



# Science and Technology of Materials, Interfaces, and Processing Southern California Chapter

Holiday 2018

Quarterly Newsletter

**Special points of interest:**

- JVSS in Kobe, Japan
- Hospitality Suite at AVS 65 for SCCAVS/ NCCAVS Members
- 2019 Advertising Renewals and Advertorial Opportunities
- SCCAVS Equipment Expo, Short Course & Poster Session 2019

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*JVSS International Joint Symposium: "Interfacial Science for green Innovation"*

*Contributed By Corinne D'Ambrosio*

**Kobe International Conference Center, Kobe Japan  
November 20, 2018**

As a Director on the Board of AVS, I was invited to speak at the JVSS International Joint Symposium in Kobe, Japan. The International Joint Symposium consisted of 6 invited speakers from KVS, CVS, TVS, AVS, and JVSS and covered topics such as catalysis, photocatalysis, solar cells, fuel cells, interfacial energy conversion, energy storage devices, thermoelectric conversion, *in situ* and *in operando* analyses, all from the viewpoint of surface and interface science. Professor Ken-Ichi Fukui of Osaka University's Dept. of Materials Engineering Science was the chair.



Professor Xiao Xudong from the Chinese University of Hong Kong gave an interesting opening talk regarding CIGS solar cells from lab to commercialization, which focused on how pollution and environmental concerns in China make photovoltaic (PV) usage and not just production so important. PV production in China has been the largest in the world since 2010, with 70 GW produced in 2017 alone. However this has mainly been for export to Europe, the US, and Japan and not for domestic use. This gives rise to the saying, "China pollutes itself but cleans the world," and is only recently changing. As of 2017 China became the largest user as well, with 133 GW installed.

*(Continued on page 2)*



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## JVSS (Continued from Page 1)

The speaker specifically mentioned some successes of giant Hanergy, who bought out Miasole among others, for flexible CIGS technology as the direction of the future, but didn't feel there was a commercially available option for production equipment for CIGS, relegating it to the laboratory environment.

This was a perfect segue for my talk, which introduced the AVS, invited the audience to AVS 66 in Columbus, OH next October, and introduced Von Ardenne in addressing the challenges for economic and efficiency improvements for thin film and C-Si PV production from the point of view of how high throughput, high technology PVD equipment can lower CAPX and OPEX. In fact, Von Ardenne signed an agreement with CNBM in 2016 for 2 x 300MW production lines for CIGS, specifically, to be manufactured in China in two plants by 2018, although it remains to be seen if there is a commercial answer (or demand) for Professor Xudong's concern about CIGS on flexible substrates, per above.

Professor Chu from National Chiao Tun University was the speaker for the TVS. His talk was on oxide heteroepitaxy for soft technology, and discussed device technology on mica and muskovite, including TCO's for flexible electronic devices for smart glass, smart windshield, smart windows, water splitting, and even Perovskite solar cells on mica. He calls this "MICAtronics" and the idea is to build up X-tronics on mica substrates, using inorganic materials.

The speaker from KVS was Hyunsik Im from Dongguk University, who presented on nanostructured oxide and metal hydroxide electrodes for enhanced electrochemical energy storage and oxygen evolution reaction vs morphology engineering. A common thread between this and the previous presenter's topic was water splitting, or electrocatalysts for OER. For supercapacitor electrodes, he also discussed self-assembled nanostructured electrocatalyst  $\text{CuCo}_2\text{O}_4$  for OER and Li-battery anode applications.

The last two speakers were both from JVSS. Professor Domen from Shizu University in Tokyo gave a talk on photocatalytic water splitting for solar hydrogen production. He did explosion tests (a crowd pleaser) of  $\text{H}_2/\text{O}_2$  mixture in a tube with no damage to tube, to suggest a small scale pilot plant for solar hydrogen production. This pilot plant will be in production by Summer 2019.

Professor Ken-Ichi Fukui was the final speaker as well as Chair of the symposium. His talk focused on structuring of interfacial liquid relevant for electrochemical devices. He spoke of the new analysis technique for such devices developed with electrochemical measurement and high spatial resolution, or Electrochemical Frequency Modulation-AFM. We can obtain close to the water molecules' number density profile by this EC-FM-AFM method. This method revealed potential and electrolyte dependent structuring of interfacial water layer, and belief is the "stiffness" of the H-bonding network of the interfacial water is affected by the kind and concentration of electrolyte anions ( $\text{HClO}_4$ ,  $\text{H}_2\text{SO}_4$ , etc.) Ionic Liquid has advantages for Li-Ion battery applications since it is non-flammable.

(Continued on page 4)

SOUTHERN CALIFORNIA  
CHAPTER OF THE AVS :  
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### Upcoming Events

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## Chapter Activities

### Hospitality Suite at AVS 65

The Northern and Southern California Chapters of the AVS joined forces on Tuesday, October 23rd to host a Member Appreciation Suite at AVS 65 in Long Beach for our West Coast AVS members and supporters. Serving drinks and light appetizers was our way of saying THANK YOU to our local Chapter supporters, members-at-large, and leadership.

There were networking opportunities, a raffle prize valued at \$250, Beer, Wine, and Hors d'oeuvres. Dr. Alan Van Drie of TAE Technologies won the Apple Watch sponsored by NorCal Products. See pictures from the event, below.

\*\*\*Thank you to NorCal Products for sponsoring the raffle\*\*\*



More pictures on page 6

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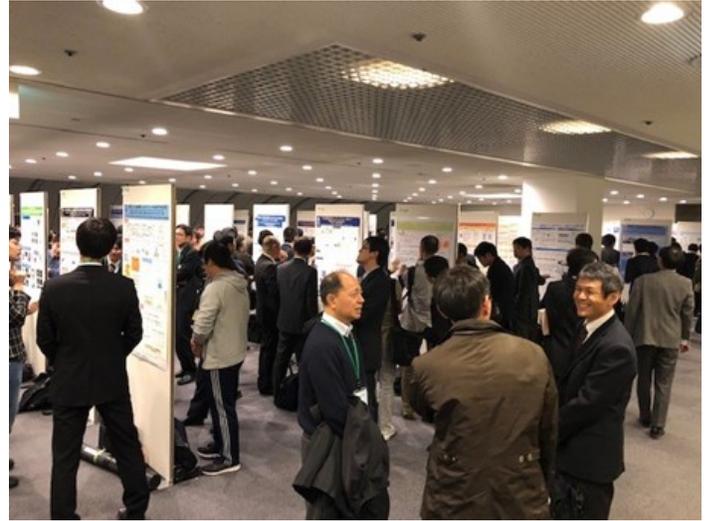
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### JVSS (Cont'd from Page 2)

After the symposium was over, there was a banquet that included a ceremony for establishing a new society: on April 1, 2018, the Vacuum Society of Japan (VSJ) and the Surface Science Society of Japan (SSSJ) merged to establish the Japan Society of Vacuum and Surface Science (JVSS), which includes the fields of the two societies. There was also a very well attended poster session (see image below) after the symposium. I was honored to be invited by the JVSS to be the representative from the American Vacuum Society at this highly technical and successful event, and enjoyed my time exploring Kobe and the surrounding area.



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September 30 to October 2, 2019

Holiday Inn Buena Park

*Equipment Exhibition (October 1), Student Poster Session, & Short Course Program*

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**\$199-Business Card Sized Ad (3 ½" W x 2"H)**

**\$375-Quarter Page Ad (4 ¼" W x 5 ½" H)**

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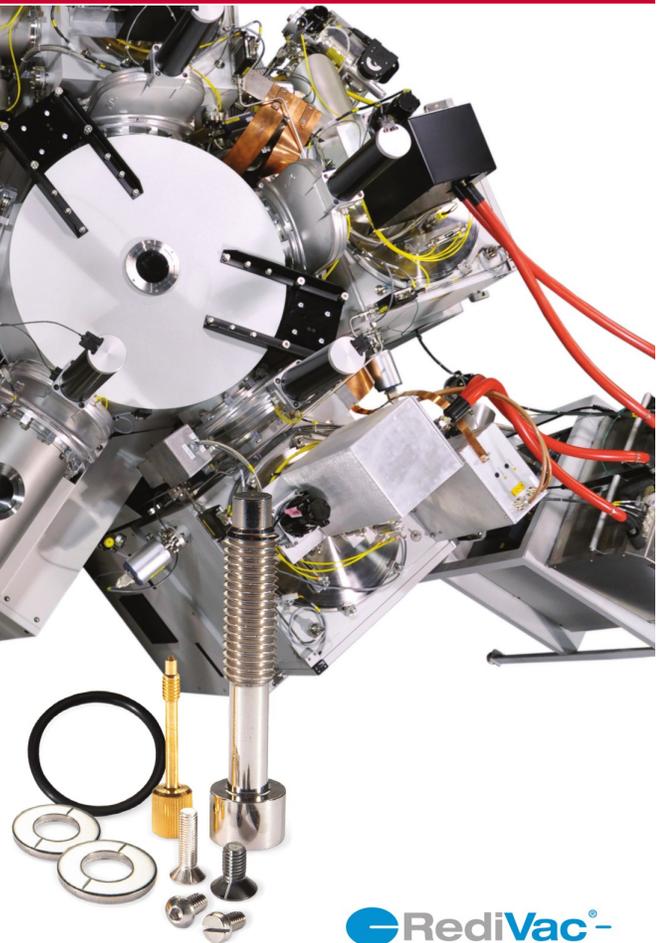
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Sun	Mon	Tue	Wed	Thu	Fri	Sat
23	24	25 	26	27	28	29
30	31	1 	2	3	4	5 ● <i>New Moon</i>
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20 ○ <i>Full Moon</i>	21	22	23	24	25	26
27	28	29 <i>SCCAVS Meeting</i> 6pm at Renato's	30	31		



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