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Editors: F. Shahedipour-Sandvik, E. Fred Schubert, L. Douglas Bell, Vinayak Tilak and Andreas W. Bett

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**MATERIALS RESEARCH SOCIETY
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Compound Semiconductors for Energy Applications and Environmental Sustainability

Symposium held April 14–16, 2009, San Francisco, California, U.S.A.

EDITORS:

F. Shahedipour-Sandvik

State University of New York-Albany
Albany, New York, U.S.A.

E. Fred Schubert

Rensselaer Polytechnic Institute
Troy, New York, U.S.A.

L. Douglas Bell

Jet Propulsion Laboratory
Pasadena, California, U.S.A.

Vinayak Tilak

General Electric Global Research Center
Niskayuna, New York, U.S.A.

Andreas W. Bett

Fraunhofer Institut for Solar Energy Systems
Freiburg, Germany



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Warrendale, Pennsylvania

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PREFACE

This volume contains a subset of oral and poster presentations that were made at Symposium O, "Compound Semiconductors for Energy Applications and Environmental Sustainability," held April 14–16 at the 2009 MRS Spring Meeting in San Francisco, California.

Compound semiconductors have long been an integral part of everyday life. They are a class of semiconductors that have unique properties such as a direct band gap, the ability to control the band gap and wider band gaps than seen in silicon. These properties can be leveraged for many energy-related applications such as efficient lighting, high efficiency solar cells and efficient switching. Recent progress on their potential as emitters, sensing devices in biological and chemical environments and high efficiency power devices demonstrates their impact on the conservation of energy and the environment, resulting in reduction of global warming. Compound semiconductor based photovoltaic systems are emerging as economical means of generating renewable energy through the use of concentrator technologies. Examples include energy saving solid state lighting for general illumination, and use of compound semiconductors in power switching applications such as hybrid vehicles.

Although solid state lighting devices have shown energy saving and environmental benefits, much work needs to be done to realize their full potential, including resolving the issue efficiency droop at high current densities and increasing the efficiency of LEDs with emission in green (i.e., closing the green gap). In other cases, a substantial amount of work in developing and optimizing materials and device properties may be required. Understanding the interaction of these compounds with their environment for their compatibility, and studying the potentially negative impact they may have on organisms and the natural environment are other topics that need much research. This volume contains reports from internationally known experts on the state of compound semiconductor based devices with application in environmental conservation and energy saving challenges associated with realization of such devices, and obstacles to their widespread use.

The Symposium Organizers wish to thank all who contributed to the success of this symposium, in particular the authors, reviewers, and the MRS staff.

F. (Shadi) Shahedipour-Sandvik
E. Fred Schubert
L. Douglas Bell
Vinayak Tilak
Andreas W. Bett

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