1. Record Nr. UNINA9910797934803321 Autore Yang Bin (Associate professor) Titolo Micro and nano energy harvesting technologies // Bin Yang, Huicong Liu, Jingquan Liu, Chengkuo Lee Pubbl/distr/stampa Boston:,: Artech House,, [2015] [Piscatagay, New Jersey]:,: IEEE Xplore,, [2014] **ISBN** 1-5231-1740-0 1-60807-815-9 Descrizione fisica 1 online resource (305 p.) Collana Artech House microelectromechanical systems (MEMS) library Disciplina 620.5 Soggetti Energy harvesting **Energy conversion** Power resources Nanotechnology Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Note generali Description based upon print version of record. Includes bibliographical references and index. Nota di bibliografia Nota di contenuto Preface; 1 Piezoelectric MEMS Vibration Energy Harvesting; 1.1 Working Principle: 1.2 Mechanical and Electrical Modeling: 1.3 Fabrication of Piezoelectric MEMS Energy Harvesters; 2 Electromagnetic MEMS Vibration Energy Harvesting: 2.1 Basic Principle and Modeling: 2.2 Characterization of Coils and Magnets; 2.3 Review of Existing Electromagnetic Energy Harvesters; 3 Electrostatic MEMS Vibration Energy Harvesting; 3.1 Basic Principles; 3.2 Electret-Free Electrostatic Microharvesters; 4 Triboelectric Energy Harvesting; 4.1 Working Principle; 4.2 Materials and Fabrication. 4.3 Development of Triboelectric Energy Harvesters5 Strategies for High-Performance Vibration Energy Harvesters; 5.1 Hybrid Energy Conversion Strategies; 5.2 Frequency Broadening Strategies; 6 Microelectronic Circuits for Vibration Energy Harvesting; 6.1 Overview of Energy-Harvesting Electronics; 6.2 Case Study of Energy-Harvesting Electronics; 7 MEMS Acoustic Energy Harvesting; 7.1 Working Principle; 7.2 Acoustic Microharvester; 7.3 Application of Acoustic Energy

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Sommario/riassunto

Seeking renewable and clean energies is essential for releasing the heavy reliance on mineral-based energy and remedying the threat of global warming to our environment. In the last decade, explosive growth in research and development efforts devoted to microelectromechanical systems (MEMS) technology and nanowiresrelated nanotechnology have paved a great foundation for new mechanisms of harvesting mechanical energy at the micro/nano-meter scale. MEMS-based inertial sensors have been the enabler for numerous applications associated with smart phones, tablets, and mobile electronics. This is a valuable reference for all those faced with the challenging problems created by the ever-increasing interest in MEMS and nanotechnology-based energy harvesters and their applications.nnThis book presents fundamental physics, theoretical design, and method of modeling for four mainstream energy harvesting mechanisms -- piezoelectric, electromagnetic, electrostatic, and triboelectric. Readers are provided with a comprehensive technical review and historical view of each mechanism. The authors also present current challenges in energy harvesting technology, technical reviews, design requirements, case studies, along with unique and representative examples of energy harvester applications.