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Preface

The treatment of waste streams and environmental matrices contaminated with complex man-made chemicals (often considered hazardous wastes) has matured dramatically over the past 25 years. The field of environmental engineering has also evolved over this period in time from a subset of civil engineering, focused on primarily municipal engineering needs (water, wastewater, and refuse management), to a truly multi-disciplined field involving numerous engineering and scientific disciplines. The engineering disciplines of chemical, biological, and mechanical have become additional major contributors to the field of environmental engineering. Also, the science disciplines, such as chemistry, biology, and geology, have greatly enhanced the field of environmental engineering through improved understanding of governing reactions and treatment mechanisms. In fact, interest is so widespread that the field of environmental engineering is often offered as a separate academic program within numerous engineering colleges within the United States and abroad.

Technological breakthroughs in analytical chemistry, molecular biology, toxicology, and numerical modeling have increased the knowledge base on contaminant fate within the environment, treatment process effectiveness and efficiency, and the toxicological impact of a chemical release on the receiving ecosystem. These dramatic breakthroughs have come about due to the new multi-disciplined approach to the field of environmental engineering and science. From an environmental process engineering standpoint, this diversity of contributing disciplines has resulted in great optimization steps with traditional treatment processes and the development of new processes that are just now being applied at the field scale. The interaction and thought exchanges between the participating professional fields has recently expanded into discussions on the basic mechanisms of individual processes that may be integrated to formulate new and improved "hybrid" processes. The integration steps are made such that positives aspects of one process are merged with the positive aspects of another process at some complimentary point during treatment. This merging is performed to then formulate a new hybrid process that is superior to the two processes as stand-alone designs.

This issue presents numerous papers that present developing processes that have been marginally utilized for treatment of hazardous wastes within environmental matrices due to their relative state of developmental immaturity and/or noted process shortcomings. The information in these papers highlights process limitations and strengths while illustrating potential areas for integrating the subject processes into innovative hybrid treatment systems. The papers were selected from technical presentations made at the 2000 American Institute of Chemical Engineers' Spring meeting in Atlanta, Georgia, during a topical conference that

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focused on highlighting processes and techniques particularly primed for utilization within integrated process designs. This topical conference was organized by Dr. Bob Peters of the University of Alabama, Birmingham, Dr. Mark Bricka of Mississippi State University, and myself.

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