

Wednesday, February 13

Synthesis Techniques for Advanced Nanocrystalline Ceramics

Olivia Graeve, Ph.D.
San Jose State University

Our February meeting is joint with the American Ceramics Society

5:30 pm Social/Networking.....6:15 pm Dinner.....7:30 pm Speaker

Meeting Location:
WYNDHAM GARDEN HOTEL
1300 Chesapeake Terrace
Sunnyvale
(408)747-0999

Dinner Cost: ASM Members \$18, Students \$8, Guests \$20
Meal Choices: London Broil, Chef Salmon, or Vegetarian

RESERVATIONS REQUIRED:
Janine Kardokus at (408) 986-7568 or janine_kardokus@amat.com
\$2 late fee after noon on Monday, Feb 11

February Meeting Sponsor: 



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Meeting Directions

From points south: north on Lawrence Expressway, pass over 237, make the first left (Moffett Park Drive/Baylands Park), then the first left onto Chesapeake Terrace. **From points east or west:** Caribbean Drive (Lawrence Expressway North) exit off 237, first left at Moffet Park Drive/Baylands Park, then left on Chesapeake Terrace. **In either case, once you are on Chesapeake, simply proceed to the end where you'll find The Wyndham Garden Hotel.**

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About the Topic

Synthesis Techniques for Advanced Nanocrystalline Ceramics

Interest in nanocrystalline materials has increased dramatically in the last few years. This is due to the realization by many scientists and engineers that decreasing microstructure particle size creates drastic variations in the properties of the material (including variations in strength, electrical properties, and optical properties). However, despite the potential usefulness these variations allow, nanocrystalline materials have proven difficult to synthesize.

This presentation will discuss several synthesis techniques for nanocrystalline ceramics. The ceramics under discussion have uses both in structural and electronic applications. Several synthesis techniques will be presented, including sol-gel techniques and field-activated combustion synthesis.

The presentation will focus specifically on nanocrystalline TaC synthesized by the field-activated combustion method. Due to thermodynamic and kinetic limitations, self-combustion reactions are not possible in certain reaction systems. These limitations include a low enthalpy, a non-optimum thermal conductivity, and a low reaction rate. Because of these limitations, a large number of materials systems cannot be synthesized by this method. However, a solution to this difficulty has been proposed through the use of an electric field as an activator. The effect of the field can be thermal, providing an additional energy, or it can include other contributions such as electromigration effects. These effects are manifested by significant changes in the dynamics of combustion reactions. The application of the field increases the temperature and rate of the reaction and influences the mechanism, thus affecting the nature and composition of the product. Furthermore, there is evidence that the field has a role in the microstructural development of the product, exerting an influence on the grain size of the product.

About the Speaker

Dr. Olivia A. Graeve, San Jose State University

Dr. Graeve holds a B.S. degree from the University of California, San Diego in Structural Engineering and a Ph. D degree from the University of California, Davis in Materials Science and Engineering. Currently she is a faculty member with the Department of Chemical and Materials Engineering at San Jose State University. Her research interests include computer modeling of synthesis processes, nanocrystalline materials synthesis, and computer modeling of the mechanical behavior of nanocrystalline materials. She is a member of the American Ceramic Society and treasurer for the Northern California Section of the American Ceramic Society.

February Meeting Sponsor

ASMI-SCV would like to thank Morgan Advanced Ceramics for sponsoring our February meeting. Morgan is a world-leading supplier of ceramic components and assemblies to the medical, microelectronics, semiconductor, laser/power tube, and aerospace industries. The company utilizes its innovative application engineering expertise to provide ceramic solutions for customer problems. We appreciate their support, which enables us to provide quality technical programming to our membership at a reasonable cost.

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SJSU Engineering Open House & Student Outreach

Each semester, the College of Engineering at San Jose State University opens its doors to the public. This Spring's Open House will be on Friday, March 8th, from 9 am to 1 pm. Even if you cannot attend yourself, you could be instrumental in getting a local school to participate with a field trip to the Open House. This is an excellent way for young people (ages 8 through 18) to discover the various engineering disciplines including materials engineering! Why not contact a teacher-friend or your local school and see if they might be interested in participating? Teachers and high school counselors may participate in a concurrent briefing in the College of Engineering, details below.

The contact number is 408-924-3800 for further information and group sign-up. Encourage all to visit the Materials Engineering facilities on the 2nd and 3rd floors of the Engineering Building (maps will be provided).

Spring 2002 SJSU Engineering Open House

Friday, March 8, 2002

Time: 9 am - 1 pm

Place: SJSU Engineering Building, 7th and San Fernando
(Parking at 7th and San Carlos)

Engineering Conference Day

Same time, same place (COE Auditorium E-189)

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National Engineers Week Feb 18-24

National Engineers Week (www.eweek.org) was launched 50 years ago as a way to showcase engineering's contributions to our quality of life. It is a time for local communities to recognize their engineers for professional and community service.

More importantly, National Engineers Week is also a time to help cultivate an interest in math, science, and engineering in our nation's youth with programs such as the *Discover "E"* (E for engineering) program. In our area, the Silicon Valley Engineering Council (www.svec.org) coordinates a number of activities related to National Engineers Week. If you would like to learn more or become involved, visit the websites noted above or contact our own ASMI-SCV Education Committee Chair, HuiHui Lin, at (408)256-1072 or huilin@us.ibm.com.

Farewell Message from the Chair

For those of you that don't already know, I ended my term as Chapter Chair in January due to a job change. I will be moving (with my family) to Singapore for the next 18 months to be Technical Staff to the IBM Director of Server Hard Disk Drive Manufacturing. I wanted to thank you, the chapter members and leaders, for the many skills you've helped me build during the past several years of my involvement with the Santa Clara Valley Chapter. I'm sure that the organization skills, team building skills, ability to write good minutes, leadership and negotiation skills, financial understanding of projects, and the many bits of technical information I've gathered from my involvement with all of you will serve me well in my new job and in the many years ahead in my career.

Although I am disappointed that I wasn't able to accomplish all I'd hoped to do as chair this year, I am certain that I leave the chapter in good hands as Jim Knowles takes over the leadership role of Chair (with the wonderful support of the whole dedicated Executive Committee). I strongly encourage you to consider expanding your role in the chapter as I can truly say it gives you a great place to build your skill set! If you're interested in learning more about chapter involvement, please contact Lou Wirtz, Nominating Committee Chair, or Jim Knowles, Chapter Chair, for more information. Thanks again for the opportunity to serve the chapter and I look forward to seeing you in 2003 for Past Chair's Night!

- Wendy

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Silicon Valley Engineers Week Banquet

As the culmination of our local celebration of National Engineering Week, the Silicon Valley Engineering Council (SVEC) will be holding their annual Silicon Valley Engineers Week Banquet of Friday, February 22 at the Santa Clara Marriott Hotel.

This year the Hall of Fame Inductee will be Dr. John L. Hennesy, President of Stanford University, former Provost, Dean of Engineering, and co-founder of MIPS Computer Systems.

The keynote speaker will be H. Gerald Schwartz, Jr., President of the American Society of Civil Engineers (ASCE). In recognition of its 150th anniversary, ASCE is chairing National Engineering Week 2002.

This event is a great way to connect with the local engineering community and support the theme of Engineers Week. If you are interested in attending the banquet or would like to find out more about participating in or sponsoring SVEC activities, visit www.svec.org or contact Steve Sherman at (408)236-2400 x137 or ssherman@ruthandgoing.com.

Advertising Opportunities

Would you like to see your ad here in the Newsletter? Contact Scott Dickerson at scott_dickerson@amat.com or (408)584-1013.

Would you like to see your ad in our upcoming Yearbook (Member Directory)? Contact Stacy Ewert at stacy.s.ewert@lmco.com or (408)756-4360.

Upcoming Events

Feb 11-15: AVS, "AVS Third International Conference on Microelectronics and Interfaces (ICMI)" Visit www.avs.org

Feb 13-14: AVS, "NCCA VS 23rd Annual Equipment Exhibition" Visit www.avs.org

Feb 13: ASCE, Presentation from Santa Clara Valley Water District. Visit: www.engr.sjsu.edu/clubs/asce/

Feb 13: ASQ - Statistics Task Group, "Factor Effects Analysis". Visit www.asq-svc.org/statistics_meeting.html

Feb 13: NiDI, "Stainless Steel for Municipal and Potable Water Handling Systems". Contact Stephen Lamb at (304) 733-1516 or procr@bigfoot.com

Feb 16: ISA, "Speed Control of Electric Motors Using Variable Frequency Drives". Visit www.isanorcal.org/upcoming_events.html

Feb 16: ISA, "NUMMI Tour #2". Visit www.isanorcal.org/upcoming_events.html

Feb 19: AIChE, "Delivering on its Promises - Alza is Leading the Next Generation of Drug Delivery". Visit www.aiche-norcal.org/meetings.html

Feb 20: ASQ, "The Silicon Valley Six Sigma Event". Visit www.asq-svc.org/2002-jan-feb-mar-dinner-mtgs.html

Feb 21: ACS, "The Role of the USGS in Discovering the Third Largest Oil Field in the World". Visit www.scvacs.org/Local_Folder/din_mtg.html

Feb 26: IEEE, "National Electrical Code Panel Discussion - Q&A". Visit www.ee.com/grid/grid01.02/sum.htm

Feb 27: AIChE, "Plasma Deposition of Silicon Thin Films: Atomic-Scale Modeling of Radical-Surface Interactions". Visit www.aiche-norcal.org/meetings.html

Feb 28: AIAA, "Search for Extraterrestrial Intelligence". Visit www.aiaa-sf.org/

Mar 3-8: SPIE, "Microphotolithography 2002". Visit spie.org/Conferences/Programs/02/ml/

Mar 12-14: IEEE-CPMT, "Semiconductor Thermal Measurement and Management Symposium (SEMI-THERM)". Visit cpmt.org/scv/

Mar 13: IEEE-CPMT, "The JEDEC JC15.1 Thermal Standards Subcommittee - An Agent for Promoting a Paradigm Shift in Thermal Simulation". Visit cpmt.org/scv/

Apr 10: IEEE-CPMT, "The Semiconductor Packaging & Assembly Roadmap". Visit cpmt.org/scv/

Also, San Jose State maintains an online discussion board. This is a great resource for technical information, job opportunities, and the latest on local society activities. Visit the board at www.engr.sjsu.edu/cgi-bin/cme/mate/mate.cgi

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Materials CampSM Fact Sheet

WHAT IS MATERIALS CAMP?

- Weeklong, summer residential camp utilizing hands-on learning principles of applied math, physics, chemistry, and basic physics.
- A very unique team-based, intensive problem solving science experience under the direction of a distinguished world-class faculty “Materials Mentor”.
- Combination of mini-demonstrations, field trips with extensive involvement in unique laboratory facilities to actively explore materials science & engineering principles.

WHERE IS MATERIALS CAMP LOCATED?

- University of Washington (Seattle) and ASM Materials Engineering Institute (Cleveland)

WHO SHOULD ATTEND?

- High school students. There are no geographic restrictions.
- Highly motivated inquisitive learners with math and science aptitude.

WHAT DOES IT COST TO ATTEND?

- Absolutely nothing. Students receive free travel, housing, meals, tuition, entertainment and knowledge.

HOW DO STUDENTS APPLY?

- Applications are available on-line (see below), and are due by **15 March**.
- Required information includes school transcript, a maximum of two letters of recommendation (one from a high school teacher and one from an ASM member, where applicable), and a personal essay.

HOW ARE STUDENTS SELECTED?

- This is a competitive application process. Students must have basic knowledge of algebra, chemistry, and physics and describe why they want to learn more about engineering and materials science as a possible college major and career.
- Experienced practicing engineers review each application to select the “best and brightest”, highly motivated students who have not yet made a firm decision about a college major or career.
- Students must have a strong interest in applied science.
- Prior participation in science fairs is helpful.

WHAT WILL STUDENTS ACTUALLY DO AT MATERIALS CAMP?

- **Have fun.** Our number one goal is to make applied science an exciting, fun experience. Additionally, students enjoy evening activities including visits to amusement parks, the Rock and Roll Hall of Fame (Cleveland) / Experience Music Project (Seattle), aviation museums, soccer, and blacksmithing.
- Solve a technical problem. Using the “failure analysis” exploration model, students work in small groups and investigate the failure of a man-made material to perform its intended function.
- Learn to use state-of-the-art research equipment in an engineering laboratory under the guidance of experts.

WHERE CAN I GET ADDITIONAL INFORMATION?

- Visit our website at: www.asminternational.org/foundation
- Call the ASM International Foundation toll-free: 1-800-336-5152.

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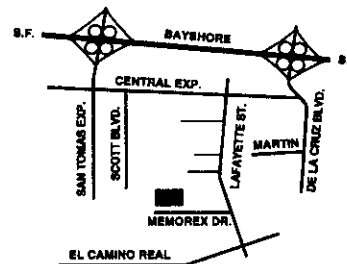
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In Memoriam

Those of you that read your Oct 2001 *Advanced Materials & Processes* know that the Santa Clara Valley Chapter lost one of our most esteemed members recently. Claus Goetzel, FASM, and longtime active member of the Santa Clara Valley Chapter died this past summer. Born in Berlin, he came to the United States after earning a degree in engineering. In 1939, he completed a doctorate at Columbia University. During his years at the American Electro Corp., he developed special armor piercing shells that were vital to the war effort. He also invented crucial parts for proximity fuses that enabled Navy fighters to shoot down kamikaze planes without having to achieve direct hits. It has been said that aside from the atomic bomb, this was the most important tool the Navy had in the Pacific war effort. In 1947 he founded Sintercast Corp. America, where he obtained more than 30 patents. When the company was merged into Chromalloy Corp. in 1957, Goetzel joined the faculty of New York University. From 1960 until 1978, he was a consulting scientist at Lockheed Missiles and Space Co. in Sunnyvale, California. It was during this time that he was an active in the Santa Clara Valley Chapter. A member of ASM since 1937, he was named a Fellow in 1987.

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2001-2002 ASMI Santa Clara Valley Chapter Information

Officers

Chair	<i>Wendy Chung is off to Singapore. Best wishes, Wendy! Jim Knowles is Acting Chair.</i>		
Vice-Chair	Jim Knowles	Grand Kauai Consulting	(650)728-3786 jim@grandkauai.com
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Vivid Incorporated	John H. Comeau	Santa Clara

Executive Committee Meetings: 4th Wednesday of Sep, Nov, Jan, Mar, and May at 6:30 pm, Round Table Pizza at El Camino & 237. Any member can attend! Call Jim Knowles at ((650)728-3786 to confirm the schedule and reserve a seat at the table.

2001-2002 Technical Program

Sept. 12	Materials Issues for Electricity Generation in the Near Future <i>Dr. John Stringer, EPRI, Palo Alto</i>	<i>Past Chair's Night</i>
Oct. 10	Thin Film Materials Science at Stanford <i>Professors W.D. Nix and B.M. Clemens, Stanford University</i>	
Nov. 14	Wafer Level Packaging <i>Luu Nguyen, National Semiconductor</i>	
Dec. 12	Underwriters Laboratories in Santa Clara <i>Martha Martinez, Underwriters Laboratories</i>	<i>Companion's Night</i>
Jan. 9	Thin Film Metallurgy from the Metals Supplier's Point of View <i>Daniel Marx, Praxair MRC</i>	<i>SCV Fellow's Night</i>
Feb. 13	Synthesis Techniques for Advanced Nanocrystalline Ceramics <i>Olivia Graeve, San Jose State University</i>	<i>Joint with ACerS</i>
Mar. 13	Nanotechnology Overview <i>Barbara Jones, IBM Almaden Research</i>	
Apr. 10	Materials Applications for the Airborne Laser Program <i>Al Gegaregian, Lockheed Martin Missiles and Space</i>	<i>Joint with SAMPE</i>
May 8	Update on Battery Technology <i>Fritz Kalhammer, Consultant</i>	<i>Awards Night</i>
