THE CHROMATOGRAPHY FORUM OF DELAWARE VALLEY

December Meeting
Tuesday, December 15, 2009

High Efficiency Separations using Sub-um Silica Particles

Professor Mary J. Wirth
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Abstract:

In the interest of increasing speed in HPLC separations, we are investigating a wild idea: using extremely small silica particles, 330 nm. And it seems to be working. These particles are virtually monodisperse, which causes them to pack as face-centered cubic crystals. This eliminates the packing heterogeneity that degrades the efficiency in today's sub-2 um columns. So far, we are packing capillaries of 75 or 100 um i.d. Plate heights as low as 200 nm are obtained for a hydrophobic dye having a retention factor of 12. With this order of magnitude drop in plate height, the column length can also be shortened by an order of magnitude, down to 1 cm, thereby increasing the separation speed by an order of magnitude. Using a 12,000 psi column back pressure, the optimal flow rate is achieved despite the small diameter of these particles, because the low interstitial volume gives rise to an increased linear velocity inside the packing. A volumetric flow rate of 200 nL/min is achieved for a 2-cm long packed bed, which easily supports nanospray ionization. Hence the material lends itself to practical separations.

About the Speaker:

Mary J. Wirth is currently the W. Brooks Fortune Professor of Chemistry at Purdue University, where she moved in July of 2009. She was on the chemistry faculty at the University of Arizona for the past five years, and prior to that, she was the C. Eugene Bennett Professor of chemistry at the University of Delaware. She is Founder and Chairman of bioVidria, Inc. in Tucson, AZ. She received her B.S. at Northern Illinois University in 1974 and her Ph.D. at Purdue University in 1978. Professor Wirth has been the recipient of many awards, including the ACS Division of Analytical Chemistry Award in Spectrochemical Analysis, the EAS Gold Medal Award, and the ANACHEM award. Her expertise involves creating new materials for separations, including silica colloidal crystals, horizontally polymerized silanes, polymer brush layers, protein microarray substrates without nonspecific binding, affinity extraction of trace proteins, and inorganic matrices for fast protein electrophoresis.

Location:
D'Ignazio's Towne House
117 Veterans Square
Media, PA 19063

Times:
Executive Mtg - 5:00 pm
Social "Hour" - 5:45 pm
Dinner - 6:30 pm
Presentation - 7:30 pm

Directions:
See below

Cost of Dinner:
$30 or MC/Visa /AmEx

NOTE TO STUDENTS: Full-time students with valid ID may attend dinner meetings at half price. **Faculty members at colleges and universities are urged to bring one or more students to the meeting. If they do, they also can attend at half-price.**

Dinner Choices: Flounder w/crab, Chicken Marsala, or Eggplant Parmesan. Please specify choice of entree when making dinner reservations.

For Reservations:
Please register/call before 4 p.m., **Friday, December 11th, 2009**. Please note that "no-shows" will be billed for the dinner.
Late reservations: We still want you to attend, so call now. However, we cannot guarantee your entrée selection for dinner.

Contact: We strongly recommend online registration http://www.cfdv.org/ but you can also e-mail sheree@cfdv.org, or FAX 610-485-9467. For FAX/e-mail, please include your name, employer, work telephone & meal choice. Alternatively, call Ms. Sheree Gold at 610-485-3479 and provide same information.

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Directions to the Towne House
Take I-95 to the Blue Route, I-476; take Exit 3 (Media). Go west on Baltimore Pike past intersection of Rt. 252. The Towne House is 10 blocks further, on the right corner of Veterans Square. (Address: 117 Veterans Square, Media, PA 19063; Phone: 610-566-6141)