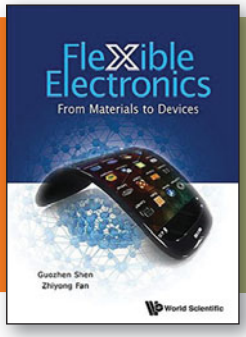
high-temperature environment and the thermodynamics and kinetics of grain growth. The authors identify the lack of reliable thermodynamic data as a key limitation in this field. The discussion brings out the interplay of structural relaxation, redistribution of excess free volume, diffusion, and recrystallization in multicomponent nanostructures at elevated temperature. Chapter 3 focuses on the effects of ion and neutron irradiation on the structure and properties of nanomaterials. The authors effectively highlight recent studies on the radiation tolerance of nanocrystalline oxides and rapid grain growth under irradiation. The material addresses both fission and fusion reactor applications.

Chapter 4 reviews the effects of severe plastic deformation and cyclic loading on nanostructure formation and phase transformation. This chapter also explores the challenge of achieving high density while retaining nanostructural features during processing under extreme loads and high temperatures. Chapter 5 discusses the effects of corrosion on nanomaterials. The behavior of a variety of alloys and high melting point compounds in liquid media and high-temperature oxidizing environments is reviewed. The concluding chapter identifies areas for further research. Each chapter ends with a section on applications and a long list of references. The book has more than 50 plots, micrographs, and schematic diagrams.

The book would have benefited from more careful copy editing of the English language. Moreover, although a list of acronyms is provided at the front of the book, the excessive use of acronyms makes the text difficult to read. However, the integration of theoretical approaches and simulation results with experimental data offers fresh insights into the behavior of nanomaterials. Overall, this book will serve as a useful reference for researchers interested in nanomaterials driven to extremes.

Reviewer: Ram Devanathan *is Technical Group Manager of Reactor Materials and Mechanical Design, Pacific Northwest National Laboratory, USA.*



Flexible Electronics: From Materials to Devices
Guozhen Shen and Zhiyong Fan, Editors
World Scientific, 2016
476 pages, $178.00 (e-book $142.00)
ISBN 978-981-4651-98-1

This book gives an excellent introduction to flexible electronics, which refers to the science and technology of using flexible materials for manufacturing electronic circuits and optoelectronic devices. Flexible electronics enables wrapping devices into desired shapes and allows compact and efficient layouts to be created. It is considered the next generation of microelectronics, very promising for practical applications in wearable products. The authors present a comprehensive review of the field, aiming to understand this advanced science and engineering paradigm, which has enormous potential.

The book comprises 10 chapters, which provide a detailed introduction of flexible electronics with typical materials and devices. Chapter 1 presents an overview of flexible electronics based on carbon nanotubes. Chapter 2 introduces various nanomaterial-based flexible sensors. Chapter 3 reviews the synthesis, properties, and applications of graphene in flexible electronics. Chapter 4 goes into high-performance flexible electronic circuits by integrating nanowires such as IV, II–VI, and III–V semiconducting nanowires. Chapter 5 focuses on electronic and optoelectronic devices based on graphene for high-frequency electronics and THz technology.

Chapter 6 is concerned with the design of nanostructures for flexible energy conversion and storage, including photovoltaic cells, lithium-ion batteries, and supercapacitors. Chapter 7 deals with next-generation flexible solar cells, such as dye-sensitized, organic, and perovskite solar cells. Chapter 8 illustrates flexible solar cells, with an emphasis on inorganic, organic, and organic–inorganic solar cells. Chapter 9 covers recent advances in fiber supercapacitors based on various nanostructures. Chapter 10 discusses flexible electronic devices based on electrospun microfibers and nanofibers with stretchable behaviors. References are listed at the end of the chapters, and multiple indexes are provided at the end of the book.

This book provides a detailed and comprehensive introduction to flexible electronics based on advanced materials. Most of the materials that are extensively studied today are discussed, such as carbon nanotubes, graphene, typical semiconductors (e.g., Si, Ge, GaAs, ZnO, TiO_2, and InGaZnO) and organics. From there, flexible thin-film transistors, memories, electronic circuits, light-emitting diodes, photodetectors, solar cells, supercapacitors, lithium-ion batteries, and sensors can be fabricated by elaborately designed techniques, most of which are discussed in detail. The book is neither too advanced nor too simple, and is useful as a reference source of materials and devices. The comprehensive summary and review of the published results in the field are remarkably helpful and vital for further developments.

I recommend this book to all interested in flexible electronics, particularly those engaged in the field. It is written at a level appropriate to researchers with a chemistry, physics, electronics, optical, materials, or device background. It is also a good book for advanced undergraduate and graduate students.

Reviewer: Jianguo Lu *of Zhejiang University, China.*

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FOCUS ISSUE • AUGUST 2017

Submission Deadline—January 1, 2017

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Achieving Superior Ceramics and Coating Properties through Innovative Processing

The development and implementation of new materials and innovative processing methods provide opportunities to expand and use advanced materials in next generation technologies and devices, to improve their quality and reliability, and to increase manufacturing efficiency. Advanced ceramics are one of the most promising areas in the creation of new generation technologies. Properties and performance of ceramics, composites, and coatings strongly depend on processing routes and their features. While many publications are related to advanced ceramic processing, only a small fraction focus on how processing affects the application properties and performance at particular service conditions. This Focus Issue will be devoted to recent advances in ceramic and coating properties and performance as achieved through innovation in processing of advanced ceramics, composites, and coatings.

Papers will consider aspects of processing on the following topics:

- novel technology of starting materials preparation;
- ceramic colloidal processing;
- novel forming technology of ceramics and composites, including for large-size and complex-shape products;
- thin and thick ceramic film processing;
- advanced methods of ceramic and composite coating formation, in particular, for complex-shape components;
- novel firing technology and sintering features;
- design-oriented technology, including additive manufacturing, from small to large-scale production.

Application properties may be related, in particular, to wear-, corrosion-, thermal shock-resistance, structural integrity under mechanical and thermal loads, ballistic performance of armor ceramics, particular electrical properties related to fuel cells, insulators, supercapacitors, semiconductors, conductors and sputtering targets, optical transmittance, catalytic properties, permeation of porous structures, and biomedical applications. The papers on the proposed topic will be of interest and importance to specialists from academia, research centers, and industry.

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