

The Physical Chemistry of Materials: Energy and Environmental Applications

By Rolando M.A. Roque-Malherbe

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In recent years, the area dealing with the physical chemistry of materials has become an emerging discipline in materials science that emphasizes the study of materials for chemical, sustainable energy, and pollution abatement applications. Written by an active researcher in this field, **Physical Chemistry of Materials: Energy and Environmental Applications** presents methods for synthesizing and characterizing adsorbents, ion exchangers, ionic conductors, heterogeneous catalysts, and permeable porous and dense materials. It also discusses their properties and applications.

The book explores various examples of these important materials, including perovskites, zeolites, mesoporous molecular sieves, silica, alumina, active carbons, carbon nanotubes, titanium dioxide, magnesium oxide, clays, pillared clays, hydrotalcites, alkali metal titanates, titanium silicates, polymers, and coordination polymers. It shows how the materials are used in adsorption, ion conduction, ion exchange, gas separation, membrane reactors, catalysts, catalysts supports, sensors, pollution abatement, detergency, animal nourishment, agriculture, and sustainable energy applications.

Rising pollution levels and the need for sustainable energy have necessitated new ways of using certain materials to combat these problems. Focusing on this emerging discipline, **Physical Chemistry of Materials** describes the methods of syntheses and characterization of adsorbents, ion exchangers, ionic conductors, catalysts, and permeable materials. It tackles key issues in materials science and physical chemistry.

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Editorial Review

Review

The structure of the book is coherent. Extensive equations, figures and references provide suitable complement to the text. The production quality allows the reader to understand the ideas with minimal confusion or difficulty. This book succeeds in being systematic and practical, and can be used as a great reference for science and engineering researchers or a textbook for university studies … Not only does this book summarize the classical theories under the discipline of physical chemistry of materials, but also exhibits their engineering applications in response to the currently urgent needs of energy and environmental issues.
?*Materials Today*, March 2010

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?*CHOICE*, September 2010

About the Author

Rolando M.A. Roque-Malherbe is the director of the Institute of Physical and Chemical Applied Research at the University of Turabo in Puerto Rico.

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