WASHINGTON CHROMATOGRAPHY DISCUSSION GROUP

Meeting Announcement

Wednesday, March 16, 2016

US Pharmacopeia
12601 Twinbrook Parkway, Rockville, MD 20852

Social hour begins at 6:00 pm
Presentation begins at 7:00 pm

"Six Dimensions of Separations: Are we holding ourselves back with packed column thinking?"

Nicholas H. Snow
Department of Chemistry and Biochemistry, Center for Academic Industry Partnership
Seton Hall University, South Orange, NJ

The advent of readily available high-resolution and sensitivity multidimensional separation and detection techniques such as GCxGC-ToFMS and GC-MS-MS has provided chromatographers with unprecedented separation and detection capability. When combined with on-line sample preparation techniques such as SPME and static headspace extraction, there are now numerous avenues for chromatographers to improve separation selectivity and ultimately resolution. These additional dimensions also provide opportunities to compromise selectivity, especially when combined with historical lessons originally applied to packed columns. Considered holistically, an SPME-GCxGC-ToFMS method actually has up to six dimensions of separation: sampling, extraction, injection, two dimensions of GC and MS detection. Each can generate both desired and undesired selectivity that impacts the ultimate resolution and sensitivity generated by the full method. Using examples from forensic, pharmaceutical and organic contaminant analysis, each of the multiple dimensions of analyses involving SPME, GCxGC-MS and GC-MS-MS will be examined in terms of selectivity (both desired and undesired) selectivity generation and whether they still suffer from packed column thinking. For example, in environmental analysis, it will be shown that, if desired selectivity is maximized and undesired selectivity minimized, the sensitivity of SPME-GC-MS-MS is easily competitive with LC-MS-MS for the analysis of emerging contaminants in water. In pharmaceutical analysis, the six “non-volatile” compounds not included in the standard USP and ICH headspace methods can, in fact, be determined by headspace extraction. To maximize the potential of GC, all of the six dimensions must be understood and optimized.

Biographical Information: Nicholas H. Snow is Professor of Chemistry and Biochemistry and Director of the Center for Academic Industry Partnership at Seton Hall University. He is currently

teaching advanced undergraduate and graduate courses in analytical chemistry and separation science. He has been recognized twice by the Seton Hall University Board of Regents for outstanding teaching and service to students. He maintains an active research group with projects involving rapid separations of complex mixtures, multidimensional separations, sampling techniques for chromatography, gas chromatography and gas chromatography/mass spectrometry. He is especially interested in working with industrial and private partners in solving difficult analytical problems. He earned his PhD in 1992 from Virginia Tech.

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