

Edited by
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Multifunctional Nanocomposites for Energy and Environmental Applications

Volume 1



Focusing on real applications of nanocomposites and nanotechnologies for sustainable development, this book shows how nanocomposites can help to solve energy and environmental problems, including a broad overview of energy-related applications and a unique selection of environmental topics.

Clearly structured, the first part covers such energy-related applications as lithium ion batteries, solar cells, catalysis, thermoelectric waste heat harvesting and water splitting, while the second part provides unique perspectives on environmental fields, including nuclear waste management and carbon dioxide capture and storage.

The result is a successful combination of fundamentals for newcomers to the field and the latest results for experienced scientists, engineers, and industry researchers.



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Volume 1

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**Multifunctional Nanocomposites
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Preface

Advances in energy and environmental engineering materials are one of the crucial prerequisites for the protection of the sustainable ecology. Scientists and engineers in the energy sector are exploring for new reserves of oil and gas, processing these raw materials into fuels and other useful chemicals, and developing new technologies like solar photovoltaic cells, wind turbine, batteries, and fuel cells that are sustainable and more environmentally sound. Meanwhile, numerous researchers are getting involved in improving the environment, minimizing waste, and protecting the personal health and safety of humans and the surrounding communities through process monitoring and control and by designing new processes that are more efficient and take advantage of sustainable raw materials. At present, nanocomposites have expanded into almost every aspect of science and applications worldwide with various functions produced by well-developed innovative nanotechnologies. The multifunctional nanocomposites made a great contribution to progress the energy and environmental applications in the last two decades. Currently, a great understanding of the potential and challenge of nanomaterials for energy and environmental applications is highly expected for both academic and industrial uses. Therefore, we gathered the preeminent researchers around the world to present the cutting edge of what they have investigated. The publication of this book will accelerate the spread of excellent ideas that are currently trickling through the scientific literature.

In preparing this book, we have been ably assisted by Dr Xingru Yan, who, among other contributors, has been largely responsible for organizing all chapters, compiling all the problems, and restructuring one or two of the chapters. Finally, I would like to thank all the authors who squeezed valuable time out of their busy lives to contribute to this book and those reviewers who gave invaluable critical comments on the manuscripts. Many thanks for your hard work.

June 16, 2017
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