

Submission Deadline—May 15, 2014

The Synthesis of Nanostructured Functional Oxide Materials

The driving force for research activities in the synthesis of nanostructured functional materials is the ability to control a material's properties by controlling the size and shape of the crystals and their arrangement into 1-, 2- and 3- dimensional structures extending over several length scales. These developments can lead to new applications in diverse fields including energy conversion and storage. The future of these technologies is strictly dependent on the availability of optimized synthesis routes that allow the processing and manipulation of functional metal oxides in a precise manner. Functional metal oxides represent an important class of materials with a wide spectrum of applications in energy conversion devices such as solar cells, fuel cells and photo- and photoelectrochemical cells for water splitting. This class of materials is fundamental also to the development of new storage devices, such as batteries and supercapacitors. This Focus Issue is dedicated to the most recent advances in the synthesis of nanostructured functional metal oxides and their applications in energy conversion and storage.

Contributed papers are solicited in the following areas:

- ◆ Colloidal synthesis of nanostructured functional oxide materials
- ◆ Assembly of nanostructured functional oxide materials into 1-, 2- and 3-dimensional superstructures
- ◆ Advances in morphological, structural and chemical characterization
- ◆ Applications in hydrogen generation by water splitting
- ◆ Applications in batteries and supercapacitors
- ◆ Applications in solar cells

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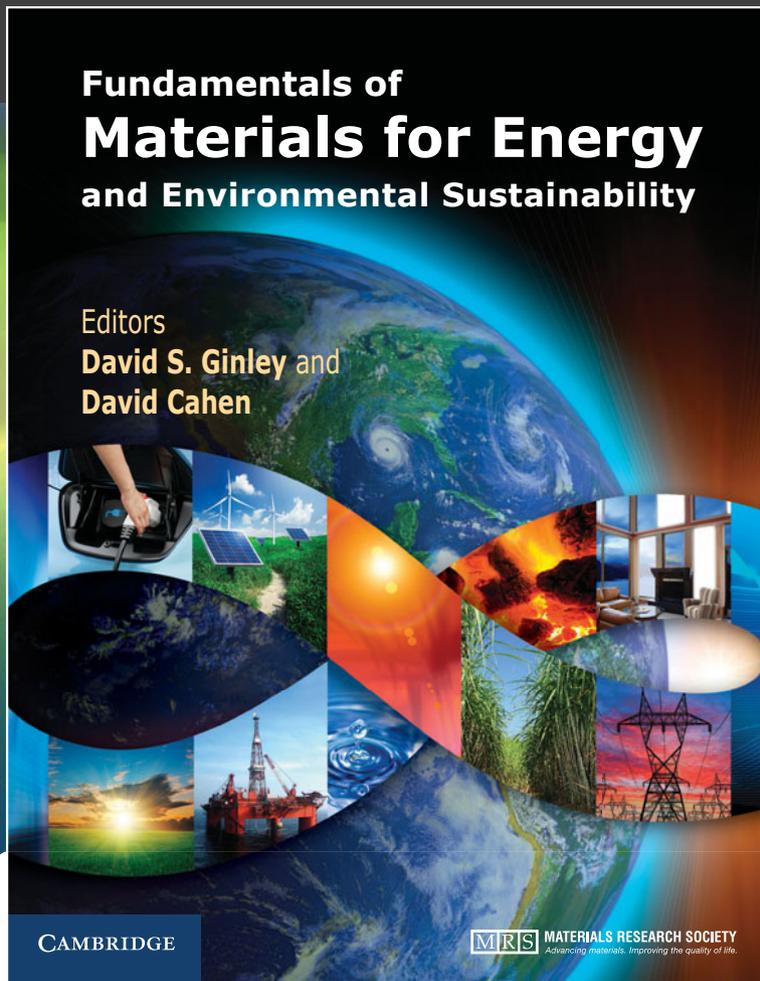
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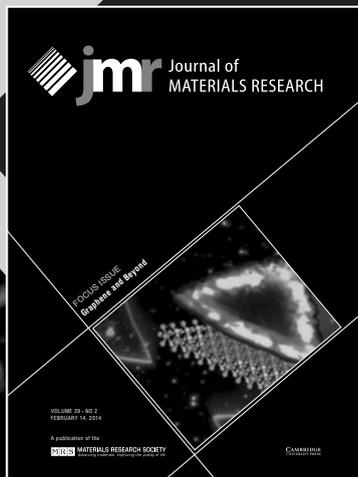
Fundamentals of Materials for Energy and Environmental Sustainability

Editors

David S. Ginley
and
David Cahen

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Submission Deadline—June 30, 2013



Graphene and Beyond

The discovery of graphene, i.e., a single atomic layer of carbon, can be considered a defining point in the research and development of stable, truly 2D material systems. This breakthrough has opened up the possibility of isolating and exploring the fascinating properties of atomic layers of several other layered materials, which upon reduction to single/few atomic layers, will offer functional flexibility, new properties, and novel applications. Today, the materials research community continues to discover and harness new low-dimensional allotropes, perhaps at an historically unprecedented rate. In this context, graphene and other 2D material systems (i.e., MoS_2 , WS_2 , WSe_2 , MoSe_2 , etc.) have become versatile platforms for new materials research and device architectures, and are finding their way into nearly every facet of the research world, including conductive polymers, transparent electrodes, chemical sensors, high-frequency devices, optoelectronic sensors, alternative energy, and bio-inspired systems, to name a few. At the same time, researchers from diverse disciplines are pushing the frontiers of these materials by developing innovative arrays of ribbon, hybrid, functionalized, doped, and heterostructures, often resulting in dramatically new scientific and engineering directions.

Abstracts related to experimentally demonstrated and theoretically predicted properties, including details of the synthesis, structure, chemistry, stacking sequence, and transport manipulation of these materials, are solicited. This includes interdisciplinary topics related to the materials science, chemistry, physics, mechanics, and engineering of 2D materials such as graphene, graphane, transition-metal dichalcogenides, silicene, and others.

Contributed papers are solicited in the following areas:

- ◆ Graphene and related carbon nanomaterials
- ◆ 2D-layered oxides, nitrides, and sulfides
- ◆ General properties of flat and tubular 1D-layered systems: nanotubes and nanoribbons
- ◆ Creation of atomic layers from layered materials by exfoliation and unzipping
- ◆ Creation of atomic layers from layered materials by chemical vapor deposition
- ◆ Chemical modification of 2D-layered materials and derivatives
- ◆ Structural and electronic characterization of 2D-layered materials including sheets, nanoribbons, and concentric tubules
- ◆ New physics of layered systems: sheets, tubules, and nanoribbons
- ◆ Applications of 2D-layered materials and derivatives

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