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Fabric Phase Sorptive Extraction (FPSE): A versatile sample preparation technology that meets the demands of twenty first century modern analytical laboratories

Statement of the Problem: The invention of fabric phase sorptive extraction (FPSE) has begun a new era in analytical sample preparation by ingeniously combining two competing for sample preparation techniques, solid phase extraction (SPE) and solid phase microextraction (SPME) into a single sample preparation technology platform. The integrated system, FPSE utilizes a flexible, yet active fabric (cellulose, polyester and fiberglass) substrate to host a thin layer of sol-gel derived extracting sorbent. The engineered selectivity of the sol-gel sorbents and the hydrophobicity/hydrophilicity of the fabric substrate synergistically complement to the net polarity of the fabric phase sorptive extraction medium and consequently, determine its extraction efficiency. The sponge-like porous architecture of sol-gel extraction sorbent and the inherent permeability of the fabric create an extraction medium that mimics a solid phase extraction disk and allows permeating aqueous sample matrix through its body, leading to rapid sorbent-analyte interaction and subsequent successful retention of the analyte(s) onto the extraction medium. The flexibility of the FPSE medium permits direct insertion into the sample container for analyte extraction and thus minimizes the number of transfer containers used in the sample preparation process. The sol-gel coating technology allows utilization of typical functional ligands commonly used in solid phase extraction such as C8/C18 as well as polymers used in solid phase microextraction such as polydimethylsiloxane (PDMS). Unlike SPE and SPME, FPSE can be performed either in equilibrium extraction mode (as in SPME) or inexhaustive extraction mode (as in SPE). In addition, sol-gel coated sorbents demonstrate superior thermal, solvent and pH stability (1-13) compared to conventional sorbents. Due to these unmatched advantages, FPSE has gained considerable popularity in a short period and has demonstrated numerous applications in a wide variety of samples including food, biofluids, wastewater and air. In the current talk, analytical data pertaining to some fascinating applications of FPSE will be presented.

Biography

Abuzar Kabir is a Research Assistant Professor in the Department of Chemistry and Biochemistry, Florida International University (FIU), Miami, Florida, USA. His research interest primarily focusses on synthesis and applications of novel sol-gel derived advanced material systems (chromatographic stationary phases, surface coatings of high-efficiency microextraction sorbents, nanoparticles, microporous and mesoporous functionalized sorbents) for analyzing polar, medium polar, nonpolar, ionic analytes, heavy metals and organometallic pollutants from biological/pharmaceutical/clinical/environmental sample matrices. He is an ardent advocate of Green Analytical Chemistry (GAC). His recent inventions, fabric phase sorptive extraction (FPSE), dynamic fabric phase sorptive extraction (DFPSE), Capsule Phase Microextraction (CPME), substrate-free liquid chromatographic stationary phases and extraction sorbents, organic polymeric liquid chromatographic stationary phases and extraction sorbents and universal molecular imprinting technology have drawn tremendous interests among the researchers. He has published more than 50 peer-reviewed journal articles, 9 book chapters and 90 conference proceedings. Dr. Kabir has invented numerous chromatographic stationary phases and sample preparation technologies, resulting in 15 US patents.

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