

Submission Deadline—November 1, 2015



## Advanced Materials and Structures for Solar Fuels

Efficient and cost-effective generation of renewable fuels, such as hydrogen from renewable resources like solar energy, is crucial to ensure a sustainable future. Due to the lack of materials and structures, however, current technologies for renewable hydrogen production via photoelectrochemical (PEC) water splitting have significant challenges in efficiency, durability, and cost. In view of their importance in sustainable energy and environmental applications, a compilation of accomplishments in photocatalytic materials research will promote rapid advances of the field.

This *JMR* Focus Issue will present latest developments in photocatalytic materials and structures, with focus on both the fundamental materials science and their applications in solar fuels production.

### Contributed articles are sought in the following areas:

- ◆ Fundamental studies of solar fuels generation via PEC water splitting
- ◆ Semiconductor materials, advanced structures, and systems for solar fuels
- ◆ Surface and interface properties of semiconductor/electrolyte junctions
- ◆ Nano-materials and heterostructures
- ◆ Overlayers, underlayers, etc. for enhanced kinetics and charge transfer
- ◆ Molecular and mesoscopic modifications of photocatalysis
- ◆ Modeling and simulation of semiconductors, interfaces, and transport processes
- ◆ Short reviews of materials and structures

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### MANUSCRIPT SUBMISSION

To be considered for this issue, new and previously unpublished results significant to the development of this field should be presented. The manuscripts must be submitted via the *JMR* electronic submission system by **November 1, 2015**. Manuscripts submitted after this deadline will not be considered for the issue due to time constraints on the review process. **Submission instructions may be found at [www.mrs.org/jmr-instructions](http://www.mrs.org/jmr-instructions)**. Please select "Focus issue: *Advanced Materials and Structures for Solar Fuels*" as the manuscript type. **Note our manuscript submission minimum length of 6000 words**. All manuscripts will be reviewed in a normal but expedited fashion. Papers submitted by the deadline and subsequently accepted will be published in the Focus Issue. Other manuscripts that are acceptable but cannot be included in the issue will be scheduled for publication in a subsequent issue of *JMR*.

**[jmr@mrs.org](mailto:jmr@mrs.org)**  
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## Two-Dimensional Heterostructure Materials

Continuing a theme first published in February 2014 under the title “*Graphene and Beyond*,” this *JMR* Focus Issue centers on heterogeneously integrated atomic layers – the next frontier in two-dimensional (2D) materials research.

The isolation of graphene constituted a new paradigm in materials exploration in which atomic layer control is possible, and even though graphene is considered transformational, it is only one of hundreds of layered materials that exhibit unique properties compared to their bulk counterparts. Materials such as transition-metal dichalcogenides, silicene, phosphorene, and 2D polymers represent a growing variety of 2D materials of interest to the research community. Heterogeneous integration of conducting, semiconducting, and insulating layered materials is expected to lead to completely new and widely tunable electronic and optoelectronic properties that are different from the constituent layers. These exciting possibilities are now beginning to be realized experimentally, making this a propitious time to offer a Focus Issue on the materials science of these novel structures.

Research related to experimentally demonstrated and theoretically predicted properties, including details of the synthesis, structure, chemistry, stacking sequence, and transport manipulation of 2D heterostructures is solicited. This includes interdisciplinary topics related to the materials science, chemistry, physics, mechanics, and engineering of 2D material systems.

### The issue will have a special emphasis on:

- ◆ Modeling of heterostructures built from 2D-layered materials
- ◆ Synthesis of lateral and vertical heterostructures of 2D layered materials by chemical and physical vapor deposition methods
- ◆ Chemical modification and doping of novel 2D-layered materials and derivatives.
- ◆ Physical property (mechanical, electronic, opto-electronic, catalytic, etc.) characterization of heterostructures of 2D layered materials
- ◆ Applications (catalysis, energy storage, sensors, optoelectronic, etc.) of 2D materials and their heterostructures

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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 two 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.

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