



SCCAVS Newsletter



January 2012

The Science & Technology of Materials, Interfaces, & Processing

Special points of interest:

- Report on "Fuels from Sunlight" talk given by Dr. Nate Lewis of JCAP
- "Advances in Vacuum Vessel Design" dinner and talk by GNB scheduled for January 25, 2012 ***REGISTER EARLY***
- Tentative date announced for NEW SCCAVS sponsored equipment exhibition and student symposium this Fall at UCLA

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"Fuels From Sunlight"

Synopsis of talk given by Dr. Nathan Lewis (JCAP), September, 2011

Richard Stamberg

A number of very interested attendees welcomed Professor Nathan Lewis, Director of the new Joint Center for Artificial Photosynthesis at California Institute of Technology, a \$122 million DOE Project. The stated goal of this project is "To demonstrate a manufacturably scalable solar fuel generator, using earth-abundant elements, that, with no wires, robustly produces fuel from the sun, 10 times more efficiently than (current) crops." This approach is akin to photosynthesis, as opposed to Fuel Cells, which generate electric power from fuel.

The project comprises two DOE National Labs, six research universities, and two National Labs. The project will also interface with 20 leading Institutions in associated science partnerships to formulate dynamic ways that JCAP can benefit others in the field.

Dr. Lewis noted that the density of energy storage in chemical bonds is among the highest of all alternatives. He believes the project has the critical mass of dedicated researchers necessary for success. Although the initial project focus will be on generating gaseous hydrogen fuel, the research will also seek ways to create

liquid fuels since these are better suited for airplanes and automobiles. The project's first anniversary arrived in October, 2011.

Research in the short-term (5-years) will focus on using earth-abundant elements to develop light absorbers, catalysts, linkers, membranes, and scale-up science. In the intermediate-term (10-years) these technologies are to be integrated synergistically. The longer term goals (15-year) are to maximize efficiency and minimize cost. AVS disciplines in thin films, nano-structures, surface and interfaces, and vacuum technology will be instrumental throughout.

Continued on page 4



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SCCAVS Equipment Exhibition, Short Course, and Student Symposium

Tentative date for SCCAVS Equipment Exhibition, Short Course Program, and Student Symposium is October 3rd, 2012 to be held at UCLA's main campus.

Vendors will be provided with space for table-tops displays and will have the opportunity to give brief talks on items of interest (10-15 minutes) during a vendor Quo Vadimus session . More information coming soon

For Early Interest List please contact corinne@mbartech.com

**SOUTHERN CALIFORNIA
CHAPTER OF THE AVS :
THE SCIENCE &
TECHNOLOGY OF
MATERIALS,
INTERFACES, AND
PROCESSING**

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We're on the web!
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Upcoming Events

NCCA VS 33rd Annual
Equipment Exhibition
February 22, 2012
San Jose, CA



39th ICMCTF
April 23-27, 2012
San Diego, CA



Upcoming Chapter Activities

“Advances in Vacuum Vessel Design” Speaker Dinner January 25, 2012

Jim Garner

The Southern California Chapter of the AVS invites you to a presentation on **Advances in Vacuum Chamber Technology**. It includes Dinner and the Presentation by Ken Harrison (President & CEO) and Thomas Dobler (Sales Manager) of GNB Corporation.

The talk will focus on new technologies impacting vacuum chamber fabrication, including computer-based design and analysis techniques, welding technologies, surface preparation, and UHV technologies for large systems.

The event begins on Wednesday, January 25, 2012 at 6:30 p.m., at the Holiday Inn in Torrance. Dinner is at 7:15 p.m. and the presentation will begin at 8:00 p.m.

The cost is \$30 (\$15 for students), and includes dinner and the presentation. Please see www.sccavs.org for a meeting announcement with additional details and a registration form. Please register by January 17 to ensure your participation in this exciting event!

Synopsis

New vacuum chamber technologies are enabling significant improvements in performance and cost. These have a payoff for everyone who uses, specifies, designs, or fabricates chambers. GNB, a leading manufacturer of chambers, will discuss their experience with the most critical technologies, which include:

- Integration of valves, plumbing, and seals into chamber designs to improve performance and

reduce system cost.

- Finite element model interpretation methods to reduce expensive and unnecessary design margins while achieving ASME standards.

- Welding technologies such as water-jet preparation machining, TIG and dual shield MIG, and vibratory stress relief to minimize the cost of achieving close tolerances and process compatibility.

- Surface preparation methods for achieving the best possible cleanliness

- UHV all-metal seals for large flanges made from common, inexpensive materials

Our Speakers

Ken Harrison, President & CEO, GNB Corporation since 2005. He has also held mechanical engineering and management positions at SMW Systems and Gulton Stratham. He has a BSME degree from LeTourneau University and an MBA from Pepperdine University.

Thomas Dobler, Sales Manager,

GNB Corporation. Prior to this, he held mechanical engineering and product management positions with a large European vacuum valve manufacturer. Throughout his career, Mr. Dobler has collaborated with vacuum users worldwide to meet a great diversity of requirements. He has BSME and MBA degrees from the University of Gloucestershire, UK.



GNB President & CEO Ken Harrison and Sales Manager Thomas Dobler



Vacuum Vessel for use in Space Simulation Courtesy of GNB



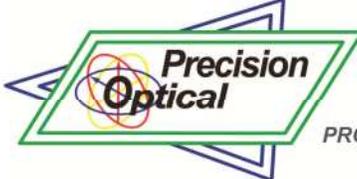
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Continued from Page 1...

Starting with evidence from an early experiment, Dr. Lewis showed that the inorganic oxide semiconductor photocatalyst strontium titanate, when used with platinum catalyst (Pt/SrTiO₃), can split hydrogen from oxygen using sunlight. Better catalysts will be developed through exhaustive experimentation using massively parallel programmable test arrays, widely used by the pharmaceutical industry. Membranes will be used to neutralize pH gradients and separate products. Nanostructures will enhance the catalytic surface area.

For further information go to Dr. Lewis's JCAP website www.solarfuelshub.org.



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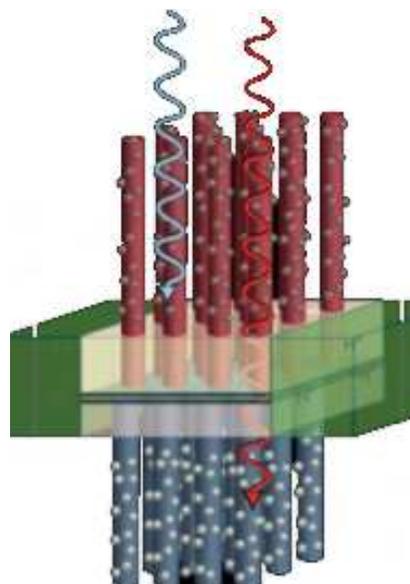
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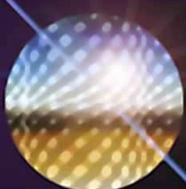
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CHAPTER ANNOUNCEMENTS

- AVS Short Courses offered by request through your local Chapter , taught by AVS National instructors. Please contact corinne@sccavs.org for details.
- Your local Chapter is seeking corporate sponsors for our area events like speaker dinners, field trips, and student sponsorships. Please contact corinne@sccavs.org to inquire about opportunities.

Additional photos from Dr. Lewis' Presentation on September 26, 2011:



EDUCATIONAL OUTREACH

Astounding Inventions is an invention fair highlighting handmade inventions by school children from the Irvine and Tustin School Districts in kindergarten through eighth grade. The competition was established to promote student interest and learning in math and science. It is held annually by the Irvine Valley College Foundation.

This year marks Astounding Invention's 25th annual convention. SCCAVS guest judges Gene Monnin of TowerJazz and Corinne D'Ambrosio of Mbar will be on site January 28th, 2012 to give special awards to two lucky students who exhibit an interest in vacuum related fields. <http://www.ivc.edu/foundation>

January 2012

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17 <small>SCCAVS MTG 6:30pm at Renato's</small>	18	19	20	21
22	23	24	25 <small>GNB Talk at Hol. Inn Torrance</small>	26	27	28 <small>Astounding Inventions at IVC</small>
29	30	31				