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Aims and Scope

The series *Topics in Current Chemistry Collections* presents critical reviews from the journal *Topics in Current Chemistry* organized in topical volumes. The scope of coverage is all areas of chemical science including the interfaces with related disciplines such as biology, medicine and materials science.

The goal of each thematic volume is to give the non-specialist reader, whether in academia or industry, a comprehensive insight into an area where new research is emerging which is of interest to a larger scientific audience.

Each review within the volume critically surveys one aspect of that topic and places it within the context of the volume as a whole. The most significant developments of the last 5 to 10 years are presented using selected examples to illustrate the principles discussed. The coverage is not intended to be an exhaustive summary of the field or include large quantities of data, but should rather be conceptual, concentrating on the methodological thinking that will allow the non-specialist reader to understand the information presented.

Contributions also offer an outlook on potential future developments in the field.

More information about this series at <http://www.springer.com/series/14181>

Yan Li • Shigeo Maruyama
Editors

Single-Walled Carbon Nanotubes

Preparation, Properties and Applications

With contributions from

Hakim Amara • Moh. R. Amer • Christophe Bichara • Xuan Cao
Yu Cao • Sen Cong • Guodong Dong • E. H. Hasdeo • Jun Hirotani
N. T. Hung • W. Izumida • Il Jeon • Xilai Jia • Esko I. Kauppinen
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Preface

Carbon nanotubes (CNTs) have been standing among the most important materials in both scientific research and technical applications since 1990s. CNTs are composed of hexagonal sp^2 carbon networks rolled up into cylinders. This unique structure endows them outstanding physical, mechanical, and chemical properties. For instance, CNTs are on the top list of superior materials in mechanical strength, electrical and thermal conductivity, as well as stability. In addition, the structure-dependent electronic and optical properties of single-walled CNTs (SWCNTs) bring great potentials in electronic and optoelectronic applications.

After 27 years (since 1991) of both research and application, now is the right time to summarize the existing knowledge, discuss the present challenges, and look forward to the future of CNTs. Therefore, we edit this collection on these purposes. The collection contains 11 contributions, covering topics on preparation, property and devices, application and industrialization. All the contributions are authored by active researchers in the field. Since preparation is always the basis of materials research and application, we therefore begin the collection with the preparation. It starts from the theoretical study on the growth mechanism, then introduces catalysts for controlled growth, further extends to the growth of horizontally aligned SWCNT arrays and SWCNT films, and finishes with the sorting of SWCNTs. Subsequently, the optical and electronic properties are discussed. The application and industrialization part involves the applications in panel display, flexible electronics, and solar cells as well as the macro production and commercialization of CNTs.

CNTs have shown to be materials with great scientific importance and remarkable potentials in advanced applications. We believe this collection can bring you comprehensive information on the progress and deep insight into the emerging future in this field.

Finally, we would like to thank all authors of every contribution. Without their enormous efforts, we would not have this collection.



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