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Nota di contenuto	Intro -- MICROFLUIDICS: THEORY AND APPLICATIONS -- MICROFLUIDICS: THEORY AND APPLICATIONS -- LIBRARY OF CONGRESS CATALOGING-IN-PUBLICATION DATA -- CONTENTS -- PREFACE -- Chapter 1 MICROBIOCHIPS MONOLITHICALLY INTEGRATED WITH MICROFLUIDICS, MICROMECHANICS, PHOTONICS, AND ELECTRONICS BY 3D FEMTOSECOND LASER DIRECT WRITING -- ABSTRACT -- 1. INTRODUCTION -- 2. CONCEPT OF 3D DIRECT WRITING INSIDE TRANSPARENT MATERIALS BY FEMTOSECOND LASER -- 3. FEMTOSECOND LASER FABRICATION OF 3D FUNCTIONAL COMPONENTS -- 3.1. Microfluidic Components and Controlling the Aspect Ratio of Microchannels -- 3.2. Micromechanics -- 3.3. Microoptics -- 3.4. Microelectronics -- 4. MONOLITHIC INTEGRATION OF MICROFLUIDICS, PHOTONICS, AND ELECTRONICS -- 4.1. Microfluidic Dye Laser -- 4.2. Optofluidic Integration -- 4.3. Electro-Optic Integration -- 5. NANO-AQUARIUM FOR DYNAMIC OBSERVATION OF MICROORGANISMS -- 5.1. Concept of Nanoaquarium -- 5.2. Nanoaquarium for Observing the Motion of <i>Euglena gracilis</i> -- 6. CONCLUSIONS AND OUTLOOK -- REFERENCES -- Chapter 2 ELECTROKINETIC FLOWS OF NON-NEWTONIAN FLUIDS IN MICROFLUIDIC CHANNELS -- ABSTRACT -- 1. ELECTROOSMOTIC FLOW OF POWER-LAW FLUIDS IN A SLIT MICROCHANNEL -- 1.1. Introduction -- 1.2. Power-Law Fluids and Governing Equations -- 1.3. Exact Solutions of Electroosmosis of Power-Law Fluids in a Slit Microchannel -- 1.4. Approximate Analytical Solutions of Electroosmosis of Power-Law Fluids in a Slit Microchannel -- Case I, $1 < n < 2$ -- -- Case II, $0 < n < 1$

-- -- 1.5. Results and Discussion -- 1.5.1. Comparison of the Exact and Approximate Solutions with the Numerical Simulations -- 1.5.2. Characteristics of Electroosmotic Flow of Power-Law Fluids -- 1.6. Summary for Electroosmotic Flow of Power-Law Fluids -- 2. PRESSURE DRIVEN FLOW OF POWER-LAW FLUIDS IN A MICROCHANNEL WITH ELECTROKINETIC EFFECTS -- 2.1. Introduction. 2.2. Pressure Driven Flow Field of Power-Law Fluids in a Slit Microchannel with Electrokinetic Effects -- Specific Cases -- Approximate Analytical Solution -- 2.3. Streaming Potential -- 2.4. Apparent Viscosity and Electroviscous Effects -- 2.5. Friction Coefficient -- 2.6. Results and Discussion -- 2.6.1. Velocity Distribution -- 2.6.2. Non-Dimensional Induced Streaming Potential -- 2.6.3. Volumetric Flow Rate -- 2.6.4. Apparent Viscosity (Electroviscous Effects) -- 2.6.5. Friction Coefficient -- 2.7. Summary for Pressure Driven Flow of Power-Law Fluids with Electrokinetic Effects -- REFERENCES -- APPENDIX -- Chapter 3 MICROFLUIDIC ELECTRO-CHEMILUMINESCENT DETECTION DEVICES WITH CAPILLARY ELECTROPHORESIS -- ABSTRACT -- ABBREVIATION -- INTRODUCTION -- UNIQUE FEATURES OF ECL -- ECL ANALYSIS TYPES -- The Direct and Indirect ECL Analysis -- ECL with Creactant -- BASIC METHODOLOGY OF CE/ECL ANALYSIS IN MICROFLUIDICS -- ECL INSTRUMENTATION -- Optical Part of ECL Mode -- Photomultiplier Tube -- Channel Photomultipliers -- Diode array -- Electrochemical Part of ECL Mode -- Working Electrode Placement in CE/ECL Detection -- MICROFLUIDIC DEVICES PROBLEMS -- The Major Factors Loss of Separation Efficiency -- CE/ECL Key Specific Futures -- KEY RESEARCH FINDINGS -- GEOGRAPHY OF SCIENTIFIC CENTRES -- POSSIBLE FUTURE DEVELOPMENTS (BASIC TENDENCIES) -- CONCLUSION -- ACKNOWLEDGMENT -- REFERENCES -- Chapter 4 MICROFLUIDIC VALVES WITHOUT DIAPHRAGMS: HYDROGEL VALVES AND PDMS-BASED ROTARY SELECTION VALVES -- ABSTRACT -- INTRODUCTION -- HYDROGEL VALVE -- ROTARY VALVE -- CONCLUSION -- ACKNOWLEDGMENTS -- REFERENCES -- Chapter 5 BIOCOMPATIBLE AND MASS PRODUCTIVE MEMS DEVICE FOR LOCALIZED SURFACE PLASMON RESONANCE -- ABSTRACT -- 1. INTRODUCTION -- 2. DEVICE DESIGN AND FABRICATION -- 3. UNIQUENESS OF THE DEVICE -- 1. Comparison to the Device With PDMS. 2. Signal Enhancement by Light Blockage -- 4. LSPR SENSING -- 5. CONCLUSION -- REFERENCES -- Chapter 6 APPLICATION TO ADAPTIVE OPTICS AND LASER MICROFLUIDICS -- 1. ADAPTIVE OPTICS -- 2. LASER MICROFLUIDICS -- CONCLUSION AND PROSPECTS -- REFERENCES -- INDEX.

Sommario/riassunto

Microfluidics deals with the behaviour, precise control and manipulation of fluids that are geometrically constrained to a small, typically sub-millimetre, scale. This book presents topical data on microfluidics.