John A. Gladysz, Dennis P. Curran, István T. Horváth (Eds.)

Handbook of Fluorous Chemistry

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Contents

Preface

It is approximately ten years since the modern era of fluorous chemistry began. A historical perspective on the development of this field is provided in Chapter 2. During this period, over 500 publications on fluorous chemistry have appeared. Although there has been a steady stream of review articles and other compendia, in our view it was time for a Monograph or Handbook. This idea found resonance among many others in the fluorous community, who either contributed chapters or offered valuable counsel.

Our goal was to create a Handbook that would supply both the necessary entry-level information for beginners and advanced reference material for experienced practitioners. With respect to the former objective, Chapters 1 through 8 constitute a cohesive pedagogical introduction to the fundamentals of fluorous chemistry. In Chapter 10, a number of reviews that highlight specific synthetic applications are provided. The companion Chapters 12 and 13 similarly treat selected materials and biomedical applications of fluorous chemistry. While it was not possible to comprehensively cover all of the diverse synthetic and materials applications that have appeared, references to most of the fluorous synthesis literature up to mid-2003 can be found in this Handbook.

Chapter 9 provides lead references to the ‘‘fluorous pool’’, or simple monofunctional compounds that are the starting points for most synthetic sequences. About 50 experimental procedures, in many cases representing optimized versions of those in the literature, have been collected in Chapter 11. Chapter 14 details several experimental ‘‘divertissements’’ that showcase some of the unusual properties of fluorous molecules. These are particularly suitable for lecture demonstrations, helping to attract new students to the field, or piquing the interest of the lay person.

We wish to express our sincere thanks to the many authors who have written chapters or subchapters for their hard work, engagement, and patience. We would also like to acknowledge here the granting agencies that supported the preparation of our sections (JAG, DFG; GL 300-3/1; DPC, NIH).

Fluorous chemistry continues to be a dynamic and evolving discipline. Indeed, the many intrinsic challenges associated with synthesis and catalysis – yield, selectivity, reactivity, overall cost, recoverability, etc. – are never-ending. One long-term mandate of fluorous chemists is to build a new world or ‘‘parallel universe’’ encompassing fluorous versions of all basic organic molecules, building blocks, reagents, homogeneous catalysts, macromolecules, supramolecular assemblies, etc. The following chapters illustrate that substantial progress has been made. However in constructing this parallel universe, the many fluorous pioneers have in fact created an expanded universe, with a diverse palette of unusual phenomena and exploitable properties that have no counterparts in old-world chemistry.

Future generations of researchers will put their mark on this discipline. If this Handbook can help to catalyze these efforts, we and the other authors will feel that this undertaking has been successful. Regardless, the call to all readers is to "take a dive into the fluorous pool"; given the high oxygen solubility, no special breathing apparatus is required, and the high density makes it difficult to sink. As is evident in the following chapters, there are a lot of good things swimming around.

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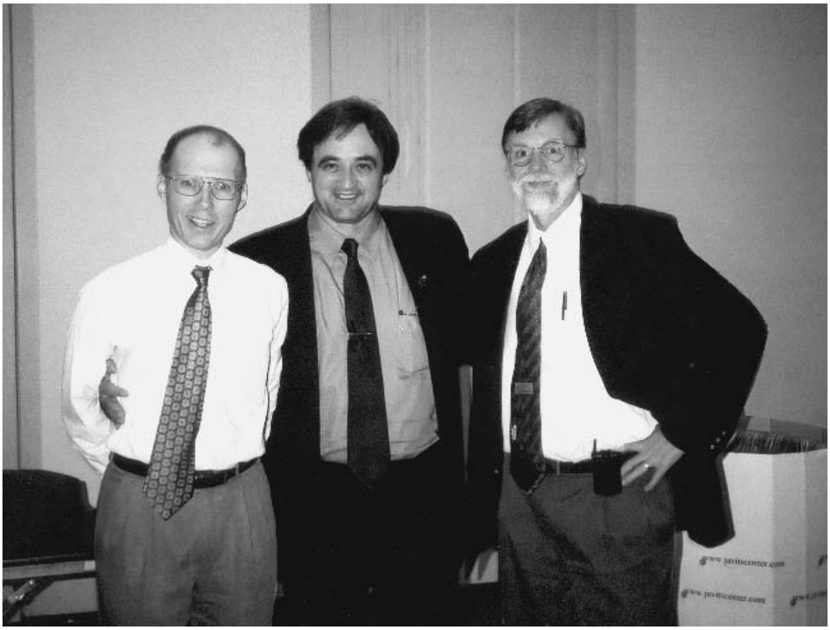

Left to right: John A. Gladysz, István T. Horváth, Dennis P. Curran

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