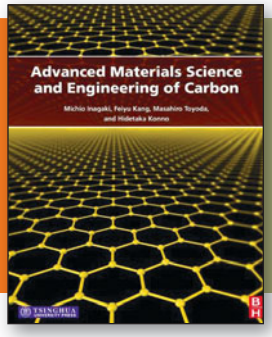
3 introduces kinetics theories during the crystal growth process. Chapters 4, 5, and 6 cover the intermolecular reactions on surfaces. Chapter 7 continues the introduction of nucleation of crystals from surface energy and kinetics standpoints, mainly using the Monte Carlo method. Chapter 8 gives a good introduction to the application of molecular dynamics to nucleation, crystal growth, and defects for short- and long-range ordered structures. Finally, chapter 9 presents many examples on how to apply those theories to mathematical models. Each example includes detailed background and the necessary programming codes for the model. Some recommended experiments are also given to illustrate each example.

The book does not cover all aspects of simulation in materials science, but the authors have successfully focused and condensed the content on atomic surface phenomena and processes of crystallization by incorporating computational simulation methods. The highly concentrated content in each chapter and well-illustrated examples make it a useful handbook or textbook for researchers or postgraduate students with a certain level of materials physics and chemistry background.

***Reviewer: Yan Hong** of General Electric, USA.*



Advanced materials science and engineering of carbon
Michio Inagaki, Feiyu Kang, Masahiro Toyoda, and Hidetaka Konno

Butterworth-Heineman, 2013
434 pages, $149.95
ISBN 978-0-12-407789-8

This book gives an excellent introduction to carbon materials for researchers in this field. Carbon is an interesting and functional element forming many important materials, such as diamond, graphite, amorphous carbon, fullerenes, carbon nanotubes, and graphene. In this book, the authors present a comprehensive review of carbon materials, aiming at understanding the advanced materials science and engineering of carbon.

The book comprises 17 chapters and 434 pages. It is divided into three parts. The first part (chapter 1) gives an introduction to carbon materials; the second part (chapters 2–10) is concerned with the formation and preparation of carbon materials; the third part (chapters 11–17) deals with applications of carbon materials. Appropriate references are listed at the end of each chapter.

Chapter 1 gives an overview of carbon materials and an outline of the book. Chapters 2 and 3 review carbon nanotubes and graphene, respectively, with emphasis on their formation and mechanism. Chapters 4–10 go into processes with specific procedures and the resultant carbon materials, including carbonization under pressure (chapter 4), graphitization under high pressure and stress (chapter 5), glass-like carbons with focus on their activation and graphitization (chapter 6), template carbonization to control morphology and pore structure (chapter 7), carbon nanofibers synthesized by electrospinning (chapter 8), carbon foams with new applications (chapter 9), and nanoporous carbon membranes and webs (chapter 10).

Chapters 11–17 cover several applications of carbon materials, such as electrochemical capacitors (chapter 11), lithium-ion rechargeable batteries (chapter 12), photocatalysis (chapter 13), spilled-oil recovery (chapter 14), adsorption of molecules and ions (chapter 15), highly oriented graphite with high thermal conductivity (chapter 16), and isotropic high-density graphite for nuclear applications (chapter 17).

This book provides a concise and comprehensive introduction to carbon materials, from material fabrication to practical applications. It is neither too advanced nor too elementary, so it is useful as a foundation for materials research. The authors have succeeded in providing a comprehensive summary and review of published results.

This book is written in a clear manner and can be well understood. I recommend this book without hesitation to all interested in carbon materials, particularly to those entering the field. It is written at a level appropriate to researchers with a chemistry, physics, or materials background. Also, it is a good book for advanced undergraduate and graduate students.

***Reviewer: Jianguo Lu** is an Associate Professor at Zhejiang University, China.*

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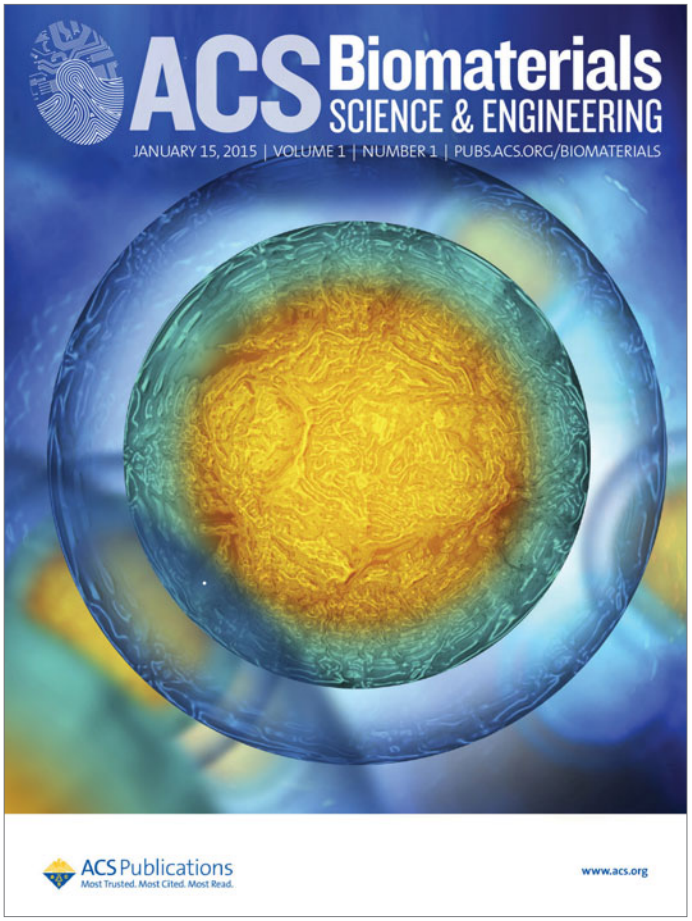

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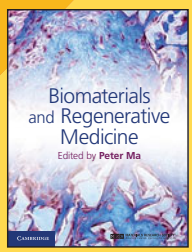

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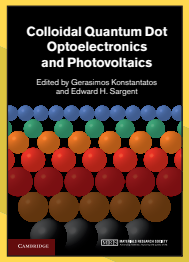

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EDITORS: Gerasimos Konstantatos and Edward H. Sargent
ISBN: 9780521198264
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Written in an accessible style by the world's leading experts, this book captures the most up-to-date research in colloidal quantum dot devices.

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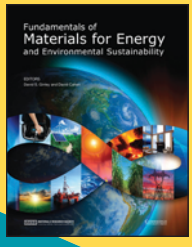

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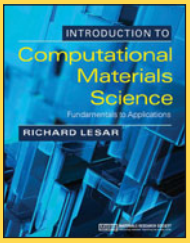

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AUTHOR: Richard LeSar
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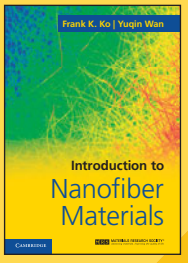

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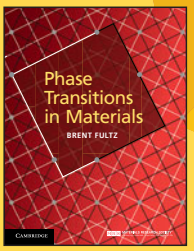

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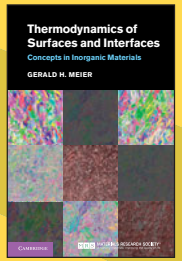

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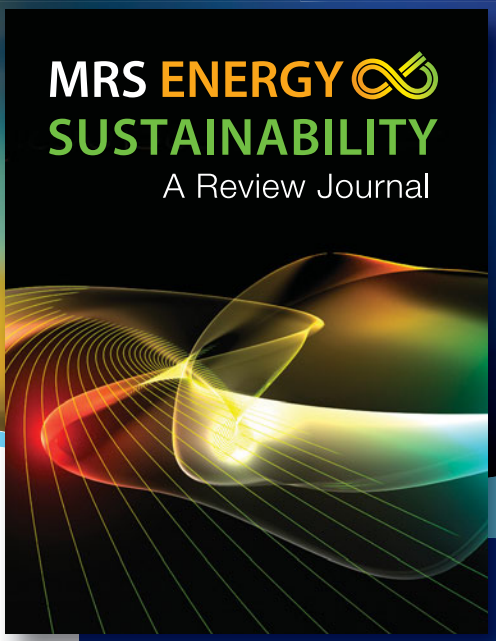

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