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Foreword

Sample preparation is one of the most critical aspects of the analysis of complex matrices for trace components and can also be the most time consuming. The introduction of solid-phase extraction techniques represented a real advantage in the strategies available to the analyst faced with problems of sample concentration and clean-up.

Solid-phase extraction can trace its origins to the use of charcoal cartridges in the 1950s for the isolation of organic compounds from water for toxicological evaluation. It only became widely used in the laboratory environment with the development of macroreticular porous polymers and silica-based chemically bonded sorbents packed into short columns or cartridges in the 1970s. The changing regulatory atmosphere of the 1980s provided a major influence in its acceptance for routine environmental applications. Solid-phase extraction was promulgated as an acceptable alternative to liquid-liquid extraction as a contribution to minimizing the use of organic solvents which, themselves, were being regulated as priority pollutants. At about the same time solid-phase extraction was accepted as a useful technique for analyzing the small sample sizes encountered in the life sciences. Solid-phase extraction has not looked back since these times and its application base has continued to expand to virtually all gas and liquid phase isolation procedures in current use. It is the first choice sampling technique in many cases.

The last decade or so has seen many changes in the laboratory and field use of solid-phase extraction techniques in response to changes in laboratory needs and operating costs. This has been a golden era in adaptation of processes, materials and technology to an ever-expanding range of problems. New sampling formats based on disk technology, polymer coated fibers and open tubular columns compete with improved cartridge formats to decrease sampling bottlenecks. New sorbents with water wettable surfaces, restricted access to bioploymers, affinity ligands, etc., provide for greater selectivity towards target analytes or more convenient laboratory use for general applications. To achieve high sample throughput multiwell plates, robotic compatibility, in-line precolumns, etc., represent unparalleled integration of the sampling and separation process in a fully automated system design. The last decade may seem hectic given the pace of these developments but shows no signs of slowing down as solid-phase extraction has become both a respectable academic research field and a commercial success.

Given the volume and diversity of research in solid-phase extraction techniques we felt that a special issue on solid-phase extraction with an emphasis on both system developments and applications was needed. Comprehensive coverage of the diversity of research was not possible but we hope that the selected topics presented in this volume will serve to capture the dynamics, breadth and intellectual health of this exciting field and act as a springboard for its continued growth.

Detroit, MI, USA Colin F. Poole
Macclesfield, UK Ian D. Wilson

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