

Introduction to Photovoltaic Technology (9/14; \$575 Regular/\$100 Student)

Course Objectives:

- Learn the fundamentals of photovoltaic (PV) from its potential importance to energy security (world level), through the macroscopic level (system operation), to the microscopic level (device operation).
- Understand the reasons for the significant growth in the U.S. and world markets for PV--who's making it, who's buying it, how it's being used, and what are the price trends.
- Learn about the materials and processes used in present PV manufacturing.
- Gain insight into what products the PV industry will need to have developed.
- Understand the current R&D focuses for different PV technologies and materials

Course Description—*Coming Soon!*

Sputter Deposition (9/15; \$575 Regular/\$100 Student)

Course Objectives

- Understand target effects and sputtered atoms.
- Learn about magnetron, diode, triode, and ion beam systems.
- Learn about DC and RF systems for targets and substrates.
- Understand reactive sputtering.
- Understand film properties and learn system parameters.

Course Description

Films are deposited by sputtering for their useful properties in microelectronics, surface protection, optics, etc., by a variety of sputtering techniques. The film properties depend on the parameters of the sputtering system, such as pressure and substrate bias.

This course provides an understanding of the cause and effect of changes in sputtering parameters on the energetics of the sputtering and deposition processes and their relationship to film properties. The energy and distribution of species ejected from the target are discussed. The effect of the sputtering system on material transport to the substrate and subsequent film deposition is also discussed for films of metals, alloys, and compounds. The parameters of different sputtering systems (diode, triode, magnetron, and ion guns) with DC and RF power supplies are discussed with respect to film properties.

Instructor Biography: Angus Rockett

Angus Rockett is a Professor and Associate Head for the Department of Materials Science and Engineering at the University of Illinois in Urbana-Champaign. He received his B.S. in physics at Brown University and his Ph.D. in metallurgy at the University of Illinois. His research involves sputter deposition of solar cell materials. He has also worked with reactive sputtering of nitrides and other materials. He is the author of more than 100 publications, holds two sputtering-related patents, has given more than 30 invited talks, and is an AVS Fellow. At the University of Illinois he teaches courses in electronic materials and processing in addition to general materials science courses. He has presented short courses and tutorials in sputtering (for AVS), materials microanalysis, and solar cells and solar cell materials for other organizations.

AVS Short Course Information

The Pacific Northwest Chapter of AVS (PNWAVS) Short Course Program will be held September 14-15, 2010 in conjunction with the PNWAVS Annual Symposium September 16-17 at the EMSL/PNNL in Richland, Washington.

All Students must check in at the Short Course registration desk to collect their name badge and course materials.

Course Location and Hotel Accommodations

All short courses will be held at the Pacific Northwest National Laboratory (PNNL), in Richland, WA, located minutes from both downtown Richland and Kennewick. A block of rooms are available at the User Guest House (within walking distance from PNNL). Information and driving directions can be found at www.pnl.gov/guesthouse. Additional accommodations are available in nearby hotels within North Richland and Kennewick (4-7 miles). Contact Barbara Diehl, barb@pnl.gov, 509-371-6453 for more information.

Registration Deadline Policy

Complete and return the registration form to enroll. Upon receipt of your registration form and payment, you will receive an e-mail confirmation with specific registration and course details.

Early Registration--Important! To ensure early registration rates and your place in the course(s) of your choice, please be sure your registration form and payment are received by the AVS office no later than **Tuesday, August 31, 2010**.

Late (or Onsite) Registration--Following the **Tuesday, August 31** early registration deadline, course fees will be marked up \$50 per course (\$25 per course for students). If you choose to register onsite, it is on a first-come first-serve basis. Please check class/space availability, 530-896-0477, heather@avs.org.

Cancellations-- If notice of cancellation is received on or before **Friday, September 3, 2010**, fees will be fully refunded. After **September 3**, refunds will be given, minus a \$100 processing fee. *No refunds/course credit for individuals who do not show up for their course(s).*

Registration Fee Discounts - (Apply only one discount per registrant)

- **Multi-Course Discount** provides a \$300 discount for every three courses taken, by *one* person, at a specific short course program (i.e., the same location and calendar week). ***This offer excludes student members and courses already being offered at a discounted rate.***
- **Member/Corporate Member Discount** provides a \$75 discount per location offering for current AVS members. ***This offer excludes student members and courses already being offered at a discounted rate.***
- **Full time students** may register at a discounted rate of \$100 per day for any course (student rates for each course are listed on the registration form). Please note, some courses include a supplemental textbook, however, as a student registrant the textbook is not included with your registration.
- AVS is not responsible for applying, or being aware that you may qualify for any of the above discounts. You may only select one discount option when registering. If you qualify for more than one discount please select the greater of the two to be applied.

How to Register

By WWW: Complete the online registration form and press "Submit". You will receive an automated reply letter upon submission and later an e-mail confirmation letter with more specific registration and course details.

By Fax/Phone: Fax your completed registration form to AVS at 530-896-0487. If you prefer to pay by check, you may first confirm your registration by calling 530-896-0477. You will receive an e-mail confirmation with specific registration and course details.

By Mail: Mail your completed registration form and payment to:
AVS, 110 Yellowstone Dr., Suite 120, Chico, CA 95973. **(AVS tax ID# 04-2392373)**
You will receive an e-mail confirmation with specific registration and course details.

To check on the status of your registration, call 530-896-0477 or e-mail heather@avs.org.

Schedule & Class Materials

Courses will begin at 8:30 a.m., finish at 4:30 p.m., and have a 1 hour lunch break. **Lunch is included.**

Attendees may obtain class materials at the short course registration desk. The short course fee for some of the courses includes the cost of a published, hardcover textbook. Certificates of completion will be given to all students attending the full course.

Registration hours:
Tuesday-Wednesday: 7:30-9:30am

Dress Code

Casual business attire. However, since room temperatures fluctuate, please bring a light sweater or jacket so that you may be more comfortable.

Onsite Short Courses

Do your employees need training now? Is travel out of the question? Are budgets tight?
Let AVS bring our short courses and qualified instructors to your organization during these tough economic times.

AVS Onsite Short Courses offers:

- **Convenience** – Lets you decide when and where your courses will be presented
- **Cost-effectiveness** – Eliminating attendee travel expenses and individual attendee course fees. Competitive pricing for any size group of employees
- **Customization** – A program that includes only those topics most valuable to your group
- **Technical experts** – Selected for their knowledge of the subject, proven teaching ability, and communication skills
- **Development** – Develop new topics not covered in our short course catalog per your organization's needs and recruit technical experts qualified to train your employees.

To request a proposal, please complete the Onsite Short Course request form,
<http://www.avs.org/education.onsite.form.aspx>

Courses by Request and Information Request Forms

Don't see a course you want? Use the online Courses by Request form at <http://www.avs.org/education.byrequest.aspx> to make a suggestion. This is a new method used to schedule course(s) you need.

If you cannot attend courses for this offering but would like more information or would like to begin receiving brochures on upcoming course offerings in your area, contact AVS, 110 Yellowstone Dr., Suite 120, Chico, CA 95973, 530-896-0477, or complete the information request form, <http://www.avs.org/education.shortcourse.request.aspx>.