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| Nota di contenuto | Microfluidic Reactors for Polymer Particles; Contents; Preface; 1 Applications of Polymer Particles; References; 2 Methods for the Generation of Polymer Particles; 2.1 Conventional Methods Used for Producing Polymer Particles; 2.2 Microfluidic Generation of Polymer Particles; References; 3 Introduction to Microfluidics; 3.1 Microfluidics; 3.2 Droplet Microfluidics; References; 4 Physics of Microfluidic Emulsification; 4.1 Energy of the Interfaces Between Immiscible Fluids; 4.2 Surfactants; 4.3 Interfacial Tension; 4.4 Laplace Pressure; 4.5 Rayleigh-Plateau Instability<br>4.6 Wetting of a Solid Surface4.7 Analysis of Flow; 4.8 Flow in Networks of Microchannels; 4.9 Dimensional Groups; References; 5 Formation of Droplets in Microfluidic Systems; 5.1 Introduction; 5.1.1 Geometrical |

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5.3.6 Maximum Throughput of a Single Junction5.4 Formation of Droplets and Bubbles in Microfluidic Flow- Focusing Devices; 5.4.1 First Reports and Observations; 5.4.2 Dynamics of Flow-Focusing Systems at Low Contrast of Viscosities; 5.4.2.1 Formation of Bubbles; 5.4.2.2 Formation of Droplets; 5.4.3 Flow Focusing: Formation of Viscous Droplets; 5.5 Practical Guidelines for the Use of Microfluidic Devices for Formation of Droplets; 5.5.1 Types of Fluids; 5.5.2 Surfactants; 5.5.3 Wetting; 5.5.4 Size of the Droplets; 5.5.5 Supplying the Liquids; 5.6 Designing Droplets
5.6.1 Control of the Interface of Homogeneous Droplets5.6.2 Heterogeneous Droplets; 5.6.3 Multiple Emulsions; 5.7 Conclusions; References; 6 High-Throughput Microfluidic Systems for Formation of Droplets; 6.1 Introduction; 6.2 Effects that Modify the Pressure Distribution; 6.3 Hydrodynamic Coupling; 6.4 Integrated Systems; 6.5 Parallel Formation of Droplets of Distinct Properties; 6.6 Conclusions; References; 7 Synthesis of Polymer Particles in Microfluidic Reactors; 7.1 Introduction; 7.2 Particles Synthesized by Free-Radical Polymerization; 7.2.1 Polymerization in Multi-Phase Flow
7.2.1.1 Emulsification of Polymerizable Liquids7.2.2 Synthesis in Single-Phase Flow; 7.3 Polymer Particles Synthesized by Polycondensation; 7.4 Combination of Free-Radical Polymerization and Polycondensation Reactions; 7.5 General Considerations on the Use of Other Polymerization Mechanisms; 7.6 Important Aspects of Microfluidic Polymerization of Polymer Particles; 7.6.1 Modes of Microfluidic Polymerization; 7.6.2 Achieving High Conversion in Microfluidic Polymerization; 7.6.3 In Situ Polymerization of Monomer Droplets; 7.7 Synthesis of Composite Particles; 7.7.1 Copolymer Particles
7.7.2 Polymer Particles Loaded with Low-Molecular Weight Organic Additives

Sommario/riassunto

The manipulation of fluids in channels with dimensions in the range from tens to hundreds of micrometers - microfluidics - has recently emerged as a new field of science and technology. Microfluidics has applications spanning analytical chemistry, organic and inorganic synthesis, cell biology, optics and information technology. One particularly promising application is the microfluidic synthesis of polymer particles with precisely controlled dimensions, and a variety of shapes, morphologies and compositions. Written as a comprehensive introduction for scientists and engineers working in micr