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Vibration; 4. System Governing Equations of the Cantilever Structure; 5. Results and Analysis for the Piezoelectric Cantilever; 6. Conclusions; References
CHAPTER 4: ENERGY FLOW ANALYSIS IN PIEZOELECTRIC HARVESTING SYSTEMS1. Background; 2. Mechanical-to-Mechanical Energy Transfer; 3. Mechanical-Electrical Energy Transduction; 4. Electrical-to-Electrical Energy Transfer; 5. Summary of the Total Energy Flow; 6. Conclusions, References; CHAPTER 5: CONVERSION ENHANCEMENT FOR ENERGY HARVESTING; 1.Introduction. 2.Modeling and Nonlinear Conversion Enhancement Principles; 3.Application to Energy Harvesting: SSH Techniques; 4.Extension of the Nonlinear Energy Harvesting Principles; 5.Implementation Considerations; 6.Conclusions References
Part II: Applications and Case Studies.CHAPTER 6: ENERGY HARVESTING FOR SMART MINIATURIZED SYSTEMS; 1. Introduction 2. Principles of Harvesting from Vibrations; 3. Designs for the Piezoelectric Microharvesting; 4. Nanomaterials for Piezoelectric Microharvesting; 5. Examples of Piezoelectrically Powered Smart Systems; 6. Conclusions References; CHAPTER 7: ENERGY HARVESTING FROM A LOW FRQUENCY POWER SOURCE; 1. Background; 2. Approaches for Low Frequency Energy Harvesting; 3. Low Frequency Energy Harvesting with PVDF; 4. Conclusions References; CHAPTER 8: WASTE HEAT TO HIGH VOLTAGE ELECTRICITY
1. Introduction2. Pyroelectric Copolymers; 3. Principle of Pyroelectric Conversion; 4. Experimental Work; 5. Economics and Technologies Comparison; 6. Conclusions; 7. Appendix; References; CHAPTER 9: ENERGY HARVESTING PRODUCTS AND FORECAST; 1. Introduction 2. Review of Commercial Devices; 3. Piezoelectric Energy Harvesters in Research; 4. Conclusions; 5. Future of Piezoelectric Energy Harvesting; References

Sommario/riassunto

The purpose of this book is to present the current state of knowledge in the field of energy harvesting using piezoelectric and pyroelectric materials. The book is addressed to students and academics engaged in research in the fields of energy harvesting, material sciences and engineering. Scientists and engineers who are working in the area of energy conservation and renewable energy resources should find it useful as well. Explanations of fundamental physical properties such as piezoelectricity and pyroelectricity are included to aid the understanding of the non-specialist. Specific technolo