

REWAS 2013: Enabling Materials Resource Sustainability

By Gabrielle Guastad

Editor's Note: This article was prepared as a group effort of the REWAS organizing committee: Randolph Kirchain, Gregory Krumdick, Anne Kvithyld, Diana Lados, Christina Meskers, Brajendra Mishra, Markus Reuter, Mark Schlesinger, and Cong Wang. It was excerpted from a longer piece, which is posted in its entirety at <http://materialstechnology.tms.org/mas/article.aspx?articleID=4691>.

One of the key engineering chal-



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lenges of the 21st century will be reducing the harmful effects associated with a growing population and the attendant flows of materials. Many have raised the alarm on the social and environmental ills associated with modern life and the industry that supports it. In response, governments, industry, and citizens have adopted regulations, new technologies, and behaviors that are aimed at addressing these acute issues.

The materials community is uniquely positioned to play a central role in addressing these problems by fundamentally changing the materials and processes used by society. Materials experts will be the key to *realizing, enabling, and understanding* sustainability via a broad, systems-level perspective to their work. REWAS 2013 was developed to showcase this emerging perspective in materials research with targeted symposia organized in these three key areas.

The goal of REWAS 2013 is to build from the successful Sustainable Materials Processing and Production symposium, organized by the Materials and Society Committee for the TMS 2010 Annual Meeting. This symposium brought together thought leaders from industry, government, and academia to



discuss successful production strategies for the materials science community to address sustainability issues.

With careful selection of topic areas, plenary talks, and speakers, REWAS 2013 expands beyond the technical community to pull in practitioners involved with methodologies that measure sustainability, including life-cycle assessment, systems modeling, and industrial ecology. This integration of perspectives is a key enabler for solving multi-disciplinary challenges. The following offers an overview of the three topic areas that comprise REWAS 2013.

Realizing Sustainability

Every sector faces unique challenges in the transition to sustainability. However, a common factor across each is the key role that materials will play in realizing this transition. Speakers in this session will focus on five key sustainability relevant areas: transportation; the built environment; electrical and electronic equipment and infrastructure; energy production and storage; and water systems. Talks will examine trends and drivers toward sustainability, their enabling materials technologies and challenges, and the tools to evaluate environmental impacts. Highlights include a Saint-Gobain director who will discuss sustainable approaches to advanced materials development for the built environment and a participant on the United Nations Environment

Program Metal Recycling study who will share findings from that report.

Enabling Sustainability

Enabling technologies, particularly in primary and secondary processing, will be important drivers to realizing the benefits of novel material solutions. Talks in this session will focus on: sustainable metals and materials processing; design of products, processes, and systems for recycling and resource recovery; and process design, modeling, and simulation. New work will be featured in the fundamental understanding of process–property relationships, particularly at differing structure scales, and in practical utilization of new methods and technologies that translate property changes into environmental gains.

Understanding Sustainability

Quantifying environmental impacts and characterizing changes toward sustainability require utilization of system-level tools and methodologies. Planned talks highlight the development and implementation of these tools with a focus on life-cycle management, life-cycle analysis, and industrial ecology, as well as systems modeling and design. Highlights include presentations on successful approaches to communicating complex, sustainability-related issues to the general public, and integrating sustainability-related research into the materials science curriculum.

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