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properties of ZnO; 1.4. Piezoelectricity of ZnO; 2: ZnO Nanostructure Synthesis; 2.1. Electrochemical deposition for ZnO nanostructure; 2.1.1. Electrodeposition of monocrystalline ZnO nanowires and nanorods via template method; 2.1.1.1. Individual nanowire growth; 2.1.1.2. Nanopillar array growth; 2.1.2. ZnO nanowire array growth via electrochemical road 2.2. Hydrothermal method for ZnO nanowire array growth 2.3. Comparative discussion on ZnO nanowire arrays obtained via electrodeposition and hydrothermal method; 2.4. Influence of main parameters of hydrothermal method on ZnO nanowire growth morphology; 2.4.1. Effect of the growth method; 2.4.2. Effect of the growth solution pH value; 2.4.3. Effect of the growth temperature; 2.4.4. Effect of the growth time; 2.5. Electrospinning method for ZnO micro/nanofiber synthesis; 3: Modeling and Simulation of ZnO-Nanowire-Based Energy Harvesting; 3.1. Nanowire in bending mode 3.1.1. Influence of the nanowire length 3.1.2. Influence of the nanowire diameter; 3.1.3. Influence of the aspect ratio; 3.2. Nanowire in compression mode; 3.2.1. Influence of the nanowire length; 3.2.2. Influence of the nanowire diameter; 3.2.3. Influence of the aspect ratio; 3.3. Nanowire arrays in static and vibrational responses; 3.3.1. Nanowire arrays in static and compressive responses; 3.3.2. Nanowire arrays in periodic vibrational response; 4: ZnO-Nanowire-Based Nanogenerators: Principle, Characterization and Device Fabrication; 4.1. Working principle of nanogenerators 4.2. ZnO-nanowire-based energy harvesting device fabrication 4.3. ZnO-nanowire-based energy harvesting device characterization; 4.4. ZnO-nanostructure-based hybrid nanogenerators; Conclusion; Bibliography; Index

Sommario/riassunto

Over the past decade, ZnO as an important II-VI semiconductor has attracted much attention within the scientific community over the world owing to its numerous unique and prosperous properties. This material, considered as a "future material", especially in nanostructural format, has aroused many interesting research works due to its large range of applications in electronics, photonics, acoustics, energy and sensing. The bio-compatibility, piezoelectricity & low cost fabrication make ZnO nanostructure a very promising material for energy harvesting.
