ewins, S. Zhang, W. E. Lindsell, P. G. Meaden, A. Fotheringham	

5 Metrology and Standards

SEMI International Standards Program-Focus on MEMS	165
C. Lee, B. Weiss	

Extreme Ultraviolet Radiation from Pulsed Discharges: A New Access to "Nanoscopy" and "Nanolytics"	169
R. Lebert, C. Wies, L. Juschkin, B. Jägle, W. Neff, J. Barthel, K. Walter, K. Bergmann	

Four Point Bending Test of Thin Films in the nm Through to μm Range	185
N. M. P. Evanno, D. - A. Mendels	

Methods for Reconstruction of Atomic Force Microscope Data Based on Morphological Image Processing	193
T. Machleidt, K. - H. Franke	

Optical 3D-Micro Structure Measurement System Based on a Laser Scanning Confocal Microscope	205
U. Brand, S. Gao, S. Cao	

Adsorption Sensitivity of Microporous Silicon to Organic and Biomolecules with High Dipole Moment	209
Y. A. Vashpanov	

6 Frontiers of MicroNano Fabrication and Engineering

6.1 Material Aspects

Nanoengineered Inorganic / Organic Composite Microcapsules	213
G. Sukhorukov, D. G. Shchukin, Y. M. Lvov	
Mounting at the Nanoscale by Addressing Nanostructured Biological Templates - Another Packaging Strategy for Nanoscaled Electronics?	221
S. Fiedler, M. Zwanzig, N. Hampp, T. Fischer	
New Functional Materials for MicroNano Fabrication and Devices	231
B. Schulz, T. Köpnick, M. Schirmer	
Nanoscalic Sol-Gel-Fillers in Fibre-Chip-Adhesives	233
A. Battermann	
Multilayers and Multicomponents-Layers Produce in Atmosphere of Metalloorganic Compounds of Aluminum in Arc Plasma Discharge of Titanium-New Technology MO PVD-Arc	235
M. Betiuk, H. Baum, M. Dabrowski	

6.2 Fabrication Aspects

Nanomanipulations in the Optical Near Field	241
P. Karageorgiev, B. Stiller, O. Henneberg, L. Brehmer, A. Nathanson	
Highly Efficient Micro Structuring of Metals, Ceramics and Dielectrics with Nd:YAG and Excimer Lasers	245
D. Ashkenasi, A. Binder, H. Jaber	
Manufacturing Engineering for Nanoproduction	257
T. Jäger, D. Werner, A. Stock	

Compact Laboratory EUV-Lamp: "In-House Beamlines" for Technologies Based on Extreme Ultraviolet Radiation	259
R. Lebert, B. Jäggle, L. Juschkin, C. Wies, M. C. Schürmann, T. Mißalla, W. Neff, J. Barthel, K. Walter, K. Bergmann	

Laboratory for Machine Tools and Production Technology: A Novel Assembly Method for Chip/Wafer Bumping and MEMS Integration	263
C. H. Wang, A. J. Pang, J. Zhang, A. J. Sangster	

Microcontroller Modules for the Modular MEMS Framework MATCH-X	265
A. Steck, M. LeNagard, R. Muckenhirn	

6.3 Reliability Aspects

Microreliability, Nanoreliability-Issues for MEMS	269
B. Michel	

Cost Savings with Micro / Nano-Replication	277
J. Kühnholz, G. Lecarpentier	

Feasibility Study of the Fabrication of 2D Polymer Photonic Crystals by X-Ray Lithography	279
J. Kando, S. Achenbach, R. Fettig, J. Mohr, U. Wallrabe	

Behaviour of Flexible Hinges for Use as Articulations in High Precision Mechanisms	287
A. Chau, P. Lambert, P. Bouillard, A. Delchambre	

Design Optimisation Applied To A Cantilever Type Piezoresistive Accelerometer	289
N. Dumbravescu, A. Enescu	

Design and Implementation of a Flexible Guiding System in Translation	293
V. Vandaele, P. Lambert, A. Delchambre, P. Bouillard	

Appendix: List of Contributors	299
---------------------------------------	------------

MicroNano Integration

Knobloch, H.; Kaminorz, Y. (Eds.)

2004, XV, 302 p., Hardcover

ISBN: 978-3-540-20252-3