

## **New Developments in Solid Phase Extraction**

**Solid phase extraction (SPE) has become a powerful and popular technique for fast, selective sample preparation prior to analysis or collection. From trace level quantitation to industrial purification, SPE devices and methods play an increasingly important role in solving the most challenging problems in pharmaceutical, food and beverage, fine chemical, and environmental monitoring applications. The principles of SPE and how the two-phase concept relates to chromatography will be covered. Popular and well-established SPE formats such as tubes and discs will be shown and explained, and advantages of designs for certain applications and automation will be included. The chemistry of plain and chemically-modified surfaces and the chemical equilibrium that that creates selective separation will be covered in detail. A systematic approach to SPE method development will be described. Finally, the latest SPE techniques and devices, such as SPME, Stir bar sorbent extraction (SBSE), molecular imprinted polymers (MIPs), 96-well plates, pipette tips and others, will be described and reviewed.**

### **II. Course Outline (per previous discussions)**

#### **Day 1 (9am – 5pm)**

**Intro to basics of SPE (with simple demonstration)**

**SPE formats**

**Automating SPE**

**Chemistry of surfaces**

**Method development**

#### **Day 2 (9am – noon)**

**Advanced SPE topics (SPME, MIPS, SBSE, Pipette Tips, etc.)**

**Applications and case studies (bring your own sample prep challenges)**

#### **Instructor Bios**

**RONALD E. MAJORS, Ph.D.**

Since 1990, Ronald E. Majors has been employed by Hewlett-Packard/Agilent Technologies, working in the area of sample preparation and chromatography column technology. His current position is a Master Scientist in the Columns and Supplies Division. Ron received his B.S. in chemistry at California State University, Fresno, in 1963 and his Analytical Chemistry Ph.D. degree in 1968 from Purdue University under the direction of L.B. Rogers. His Ph.D. thesis was in the area of molecular-imprinted phases for chromatography and sample preparation. He is the author of over 250 publications in HPLC, GC, sample preparation and surface chemistry. Among his current activities, he is editor for the monthly features, "Column Watch" and "Sample

Preparation Perspectives" in **LC/GC Magazine** for which he also serves on the Editorial Board. Dr. Majors has served as Chairman of HPLC '86 and Anabiotec '90 and as a member of the Instrumentation Advisory Board of **Analytical Chemistry**. His current interests include sample preparation especially solid-phase extraction and automation, and HPLC and GC column technology. Ron is a lifetime member of The Chromatography Forum of Delaware Valley, a member of the American Chemical Society, The Chromatography and Separations Chemistry Sub-division of the Analytical Division of the ACS where he had served as Chairman and Secretary. He is serves on the Board of Directors of the California Separations Society (CaSSS). Ron has been an invited lecturer, session organizer, and session chairman at many national and international symposia. Dr. Majors was the 1994 recipient of the Merit Award in Chromatography from the Chicago Discussion Group, the 1998 Award for Distinguished Contributions in Separation Science sponsored by the California Separations Society and, in 2000, the "Salutes to Excellence" Award from the North Jersey Chromatography Discussion Group, the 2006 Palmer Award from the Minnesota Chromatography Forum and, most recently, the Chromatographic Society's 2007 Martin Gold Medal from the United Kingdom, named for the Nobel Prize winner, A.J.P. Martin.

#### **Dr. Richard A. Henry**

Dr. Richard A. Henry received his B.S. degree in Chemistry from Juniata College in 1963 and Ph.D. in Analytical Chemistry from The Pennsylvania State University in 1966. After a postdoctoral year in separations at Purdue University with Professor L. B. Rogers, he joined DuPont at the Experimental Station in Wilmington, DE and became one of the first employees of the Analytical Instrument Products Division. Dick worked closely with Dr. Jack Kirkland and others in the development of HPLC columns and packing materials. He joined the Penn State University chemistry faculty in 1985 as Director of Analytical Laboratories where he taught Instrumental Analysis to chemistry majors. In 1985, he also founded Keystone Scientific, Inc. where he developed and marketed HPLC columns and related separation technology. He retired from both Penn State University and Keystone Scientific in 2002, and remains active in teaching short courses on separation technology and as a consultant. Dick has research interests in mechanisms of separation and all applications of new LC column technology. He is also interested in hyphenated analytical techniques, especially the rapidly growing field of LC-MS, and all multidimensional separation methods. He served two terms as Chairman of the ACS Subdivision on Separations (1998-2002) and currently serves on its Executive Committee.