1. Record Nr. UNINA9910830495903321

Titolo	Microsystem engineering of lab-on-a-chip devices [[electronic resource] /] / [editors], Oliver Geschke, Henning Klank, Pieter Tellemann
Pubbl/distr/stampa	Weinheim, : Wiley-VCH, c2004
ISBN	1-280-55863-6 9786610558636 3-527-60636-X 3-527-60165-1
Descrizione fisica	1 online resource (272 p.)
Altri autori (Persone)	GeschkeOliver KlankHenning TellemanPieter
Disciplina	621.381
Soggetti	Microelectronics Microtechnology
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Microsystem Engineering of Lab-on-a-chip Devices; Contents; Preface; 1 Introduction; 1.1 Learning from the Experiences of Microelectronics; 1.2 The Advantages of Miniaturizing Systems for Chemical Analysis; 1.3 From Concept to TAS; 1.4 References; 2 Clean Rooms; 3 Microfluidics - Theoretical Aspects; 3.1 Fluids and Flows; 3.2 Transport Processes; 3.2.1 Types of Transport; 3.2.1.1 Convection; 3.2.1.2 Migration; 3.2.1.3 Diffusion; 3.2.1.4 Dispersion; 3.3 System Design; 3.3.1 Laminar Flow and Diffusion in Action; 3.4 An Application: Biological Fluids; 3.5 References 4 Microfluidics - Components4.1 Valves and Pumps; 4.1.1 Moving Liquids by Electroosmosis; 4.1.2 Mixers; 4.2 Injecting, Dosing, and Metering; 4.3 Temperature Measurement in Microfluidic Systems; 4.3.1 Microreactors; 4.3.2 Temperature Sensors for Microsystems; 4.3.3 Resistance Temperature Detectors; 4.3.3.1 Metals; 4.3.3.2 Nonmetals; 4.3.4 Thermocouples; 4.3.5 Semiconductor Junction Sensors; 4.3.6 Temperature Sensors Built on Other Principles; 4.3.7 Conclusion; 4.4

Optical Sensors; 4.4.1 Instrumentation; 4.4.2 Absorption Detection; 4.4.3 Evanescent-wave Sensing; 4.4.4 Fluorescence Detection
4.5 Electrochemical Sensors4.6 References; 5 Simulations in Microfluidics; 5.1 Physical Aspects and Design; 5.2 Choosing Software and Hardware; 5.2.1 CFD-ACE+Version 6.6; 5.2.2 CoventorWareTM Version 2001.3; 5.2.3 Hardware; 5.2.4 The Core Elements of Typical CFD Software; 5.2.5 Pre-processors; 5.2.6 Solvers; 5.2.7 Post-processors; 5.3 Important Numerical Settings; 5.3.1 Boundary Conditions; 5.3.2 Solver Settings; 5.4 Errors and Uncertainties; 5.5 Interpretation and Evaluation of Simulations; 5.6 Example Simulations; 5.6.1 Fully-developed Flow in a Circular Capillary
5.6.2 Movement of a Chemical Plug by Electroosmotic Flow in a Detection Cell5.6.3 Conclusions; 5.7 References; 6 Silicon and Cleanroom Processing; 6.1 Substrate Fabrication; 6.2 Optical Lithography; 6.2.1 Photolithography; 6.2.2 Mask Design; 6.2.3 Hints in Planning Fabrication Runs; 6.3 Deposition; 6.3.1 Fundamentals of Coatings; 6.3.2 Deposition Methods; 6.3.3 Materials; 6.3.4 Lift-off; 6.3.5 Silicides; 6.4 Etching Removal; 6.4.1 Wet-etching Fundamentals; 6.4.2 Etching with HF; 6.4.3 Isotropic Silicon Etch; 6.4.4 Orientation-dependent Silicon Etching
6.4.5 Common Orientation-dependent Etchants6.4.6 Other Etchants; 6.4.7 Effects of Not Stirring a Transport-limited Etch; 6.5 Dry Etching; 6.5.1 Plasma Etching Fundamentals; 6.5.2 Plasma Etching Setups; 6.5.3 Etch Gases; 6.5.4 Laser-assisted Etching; 6.6 Heat Treatment; 6.6.1 Thermal Oxidation; 6.6.2 Diffusion; 6.6.3 Annealing; 6.6.4 Wafer Bonding; 6.7 References; 7 Glass Micromachining; 7.1 Wet Chemical Etching; 7.2 Reactive Ion Etching (RIE) of Glass; 7.3 Laser Patterning; 7.4 Powder Blasting; 7.5 Glass Bonding; 7.6 A Microfabrication Example; 7.7 References; 8 Polymer Micromachining
8.1 Hot Embossing

Sommario/riassunto

Written on a non-specialist level by an interdisciplinary team of chemists, biologists and engineers from one of Europe's leading centres for microsystem research, the Danish Mikroelektronik Centret (MIC), this is a concise practical introduction to the subject. As such, the book is the first to focus on analytical applications, providing life and analytical scientists, biotechnologists and pharmaceutists with an understanding of the principles behind the design and manufacture of chemical and biochemical microsystems. The text is backed by a chapter devoted to troubleshooting as well as a g