Ultra Performance Supercritical Fluid Chromatography (UPSFC™), changing the game for Normal Phase Chromatography

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The origins of chromatography were founded on normal-phase separations. These separations were challenged by the required use of hazardous and flammable solvents, long equilibration times, limited selectivity options, along with detection issues. Reverse-phase chromatography became the method of choice over normal-phase because of the broad range of selectivity, greater versatility of mobile phases, the high quality data and sensitivity obtained with this technique. However, normal-phase chromatography is still required and commands approximately 15% of the $3.6 billion HPLC separations market. SFC has been demonstrated to answer many complex separation issues typically solved by normal-phase, with inherent high speed and efficiency due to the low viscosity and high diffusivity of the CO_2 based mobile phase. Considered a leading "green" separation technology, Waters SFC systems are used to separate and isolate chiral and achiral chemical compounds using various methods of detection.

With the introduction of the Ultra Performance Supercritical Fluid Chromatography (UPSFC™) system and associated VIRIDIS™ SFC columns, Waters brings SFC to a higher standard of quality and robustness, matching customer's high expectations. UPSFC improves SFC separations with increased efficiency, lower system volume, reduced costs per injection, superior injector linearity and reproducibility and industry leading detection sensitivity.

The UPSFC System provides the opportunity to make use of smaller particle sizes and smaller columns for SFC applications. These applications, both chiral and achiral, can take advantage of the low dispersion of the UPSFC system, which has not been previously available. The greatest realization of these benefits can be observed with SFC columns containing particles that are less than 2 µm in size. For particle sizes greater than 2 µm, commonly used in chiral separations, the reduced system volume and engineered injection accuracy brings about the Ultra Performance.

This presentation will explain the advantages of supercritical fluids over liquids, and present the Waters UltraPerfomance SFC™ holistic solution. We will discuss the ease of use, the versatility and the benefits of transitioning from normal-phase liquid chromatography to SFC for both chiral and achiral applications.