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2.4 Microtechnology2.4.1 Computer Simulations in Microfluidics; 2.4.2 Micromachining; 2.4.3 Packaging of Microsystems; 2.5 MEMS and NEMS; 2.5.1 Fabrication and Characterization; 2.5.2 Functionalization; 2.5.3 Detection Methods; 2.6 Outlook; References; 3 Automation and Miniaturization of Sample Treatment; 3.1 Introduction; 3.2 Simplification of Sample Treatment: Microextraction Techniques; 3.2.1 Calibration in Microextraction Processes; 3.2.2 Solid Phase Microextraction (SPME) Techniques; 3.2.3 Liquid Phase Microextraction (LPME) Techniques
3.2.4 Comparison of Solid and Liquid Phase Microextraction Techniques3.3 Simplification of Sample Treatment: Continuous Flow Systems; 3.3.1 Coupling to Gas Chromatography; 3.3.2 Coupling to Liquid Chromatography; 3.3.3 Coupling to Capillary Electrophoresis (CE); References; 4 Miniaturized Systems for Analytical Separations I: Systems Based on a Hydrodynamic Flow; 4.1 Introduction; 4.2 The Earliest Example of Miniaturization of a Gas Chromatograph and Some Other Developments; 4.3 Capillary Liquid Chromatography (CLC); 4.4 Liquid Chromatography on Microchips; 4.4.1 The Agilent HPLC Chip 4.4.2 Other Approaches to Microchip HPLC4.4.3 Some Selected Applications; References; 5 Miniaturized Systems for Analytical Separations II: Systems Based on Electroosmotic Flow (EOF); 5.1 Introduction; 5.2 CE on the Microchip Format; 5.3 Modes and Theories of CE Microchips; 5.4 Microfabrication Techniques; 5.4.1 Microfabrication of Glass CE Microchips; 5.4.2 Microfabrication of Polymer CE Microchips; 5.5 Basic Fluidic Manipulation/Motivation: Electrokinetic Injection and Separation Protocols; 5.6 Electrochromatography in Microchip Format: Designs and Applications 5.7 Comparison of Hydrodynamic and Electroosmotic Flow-driven Miniaturized Systems

Sommario/riassunto

The book describes a general vision of the miniaturization of the analytical systems, including their principles, designs and applications. Through ten chapters the different aspects characterizing the miniaturized systems are developed. Thus, the two first chapters include the basic concepts behind miniaturization in analytical chemistry, as well as the mechanical and electronic tools needed for designing and fabricating miniaturized analytical systems. Chapters 3 to 6 represent the core of the book, as they take as the basis the analytical process and deal with the miniaturization of sample