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# Materials Challenges In Alternative & Renewable Energy

February 26-March 1, 2012 | Hilton Clearwater Beach Resort | Clearwater, Fla., USA

Co-organized by: ASM International | SPE Composites Division | The Minerals, Metals & Materials Society  
Endorsed by: Materials Research Society | Society for the Advancement of Material and Process Engineering

[www.ceramics.org/mcare2012](http://www.ceramics.org/mcare2012)



# Materials Challenges in Alternative & Renewable Energy 2012

Please join us at MCARE 2012—Materials Challenges in Alternative & Renewable Energy Conference in Clearwater, Fla., Feb. 26–Mar. 1, 2012. Designed to bring together leaders in materials science and engineering, MCARE 2012 aims to facilitate information sharing on the latest materials developments for alternative and renewable energy.

The conference includes eight plenary presentations that will be given by global leaders in the field on leading energy alternatives. In addition, the conference includes more than 230 technical presentations addressing state-of-the-art materials challenges involved with batteries and energy storage, biomass, electric grid, geothermal, hydrogen, conventional and marine and hydrokinetic hydropower, nuclear, solar, wind, materials availability for alternative energy, and nanocomposites and nanomaterials for energy.

This meeting was designed for scientists and engineers who are active in energy and materials science as well as those who are new to the field. Because of the efforts of the Technical Advisory Board, MCARE 2012 boasts outstanding speakers who will make this meeting a memorable experience for all in attendance. Sunny Clearwater, Fla., will be the ideal setting for nearly 300 people working in the materials and energy fields to share information and experiences about their work in alternative and sustainable energy.

Four premier materials organizations—The American Ceramic Society, ASM International, Society of Plastics Engineers Composite Division and The Minerals, Metals & Materials Society—representing the disciplines of ceramics, metals and polymers have joined forces to co-

sponsor this conference of global importance. In addition, the Materials Research Society and the Society for the Advancement of Material and Process Engineering endorse MCARE 2012.

## Thanks to our sponsors

Special thanks go to our sponsors, including Harper International, Lanzhou University of Technology, Savannah River National Laboratory, Toyota Research Institute North America, Sandia National Laboratories, and Dow Corning. The generous support of these sponsors is essential to a successful meeting. Thank you to GM for providing a Chevy Volt and to Toyota for providing a FVHC for the Ride & Drive demo.



## PLENARY SPEAKERS



**Eric Peeters**  
Dow Corning  
Solar Solutions  
Title: Innovation  
in Advanced  
Materials for  
Next Generation  
Technologies in  
Renewable Energy Sector

Peeters

Renewable Energy Sector



**Megan McCluer**  
US DOE Wind &  
Hydropower  
Technology  
Programs  
Title: US DOE  
Wind and Water  
Power Program

McCluer



**Bob Powell**  
General Motors  
Global R&D  
Title: Materials  
Science for Auto-  
motive Electric  
Vehicle Trans-  
portation

Powell



**Tom Sanders**  
Savannah River  
National  
Laboratory  
Title: State of  
Nuclear Energy  
in the World

Sanders



**Ned Stetson**  
US DOE  
Title: An Over-  
view of US  
DOE's Activities  
for Hydrogen  
Fuel Cell  
Technologies

Stetson



**Jim Ahlgrimm**  
US DOE Wind &  
Hydropower  
Technology  
Programs  
Title: US DOE  
Wind and Water  
Power Program

Ahlgrimm



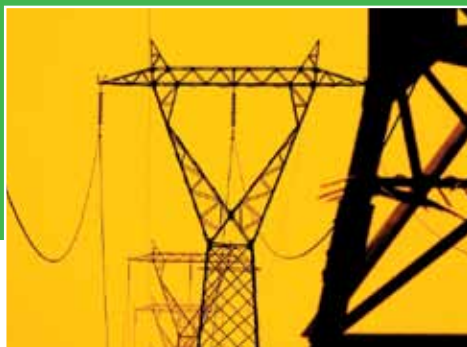
**Bhakta Rath**  
Naval Research  
Laboratory  
Title: Energy  
After Oil

Rath



**Steve Bossart**  
DOE, National  
Energy Technol-  
ogy Laboratory  
Title: Materials  
Research for  
Smart Grid  
Applications

Bossart



## TECHNICAL ADVISORY BOARD AND TOPIC CHAMPIONS

Thad Adams, SRNL  
 Sivaram Arepalli, Sungkyunkwan University  
 Ming Au, SRNL  
 Geoffrey Brennecka, Sandia National Labs  
 Robin Brigmon, SRNL  
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 David Dorheim, DWD Advisors  
 Gary Fischman, Future Strategy Solutions  
 Bernadette Hernandez-Sanchez, Sandia National Labs  
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 Steven Sherman, SRNL  
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 Mrityunjay Singh, NASA-GRC/OAI  
 Rick Sisson, Worcester Polytechnic Institute  
 Ned Stetson, US Department of Energy  
 Greg Stillman, US Department of Energy  
 Hidda Thorsteinsson, US Department of Energy  
 Mike Tupper, Composite Technology Development, Inc.  
 Eric Wachsman, University of Maryland  
 Jy-An (John) Wang, Oak Ridge National Lab  
 Ragaay Zidan, SRNL

### Schedule

#### Sunday, Feb. 26, 2012

Registration	3 – 7 p.m.
Welcome Reception	5 – 7 p.m.

#### Monday, Feb. 27, 2012

Registration	7:30 a.m. – 5 p.m.
Welcome and Plenary Lectures	8:45 a.m. – 12:15 p.m.
Networking Lunch	12:15 – 2 p.m.
Plenary Lectures	2 – 4:15 p.m.
Networking Reception	4:30 – 5:30 p.m.

#### Tuesday, Feb. 28, 2012

Registration	7 a.m. – 6 p.m.
Concurrent Technical Sessions	8 a.m. – 12 p.m.
Networking Lunch	12 – 1:30 p.m.
Concurrent Technical Sessions	1:30 p.m. – 6 p.m.
Poster Session 1 and Networking Reception	7 – 9 p.m.

#### Wednesday, Feb. 29, 2012

Registration	7:30 a.m. – 6 p.m.
Concurrent Technical Sessions	8 a.m. – 12 p.m.
Lunch on Own	12 – 1:30 p.m.
Concurrent Technical Sessions	1:30 – 6 p.m.
Ride & Drive – Toyota FVHC and GM Volt Demo	4:00 – 7 pm
Poster Session 2, Student Contests and Networking Reception	7 – 9 p.m.

#### Thursday, March 1, 2012

Registration	7:30 a.m. – 12 p.m.
Concurrent Technical Sessions	8 a.m. – 12 p.m.
Lunch on Own	12 – 1:30 p.m.
Hydrogen Session	1:30 – 5:30 p.m.

## TECHNICAL SESSIONS

### BATTERIES AND ENERGY STORAGE

Among the battery types of much interest are standard lead acid batteries and Li-ion batteries. Materials improvements are critical in making these energy systems more effective in the future.

Sessions	Date	Time
Novel Energy Storage Materials I	Feb–28	8:00 a.m.–Noon
Novel Energy Storage Materials II	Feb–28	1:30–4:50 p.m.
Novel Energy Storage Technologies	Feb–29	1:30–4:30 p.m.

### BIOMASS

Biomass is energy derived from organic plant and animal matter including wood, crops, manure, and municipal solid wastes. Biomass fuels currently account for about 3% of the energy used in the U.S.

Sessions	Date	Time
Bioprocess Development	Feb–28	1:30–5:10 p.m.
Materials Challenges	Feb–29	8:00–11:20 a.m.

Sign up by January 26 to save \$150!



## Meeting Co-chairs



**Jack G. Simon**  
Technology Access



**George G. Wicks**  
Savannah River National  
Laboratory

## Hotel

### Hilton Clearwater Beach Resort

400 Mandalay Avenue, Clearwater, FL 33767  
Phone: 727-461-3222 | Fax: 727-461-0610

Make reservations online at [www.ceramics.org/mcare2012](http://www.ceramics.org/mcare2012).  
When making reservations by phone, mention The American Ceramic Society to ensure the conference rate.

### Rates

Single/double/triple/quad \$169, plus tax  
US Government Employee \$112, plus tax

### Cut-off Date

Jan. 27, 2012



## ELECTRIC GRID

The grid cannot store significant amounts of power, so an efficient control system is essential to match electric generation with use. It is critical to improve the reliability, efficiency and security of this system.

Sessions	Date	Time
Electric Grid	Feb-28	3:50-5:30 p.m.

## GEOHERMAL

The U.S. produces more geothermal electricity than any other country, but this still amounts to less than half of one percent of all energy generated.

Sessions	Date	Time
Geothermal Systems and Applications	Mar-1	8:00-11:20 a.m.

## HYDROGEN

Hydrogen is considered a promising energy concept, but like many alternatives, there currently is no infrastructure in place to produce, store, transport or distribute hydrogen effectively.

Sessions	Date	Time
H-Separations, H-Interactions and Effects on Materials	Feb-28	8:00 a.m.-Noon
New Methods and Novel Materials for H-Storage	Feb-28	1:30-5:30 p.m.
Theoretical Studies of H-Storage Materials and Additional Practical Use in Energy Storage System	Feb-29	8:00 a.m.-Noon
Adsorption, Catalysis and Means of Enhancing H-Interaction with Materials	Feb-29	1:30-5:30 p.m.
Engineering and Modification of H-Storage Materials for Applications	Mar-1	8:00 a.m.-Noon
Analytical Methods and Characterization of Novel Hydrogen Storage Systems	Mar-1	1:30-5:30 p.m.

## HYDROPOWER

Conventional Hydropower currently accounts for about 6% of the total electricity generated in the U.S. Marine & Hydrokinetic Technologies are emerging advanced water power devices that capture energy from waves, tides, ocean currents, rivers, streams and ocean thermal gradients.

Sessions	Date	Time
Material Challenges for Conventional and Marine Hydropower	Feb-28	1:30-3:50 p.m.
Hydropower Coatings	Mar-1	8:00-10:40 a.m.

## MATERIALS AVAILABILITY FOR ALTERNATIVE ENERGY

Whether we find that materials are less available, or we find new uses for less expensive materials and materials systems, we will have to develop this supply chain to move forward.

Sessions	Date	Time
Materials Availability for Alternative Energy	Mar-1	8:00-11:00 a.m.

## NANOCOMPOSITES AND NANOMATERIALS FOR ENERGY

It is important to know the possibilities and limitations of the use of nanomaterials in providing solutions for the current energy issues.

Sessions	Date	Time
Nanocomposites and Nanomaterials I	Feb-28	8:00-11:40 a.m.
Nanocomposites and Nanomaterials II	Feb-29	8:00-11:40 a.m.
Nanocomposites and Nanomaterials III	Feb-29	1:30-5:10 p.m.

## NUCLEAR

Nuclear power extracts usable energy from atomic nuclei by controlled nuclear reactions and most often, through nuclear fission. Among the advantages of nuclear energy are no greenhouse emissions.

Sessions	Date	Time
Improved and Advanced Materials Systems for Fuel and NPP Components	Feb-29	8:00 a.m.-Noon

## SOLAR POWER

Solar power is energy derived from sunlight and can be converted into various forms of energy. The conversion to electricity can take place by photovoltaic (PV) or solar cells, as well as by use of solar power plants.

Sessions	Date	Time
PV Modules and Novel Approaches and/or Structures	Feb-28	8:00-11:40 a.m.
Thin Films and Solar Thermal	Feb-29	8:00-11:40 a.m.

## WIND

Wind power plants or wind farms use wind turbines to produce electricity. The largest U.S. farm generates enough electricity to power about a quarter of a million homes each year.

Sessions	Date	Time
Wind Power	Feb-29	1:30-5:10 p.m.

## MATERIALS CHALLENGES IN ALTERNATIVE & RENEWABLE ENERGY

February 26–March 1, 2012

Hilton Clearwater Beach Resort | Clearwater, FL USA



### 4 ways to register –

Early Registration Deadline:  
January 26, 2012

#### MAIL

The American Ceramic Society  
L-2625, PO Box 600001  
Columbus, OH 43260-2625 USA

#### FAX

1-240-396-5637  
(Credit Cards Only)

#### WWW

www.ceramics.org  
(Credit Cards Only)

#### PHONE

1-866-721-3322 US.  
1-240-646-7054 Int'l.  
(Credit Cards Only)

### Please print

This is my  work address  home address  school address

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Company/Affiliation/School \_\_\_\_\_

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### Registration

Registration	EARLY REG. THROUGH JAN. 26	AFTER JAN. 26
Member*‡	<input type="checkbox"/> \$595	<input type="checkbox"/> \$745
ACerS Member with 12-month membership renewal‡	<input type="checkbox"/> \$715	<input type="checkbox"/> \$865
Nonmember‡ (includes one year of ACerS membership)	<input type="checkbox"/> \$715	<input type="checkbox"/> \$865
Speaker/MCARE Committee Member	<input type="checkbox"/> \$495	<input type="checkbox"/> \$645
ACerS Emeritus/Senior Member‡	<input type="checkbox"/> \$445	<input type="checkbox"/> \$595
One Day: Member*‡	<input type="checkbox"/> \$445	<input type="checkbox"/> \$595
One Day: Nonmember‡ (includes one year of ACerS membership)	<input type="checkbox"/> \$565	<input type="checkbox"/> \$715
Material Advantage Student Member‡	<input type="checkbox"/> \$80	<input type="checkbox"/> \$155
Student: Not in Material Advantage	<input type="checkbox"/> \$115	<input type="checkbox"/> \$190
Extra Conference Proceedings	<input type="checkbox"/> \$75	<input type="checkbox"/> \$75

**GRAND TOTAL** \$ \_\_\_\_\_ \$ \_\_\_\_\_

\*ACerS/ASM/SPE/TMS/MRS/SAMPE Member

‡ ACerS members: Select free division affiliation (if you don't already have one)

Note 1: Registration includes welcome reception, two poster receptions, two lunches and breaks.

Note 2: Proceedings provided to member, nonmember, emeritus, and speaker registrations.

### ACerS Membership\*

If you are not a member of a division, choose one free division affiliation below.

- Art
- Basic Science
- Cements
- Electronics
- Engin. Ceramics
- Glass & Optical Materials
- Nuclear & Environ. Tech.
- Refractory Ceramics
- Structural Clay Products
- Whitewares & Materials

Join or renew a Section or Class (CEC, Keramos, NICE) affiliation by listing it here:

Your credit card will be charged accordingly.

Membership includes online access to *Journal of the American Ceramic Society*, *International Journal of Applied Ceramic Technology*, and the *International Journal of Applied Glass Science*. Also includes print subscription and online access to *American Ceramic Society Bulletin*.

### Payment

Check for \$ \_\_\_\_\_ enclosed.

(PAYABLE TO: THE AMERICAN CERAMIC SOCIETY. MUST BE IN U.S. DOLLARS AND DRAWN ON A U.S. BANK.)

Charge \$ \_\_\_\_\_ to my credit card:

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**For Hotel Accommodations call the Hilton Clearwater Beach Resort  
1-800-753-3954 or 1-727-461-3222**

**Cancellation Policy:** Full refund less \$50 if cancelled on or before January 26, 2012; 50% refund if cancelled between January 27, 2012 and February 25, 2012; no refunds after the start of the conference.