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Materials Research Society Symposium Proceedings: Volume 1166

Editors: Jihui Yang, George S. Nolas, Kunihito Koumoto and Yuri Grin

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**MATERIALS RESEARCH SOCIETY
SYMPOSIUM PROCEEDINGS VOLUME 1166**

Materials and Devices for Thermal-to-Electric Energy Conversion

Symposium held April 13–17, San Francisco, California, U.S.A.

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PREFACE

Symposium N, "Materials and Devices for Thermal-to-Electric Energy Conversion," held April 13–17 at the 2009 MRS Spring Meeting in San Francisco, California, was the ninth in a series of state-of-the-art materials and technologies for direct thermal-to-electric energy conversion symposia with primary focus on material and technological advances of thermoelectrics and thermionics [see MRS Symposium Proceedings Volumes 234, 478, 545, 626, 691, 793, 886 and 1044]. In this symposium there were 93 contributed presentations, including 17 invited talks and 28 poster presentations. These presentations showed the continuing technological development in thermal-to-electric energy conversion from research in academia, national laboratories, and industry in the United States, Asia and Europe. The symposium covered a broad range of topics in the areas of materials, devices, and applications. The tutorial session was led by Dr. Thierry Caillat of NASA Jet Propulsion Laboratory, Mr. Francis Stabler of Future Technologies, and Dr. Ryoji Funahashi of the National Institute of Advanced Industrial Science and Technology, Japan, and covered space, automotive, and industrial applications of thermoelectric technology. Harald Böttner (Fraunhofer Institute for Physical Measurement Techniques) began the symposium with an overview of the state-of-the-art in high-temperature thermoelectric materials. Dr. Böttner's talk covered materials cost, manufacturability, availability, etc., in addition to their thermoelectric properties, which provides important insights on material choices for technology development. The symposium session on nanocomposite materials included an overview given by Mildred Dresselhaus (MIT) on bulk nanostructured materials, one of the recent intensively investigated areas in the thermoelectric community. Peter Rogl (University of Vienna) gave an overview on the potential of inverse clathrates for thermoelectric applications. Continued interest in the area of thermoelectrics was evidenced by the excellent level of attendance throughout the symposium.

As with previous symposia in this series, there were a large number of graduate student presentations. This continues to be a focus of our symposium, emphasizing the strong interest from our future scientists in this field of materials research. With the generous support from our sponsors, the symposium organizers were able to give presentation awards to six students:

Oral Presentations

Reja Amatyia (Massachusetts Institute of Technology) "Materials for Solar Thermoelectric Generators"

Sabah Bux (University of California, Los Angeles) "High Temperature Thermoelectric Properties of Nano-Bulk Silicon"

Steven N. Girard (Northwestern) "Investigation of Solid-State Immiscibility and Thermoelectric Properties of the System PbTe-SnTe-PbS"

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Matthew Beekman (University of South Florida) "Preparation and Fundamental Properties of Clathrate-II Intermetallic Phases: Materials with Potential for Energy Conversion Applications"

Poster Presentations

Tomomi Okada (Tokyo University of Science) "Preparation of Delafossite CuYO_2 by Metal-citric Acid Complex Decomposition Method"

Takashi Nemoto (Tokyo University of Science) "Output Power Characteristics of Mg_2Si and the Fabrication of a Mg_2Si TE Module with a Unileg Structure"

The organizers are most grateful for the support of the U.S. Office of Naval Research and ULVAC Technologies Inc. This support funded the student awards and allowed for travel funds to help support our contributing presenters.

Jihui Yang
George S. Nolas
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Yuri Grin

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