

Advanced Materials Processing for Scalable Solar-Cell Manufacturing

MATERIALS RESEARCH SOCIETY
SYMPOSIUM PROCEEDINGS VOLUME 1323

Advanced Materials Processing for Scalable Solar-Cell Manufacturing

Symposium held April 25–29, 2011 San Francisco, California, U.S.A.

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Cambridge University Press
32 Avenue of the Americas, New York, NY 10013-2473, USA

www.cambridge.org
Information on this title: www.cambridge.org/9781605113005

Materials Research Society
506 Keystone Drive, Warrendale, PA 15086, USA
<http://www.mrs.org>

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First published 2012

CODEN: MRSPDH

ISBN: 978-1-60511-300-5 Hardback

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PREFACE

Photovoltaics have received increasing attention in the last decade from the research community as well as industry. The PV market has grown at compound annual rates of 20–40%, and new technologies such as thin films based on CdTe and Cu(In, Ge)Se₂ have taken a hold in the market. Tremendous research and development innovation in photovoltaics is occurring around the world. Symposium C, “Advanced Materials Processing for Scalable Solar Cell Manufacturing” at the 2011 MRS Spring Meeting held April 25–29 in San Francisco, California, provided a forum for exploring advanced materials processing for manufacturing of solar photovoltaics, with new research highlighted by academia and industry (start-ups and large companies) alike. The symposium began with a joint tutorial between Symposia C and D (Compound Semiconductors for Energy) that touched on (i) the PV market, (ii) PV device physics, (iii) various PV materials technologies, and finally (iv) an overview of key PV manufacturing methods and challenges. This tutorial was highly successful, with over 400 participants joining to hear D. Merfeld (GE Global Research), S. Fonash (The Pennsylvania State University), J. Ager (Lawrence Berkeley National Laboratory), and R. Romero (Black & Veatch Corp.) share their insights on these four topics, respectively.

The first session of Symposium C was kicked-off by an invited presentation by H. Atwater (Caltech) on the promise of using silicon microwires for PV. F.H. Seymour (GE-PrimeStar Solar) described the technical challenges of taking a CdTe thin film PV technology from a start-up to commercialization, whereas B. Clemens (Stanford University) described the use of ion beam assisted templating to tailor the structure of thin film PV absorbers. A.N. Tiwari (EMPA/FLISOM Ltd.) demonstrated record power conversion efficiency for flexible, roll-to-roll CdTe and CIGS solar cells. A. Braun (Solarion AG) described the challenges in scaling ion beam assisted deposition of CIGS on roll-to-roll polymer substrates. In the area of silicon PV, E. Franklin (Australian National University) described the latest developments in Sliver cell technology for silicon solar cells.

Other topics included solution-based processing, transparent conductors, and advance coatings for PV. H. Hillhouse (University of Washington) described the use of nanoparticles to form CIGS and CZTS films, whereas C. Hotz (Solexant Inc.) provided insights into commercial efforts to scale nanoparticle-based solution processing of CdTe PV cells/modules. The symposium was highlighted by a very well attended poster session. The second version of this symposium will be part of the program at the 2012 MRS Spring Meeting. The Editors would like to thank Dr. Venkatesen Mannivanan for his assistance in co-organizing the symposium. Finally, we also thank MRS and the Conference Chairs (especially Dr. Sam Mao) for their support of the symposium, as well as the following companies for their support: General Electric - Global Research; Transmill Technologies, Inc.; Solexant, Inc.

Loucas Tsakalacos
Henry Ji

July 2011

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