

SNO letter

NEWSLETTER OF SUSTAINABLE NANOTECHNOLOGY ORGANIZATION



**Sustainable
Nanotechnology
Organization**

Research | Education | Responsibility

INSIDE THIS
ISSUE:

Second SNO Conference	1
Interview with Arturo Keller Special Issue	2
Interview with Paul Weiss	3
SNO recommends SNO at GRC SNO is tax-free organization	4



**Join SNO at
www.susnano.org**

Edited by Joel Andersen

**SNO Newsletter
Submissions**

Please send news, conference announcements, job postings, letters to the editor, and other contributions to the newsletter to SNOletter@ssusnano.org. The next newsletter will appear in Oct. 2013.

SNO is preparing its second conference

Following the great success of the first conference, SNO is organizing a second conference in Santa Barbara, California, November 3-5, 2013.

The organizing committee is lead by Dr. Arturo Keller, Co-Director of the University of California Center for the Environmental Implications of Nanotechnology. The location of the conference is the Fess Parker’s Double Tree Resort on Santa Barbara beach, surrounded by the Santa Ynez Mountains.

The objective of this conference is to bring together scientific experts from academia, industry, and government agencies from around the world to present and discuss current research findings on the subject of nanotechnology and sustainability.

For more information visit www.susnano.org and click on the “Conference” tab

Deadline for submission of abstract for Oral and Poster presentation is extended to August 19, 2013

Deadline for submission of student award is August 19, 2013.



Fess Parker’s Double Tree Hotel, Santa Barbara, CA.

INTERVIEW WITH DR. ARTURO KELLER

Andersen. Feedback from the first conference was overwhelmingly positive. What were your thoughts on the 1st SNO conference?

Keller: I thought the 1st SNO Conference was terrific. We had a great turnout for the first time the members of the organization met; we had very well attended sessions, and overall I thought the quality of the presentations was quite high. We also were able to motivate a lot of junior researchers to participate, and the poster session was very well attended by all, with lots of lively interactions.

Andersen. You'll be chairing the upcoming November conference in Santa Barbara, California. What objectives have you set for the 2nd conference?

Keller. The main objective is to keep the momentum going, attracting exciting speakers to all sessions. We also want to emphasize the application side of sustainable nanotechnology, and engage more industry participants. We firmly believe that we will all benefit by having industry be a major component of SNO, since they have a better sense of the manufacturing and commercialization aspects. On the other hand, industry can benefit from the emerging information on Life Cycle Assessments, sustainable manufacturing, environmental implications, etc. So it is a win-win, but we need to get the word out to them.

Andersen. What are some trends in the field of sustainable nanotechnology you have observed over the last decade?

Keller: In this field (sustainable nanotechnology), talking about "the past decade" seems a bit long...only a few people were even thinking about sustainable nanotechnology ten years ago. There has been a tremendous growth in

research activity and information over the past few years, and some trends are beginning to emerge. On the other hand, we are continually surprised by new nanomaterials, novel applications, new manufacturing approaches and so on. We have plenty of work ahead of us.

Andersen. What directions and considerations would you like to see nanotechnology researchers take in the coming decade?

Keller. Areas that need consideration are the potential impacts of nanomaterial manufacturing on scarce elements, the recycling of nanomaterials, reducing energy and other resource requirements in the manufacture of many nanomaterials, shareable databases on information that can lead to more sustainable nanotechnology, and better understanding of the social and economic implications (positive and negative) of nanotechnology.



The new journal ACS Sustainable Chemistry & Engineering published a special issue "Sustainability and Nanotechnology" that contains 18 papers of selected work presented during the 2012 Sustainable Nanotechnology Conference. Three papers addressed applications of nanotechnology to current environmental issues. Four

papers addressed implications of nanotechnology in the environment. Another two papers are focused on nanotechnology uses in energy applications. Seven articles addressed the issue of benign synthesis of nanomaterials. Finally, the issue contained a review on nanosensors for heavy metal detection and a discussion of governance systems for sustainable nanomaterial.

Sustainability and Nanotechnology, ACS Sustainable Chem. Eng., 2013, 1 (7) pages 685-857

Publication Date (Web): July 1, 2013

ACS also was a sponsor of the first SNO Conference.

INTERVIEW WITH DR. PAUL WEISS

Andersen. Have you seen chemistry courses/materials evolve to impress upon students the growing importance of sustainability and nanotechnology within the covered discipline? What shortcomings currently exist in this area?

Weiss: Yes, we have training programs at the California NanoSystems Institute (CNSI) in both materials creation and in green energy (led by Profs. Robin Garrell and Diana Huffaker, respectively) that have developed new courses as part of their efforts. They tie together chemists, materials scientists, physicists, and engineers to work together on these problems and to “think” together. When I taught freshmen, both sustainability and nanoscience were a part of the curriculum. In our high school teacher training program at CNSI (led by Prof. Sarah Tolbert and Dr. Jia Ming Chen), these concepts are a part of the program and the experiments that we have developed. So, we are reaching out to pre-college students throughout Southern California. As you say, these curricula are evolving. These are exciting areas with great futures, so it is important to share them with students at all levels.

Andersen. What do you see as some of the most significant upcoming challenges in the coming decade or two regarding sustainability of nanotechnology?

Weiss: I think that the explosive development of new materials is already difficult to follow in terms of sustainability. We need to address the pace of development with new strategies for safety and sustainability. I have been proud to see that the efforts of our NSF Center for Environmental Impacts of Nanotechnology (led by Prof. Andre Nel) has been getting increasing attention from government in the US, California, China, and the European Union. These involve hierarchical strategies for safety, regulation, and commercialization of nanomaterials.

As editor of *ACS Nano*, we have seen tremendous interest in this area. The articles we publish are read not only by scientists and engineers, but by regulators, lawyers, and the public. We have taken on this area, both the challenges and opportunities, as one of our missions.

Andersen. Consider the rapid developments possible with nanotechnology, and the lack of information regarding environmental persistence, toxicity, etc. How, in your opinion, should a global society go about responsibly balancing technical development while exercising restraint to minimize large-scale production of widgets containing nano-components of undetermined concern?

Weiss: As I mentioned above, I think new strategies are needed. We, as a field, are developing these strategies.

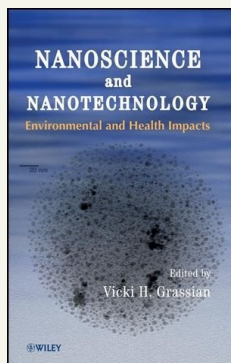
By starting with a high perspective and looking broadly at categories of materials and their biological interactions, we can target materials for more in-depth study (and purification/isolation, as needed). We are able to go deep, both in terms of characterization and safety measurements, when it is helpful, but we are also able to map out the phase space of what materials are safe for manufacture and commercialization. Some nanomaterials are not well defined, and there can be advantages to having materials with a range of properties in one mixture (just as in some applications of polymers, which can have varying sizes and degrees of cross links).

Andersen. What reminders about sustainability research would you like to provide to the members of SNO reading this interview?

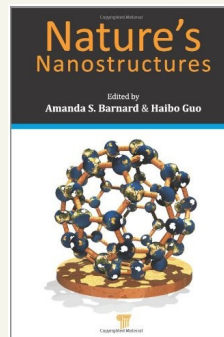
Weiss: Sustainability is a thriving, active, and exciting field. There are enormous opportunities for researchers from many disciplines to contribute. The impact of the work is likely to be high as industry, government, and the public are waiting for the results and for guidance on how to proceed. The more we know and the earlier we know it, the smarter the decisions that we as both scientific and public communities can make.

SNO RECOMMENDS

Summer readings



Nanoscience and Nanotechnology: Environmental and Health Impacts. (Edited by Vicki H. Grassian)
Through an interdisciplinary approach, this book introduces the main aspects of nanomaterials and their potential impacts in the environment and health.



Nature's Nanostructures
(Edited by Amanda S. Barnard and Haibo Guo)
A multidisciplinary effort to understand the characteristics and properties of natural nanomaterials and nanotechnology. This book can provide valuable information for those seeking inspiration from nature to produce safe and functional nanomaterials.

If you would like to contribute to this section with a book or article review send your submissions to SNOLetter@susnano.org

SNO meeting at the Environmental Nanotechnology, Gordon Research Conference.

About 40 SNO members attended an overview of current SNO activities presented by Drs. Karn and Sadik at the June GRC. SNO has consolidated its 501c3 status, and it is actively looking for sources of external funds to support workshops that will serve the SNO community.

A special issue of *ACS Sustainable Chemistry and Engineering* containing papers presented during the first SNO conference has been published.

The educational committee lead by Deb Newberry is seeking for information regarding different approaches for environmental nanotechnology and sustainable nanotechnology curriculum. If you are interested to participate in this initiative email her at deb.newberry@dctc.edu.

Finally, the organization is looking for the members' participation in different discussion groups. Please visit www.susnano.org to provide your valuable feedback.

Join SNO at
www.susnano.org

SNO sponsors Workshop I November 2, 2013

SNO will sponsor its first one-day workshop on nanoceria. This one-day workshop will discuss what we know, do not know, and suggest what needs to be determined (research recommendations) about the sustainability of nanoceria. A number of investigators have uncovered properties, some beneficial and some detrimental, to biological systems. Thus there is a need to bring together the community to discuss the biological, human health, environmental and societal improvement aspects of nanoceria. Robert A. Yokel will chair the workshop. For registration and information, see workshop tab on www.susnano.org.

SNO is a 501(c)(3)

SNO became an official tax exempt corporation in June, 2013. We are incorporated in Washington DC and now are able to receive tax deductible "bequests, devises, transfers or gifts." What this means is a portion of your membership fees could be tax-deductible, depending on how much is used for actual services to you like the conference. More important, it means that SNO as an organization can seek its own funding from foundations, government agencies, etc. Ideas about keeping SNO sustainable are welcome.

