

Submission Deadline—January 15, 2014



## Advances in Thermoelectric Materials II

In August of 2011, the *Journal of Materials Research (JMR)* published a Focus Issue entitled “*JMR Focus Issue: Advances in Thermoelectric Materials.*” Since that issue was published, there have been significant advances in thermoelectric materials research, such as a surge in thermoelectric nanocomposites, mesoscale systems, and new naturally occurring materials with favorable thermoelectric performance. Thermoelectric (TE) materials allow for direct thermal-to-electrical energy conversion, as well as conversely performing as solid-state refrigeration materials. This *JMR* Focus Issue will highlight a combination of new theoretical ideas, new materials and new device concepts, various processing and synthesis methods, along with technologies and applications related to direct thermal-to-electric energy conversion. Studies at various length scales have proved to be crucial to separate the electric and thermal transport in these materials. Theoretical studies of transport properties, band structure, and crystal chemistry of materials, thermodynamic analysis and energy transfer will also be included. Experimental efforts will include new capabilities in solid-state synthesis, new bulk materials, thin films, superlattices and nanostructured materials along with new developments in material property and device performance measurements and metrology techniques.

Contributed articles are sought in the following areas:

- ◆ Oxides and other materials with strong electron correlation
- ◆ Theoretical guidance to high efficiency thermoelectric (TE) energy conversion
- ◆ High efficiency bulk TE materials
- ◆ Low dimensional and nanoscale thermoelectric materials
- ◆ Thermoelectrics related to harvesting solar energy
- ◆ Synthetic strategies for preparing novel materials and compounds
- ◆ Naturally occurring TE materials
- ◆ Thermoelectric nanocomposite materials
- ◆ Mechanical properties of various TE materials
- ◆ Materials property measurement and new metrology techniques
- ◆ Device performance requirements for future applications
- ◆ Applications and new directions in thermal energy conversion
- ◆ Mechanical properties of various TE materials

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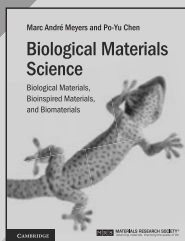
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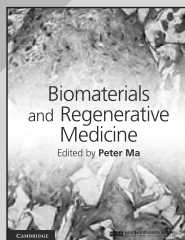
**AUTHORS:** Marc André Meyers and Po-Yu Chen  
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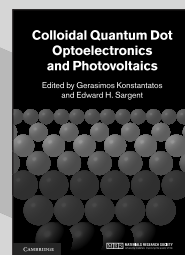
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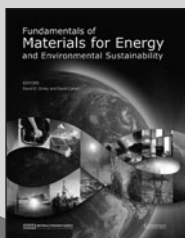
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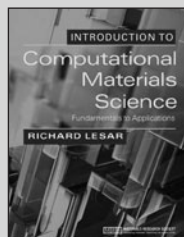
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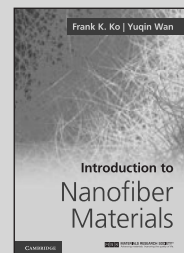
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Emphasizing essential methods and universal principles, this textbook provides everything students need to understand the basics of simulating materials behavior.

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### Introduction to Nanofiber Materials

**AUTHORS:** Frank K. Ko and Yuqin Wan  
**ISBN:** 9780521879835

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Presenting the latest coverage of the fundamentals and applications of nanofibrous materials and their structures for graduate students and researchers, this book bridges the communication gap between fiber technologists and materials scientists and engineers.

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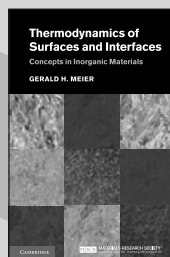
**AUTHOR:** Brent Fultz  
**ISBN:** 9781107067240

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**AUTHOR:** Gerald H. Meier  
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This book provides an accessible yet rigorous discussion of the thermodynamics of surfaces and interfaces, delivering a comprehensive guide without an overwhelming amount of mathematics.

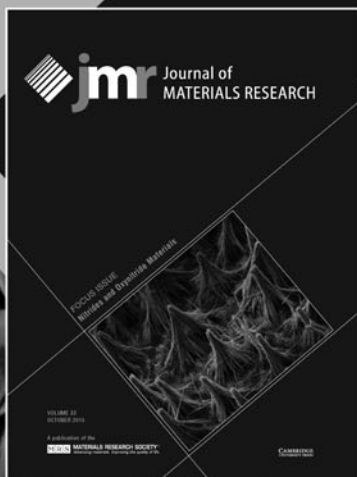
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## Nitrides and Oxynitride Materials

As a result of intensive research during the last several decades, nitride-based compounds have established themselves as inevitable materials with wide ranging applications in solid state lighting, displays, power electronics, and photovoltaics, thanks to their unique properties and capabilities beyond those of other electronic materials. Despite the fact that many nitride-based devices are already on the market, numerous challenges remain to be resolved in order to fully explore and implement their potential. It has been shown recently that the unique features of these materials, such as polarity, can lead to new device modes or improved device performance. Furthermore, the convergence of nitride materials and nanomaterials could lead to additional functionalities when combined with organics and polymers. Fundamental understanding of underlying mechanisms of surface, interface, doping, and defect-related properties will determine their full utilization and will result in exciting opportunities for further improvements, inventions, and commercialization.

This Focus Issue seeks to collect papers from research groups with diverse backgrounds in nitride and oxynitride materials and nanomaterials to discuss recent scientific and technological achievements. Submissions may cover experimental and theoretical aspects, as well as applications of these materials.

Contributed articles are sought in the following areas:

- ◆ Nitrides of different polarities
- ◆ Advances in nitride nanostructures
- ◆ Surface science of nitrides
- ◆ *In-situ* functionalization of nitrides
- ◆ Wide and ultra-wide bandgap nitrides (e.g., high Al-content AlGaN, BN)
- ◆ Bulk growth and epitaxy
- ◆ Crystal chemistry of (oxy)nitrides (e.g., high-pressure phases, single crystals)
- ◆ (Oxy)nitrides for energy conversion and storage (e.g., photocatalysts, hydrogen storage)
- ◆ (Oxy)nitrides for biomedical applications
- ◆ Luminescent (oxy)nitrides for lighting and displays
- ◆ Nitride ceramics

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The Society's interdisciplinary approach to the exchange of technical information is qualitatively different from that provided by single-discipline professional societies because it promotes technical exchange across the various fields of science affecting materials development. MRS sponsors three major international annual meetings encompassing many topical symposia, as well as numerous single-topic scientific meetings each year. It recognizes professional and technical excellence, conducts tutorials, and fosters technical exchange in various local geographical regions through Section activities and Student Chapters on university campuses.

MRS publishes symposia proceedings, the *MRS Bulletin*, and other volumes on current scientific developments. The *Journal of Materials Research*, the archival journal spanning fundamental developments in materials science, is published twenty-four times a year by Cambridge University Press for the MRS. *MRS Communications* is a full-color letters and perspectives journal focused on groundbreaking work across the spectrum of materials research.

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