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wavelength and radiation energy; 2.7.2 Mechanisms of UV curing; 2.7.3 Basic kinetics of photopolymerization; 2.8 Deposition techniques for polymer thin films

2.9 Properties and synthesis of carbon nanotubesReferences; Part 2: Design Principles; 3 Sensors for Smart Systems; 3.1 Introduction; 3.2 Conductometric sensors; 3.3 Capacitive sensors; 3.4 Piezoelectric sensors; 3.5 Magnetostrictive sensors; 3.6 Piezoresistive sensors; 3.7 Optical sensors; 3.8 Resonant sensors; 3.9 Semiconductor-based sensors; 3.10 Acoustic sensors; 3.11 Polymeric sensors; 3.12 Carbon nanotube sensors; References; 4 Actuators for Smart Systems; 4.1 Introduction; 4.2 Electrostatic transducers; 4.3 Electromagnetic transducers; 4.4 Electrodynamic transducers

4.5 Piezoelectric transducers4.6 Electrostrictive transducers; 4.7 Magnetostrictive transducers; 4.8 Electrothermal actuators; 4.9 Comparison of actuation schemes; References; 5 Design Examples for Sensors and Actuators; 5.1 Introduction; 5.2 Piezoelectric sensors; 5.3 MEMS IDT-based accelerometers; 5.4 Fiber-optic gyroscopes; 5.5 Piezoresistive pressure sensors; 5.6 SAW-based wireless strain sensors; 5.7 SAW-based chemical sensors; 5.8 Microfluidic systems; References; Part 3: Modeling Techniques; 6 Introductory Concepts in Modeling; 6.1 Introduction to the theory of elasticity

6.1.1 Description of motion6.1.2 Strain; 6.1.3 Strain-displacement relationship; 6.1.4 Governing equations of motion; 6.1.5 Constitutive relations; 6.1.6 Solution procedures in the linear theory of elasticity; 6.1.7 Plane problems in elasticity; 6.2 Theory of laminated composites; 6.2.1 Introduction; 6.2.2 Micromechanical analysis of a lamina; 6.2.3 Stress-strain relations for a lamina; 6.2.4 Analysis of a laminate; 6.3 Introduction to wave propagation in structures; 6.3.1 Fourier analysis; 6.3.2 Wave characteristics in 1-D waveguides; References; 7 Introduction to the Finite Element Method

7.1 Introduction

Sommario/riassunto

Presenting unified coverage of the design and modeling of smart micro- and macrosystems, this book addresses fabrication issues and outlines the challenges faced by engineers working with smart sensors in a variety of applications. Part I deals with the fundamental concepts of a typical smart system and its constituent components. Preliminary fabrication and characterization concepts are introduced before design principles are discussed in detail. Part III presents a comprehensive account of the modeling of smart systems, smart sensors and actuators. Part IV builds upon the fundamental conce