

1. Record Nr.	UNINA9911146775803321
Titolo	Materials for energy // editor, Sam Zhang
Pubbl/distr/stampa	Boca Raton, FL, : CRC Press, 2021
ISBN	1-000-17671-1 0-429-35140-2 1-000-17667-3 9780429351402
Edizione	[First edition.]
Descrizione fisica	1 online resource (529 pages) : illustrations
Collana	Advances in Materials Science and Engineering
Disciplina	621.3028/4 620.11
Soggetti	Electric batteries - Materials Energy storage - Materials Renewable energy sources - Materials Sustainable engineering
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover -- Half Title -- Series Page -- Title Page -- Copyright Page -- Table of Contents -- Preface -- Editor -- Contributors -- Chapter 1 Halide Perovskite Photovoltaics -- 1.1 Solar Energy and Photovoltaics -- 1.2 Halide Perovskite Materials -- 1.2.1 Structure of Halide Perovskite Materials -- 1.2.2 Optical Property and Bandgap Tunability of Halide Perovskite Materials -- 1.2.3 Optoelectronic Property of Halide Perovskite Materials -- 1.3 Stability of Halide Perovskites -- 1.3.1 Intrinsic Thermal Stability of Halide Perovskite Materials -- 1.3.2 Phase Stability of FAPbI ₃ Perovskite -- 1.3.3 Phase Stability of All-Inorganic CsPbI ₃ Perovskite -- 1.4 Summary -- References -- Chapter 2 Carbon Nanomaterials for Flexible Energy Storage Devices -- 2.1 Overview of Flexible Energy Storage Devices -- 2.2 Flexible Supercapacitors -- 2.2.1 Mechanism and Advancement of Supercapacitors -- 2.2.2 Electrodes -- 2.2.2.1 Carbon Materials -- 2.2.2.2 Conducting Polymers -- 2.2.2.3 Transition Metal Oxides -- 2.2.3 Flexible Wire-Shaped Supercapacitors -- 2.2.3.1 Wire-Shaped Supercapacitors in a Parallel Structure -- 2.2.3.2 Wire-

Shaped Supercapacitors in a Twisted Structure
 2.2.3.3 Wire-Shaped Supercapacitors in a Coaxial Structure -- 2.2.4 Applications -- 2.2.4.1 Supercapacitor Textiles -- 2.2.4.2 Flexible Microsupercapacitors -- 2.3 Flexible Batteries -- 2.3.1 Mechanism and Development of Batteries -- 2.3.2 Electrodes -- 2.3.2.1 Carbon Nanotube -- 2.3.2.2 Graphene -- 2.3.2.3 Carbon Paper/Carbon Cloth -- 2.3.3 Configuration -- 2.3.3.1 Flexible Planar Batteries -- 2.3.3.2 Flexible Wire-Shaped Batteries -- 2.3.4 Application -- 2.3.4.1 Textile Batteries -- 2.3.4.2 Multifunctional Batteries -- 2.4 Integrated Energy Device -- 2.5 Summary and Outlook -- References
 Chapter 3 Triboelectric Materials for Nanoenergy -- 3.1 Introduction -- 3.1.1 Nanoenergy -- 3.1.2 Triboelectric Nanogenerator -- 3.1.2.1 Basic Working Models -- 3.1.2.2 Theory Basis -- 3.1.2.3 Material Sources -- 3.2 The Development of Materials for TENGs -- 3.2.1 Dielectric-to-Dielectric Device Structure -- 3.2.1.1 The Working Principle of Dielectric-to-Dielectric Device -- 3.2.1.2 The Advantages of Dielectric-to-Dielectric Device -- 3.2.1.3 Development of Dielectric-to-Dielectric Paired Materials for TENGs -- 3.2.2 Dielectric-to-Conductor Device Structure -- 3.2.2.1 The Working Principle of Dielectric-to-Conductor Device -- 3.2.2.2 The Advantages of Dielectric-to-Conductor Device -- 3.2.2.3 Development of Dielectric-to-Conductor Paired Materials for TENGs -- 3.2.3 Semiconductor Device Structure -- 3.2.3.1 The Role of Semiconductor for TENGs -- 3.2.3.2 Semiconductor-to-Dielectric Device -- 3.2.3.3 Semiconductor-to-Conductor Device -- 3.3 The Output Enhancement Mechanism in TENGs -- 3.3.1 Selection of Paired Materials -- 3.3.2 Enhancement in Effective Contact -- 3.3.3 Modification of Material Composition -- 3.3.4 Control of Environmental Conditions

Sommario/riassunto

Materials for Energy offers a comprehensive overview of the latest developments in materials for efficient and sustainable energy applications, including energy conversion, storage, and smart applications. Discusses a wide range of material types, such as nanomaterials, carbonaceous electrocatalysts and electrolytes, thin films, phase change materials, 2D energy materials, triboelectric materials, and membrane materials Describes applications that include flexible energy storage devices, sensors, energy storage batteries, fuel and solar cells, photocatalytic wastewater treatment, and more Highlights current developments in energy conversion, storage, and applications from a materials angle Aimed at researchers, engineers, and technologists working to solve alternative energy issues, this work illustrates the state of the art and latest technologies in this important field.
