

# INTRODUCTION

Like so many important scientific discoveries, Buckminsterfullerene was found while alert individuals were looking for something else. In 1985, Kroto, Heath, O'Brien, Curl and Smalley were studying the formation of long-chain carbon molecules in circumstances analogous to interstellar space and stellar atmospheres. They observed that under certain conditions, clusters consisting of sixty carbon atoms were produced in unusual abundance. Their suggestion that this sixty-atom cluster might be a hollow sphere of carbon immediately captured the attention of scientists worldwide. However, for some time, experimental results came from only a few groups because of the elaborate laser vaporization supersonic cluster beam apparatus required to produce the species. Indeed, without bulk sample quantities available, the fullerene hypothesis was only indirectly testable. Nevertheless, quite precise predictions were made, many to be subsequently verified.

An explosion of fullerene research occurred with the invention of techniques for the production and isolation of bulk quantities of fullerenes in 1990. Due to the relative simplicity of sample preparation, many research groups have been able to bring the tools and insights of their specialty to the study of fullerenes, and we have seen extraordinary scientific progress.

This book is an attempt to bring together the most important research papers from these first few years of fullerene research. As such, it is a rather subjective collection, and some difficult choices had to be made (quickly). It is this editor's viewpoint that the field is growing, however rapidly, in however many directions, from a strong foundation in a certain number of excellent scientific papers. It is appropriate that researchers working in the field and entering the field should share this common canon of original literature. By and large, physicists do not read the *Journal of the American Chemical Society*, and chemists do not read *Physical Review*

*Letters*. With this volume, we can hope to firm up the starting point for further progress.

I have broken down the general field of fullerenes into several chapters, and offer a brief discussion of the pathway that has been followed for each. There are a number of excellent review papers, which cover various topics in much greater detail and authority than is possible here. I have cited them in the appropriate chapter introductions. I have not presumed to discuss in depth those topics for which current reviews are available. The reader should not conclude that I do not find these areas significant, merely that I have little to add. However, I have taken the opportunity to discuss certain topics that have not been adequately covered by other review articles, or that have seen significant progress since the most recent review papers.

Not another word can be said about fullerenes without mentioning the bibliographic data base, started by R. Smalley at Rice University. It was upgraded to electronic mail by Jack Fischer and coworkers at the University of Pennsylvania, and is currently maintained by the fullerene research groups there and by Frank Tinker and Donald Huffman at Arizona State University. The system provides a comprehensive bibliography of published papers and preprints, updated approximately monthly, with various tools for online search, etc. In addition, one can subscribe to a frequent electronic mailing list of new research papers, conference announcements, job openings, etc. One can access and learn more about these services by sending an electronic mail message consisting of the single word, "INTRO" to the following address on Internet: BUCKY@SOL1.LRSM.UPENN.EDU. Further instructions will appear by return mail. This is a useful tool for anyone following the field, and has been invaluable to this editor.

Finally, I wish to acknowledge the help and cooperation of researchers too numerous to mention. I am especially pleased to thank those people with

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**Peter Stephens**  
**Stony Brook, New York**  
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