

Handbook of Carbon Nano Materials

The explosion in the size and number of papers on carbon nanostructures emphasizes the need for a guide to the subject, not only for outsiders but also for experts in the field of nanostructures. The editors of this two-volume work are to be commended for taking on the task of providing such a guide. The presentation of the material is divided into two parts, the first on synthesis and structure and the second on applications. The latter is focused on charge transfer in carbon nanostructures.

The editors have not tried to cover all the latest developments in the field, but instead they include reviews on wider areas of carbon nanostructure research that broaden the scope to some extent. Therefore, the majority of the chapters are focused on fullerenes, thereby updating previous reviews of this field and making this a highly valuable work for interested scientists. Evidently, it has been assumed that there exists no need for an extensive review of the synthesis of empty fullerenes. However, it would have been of great interest to have a detailed discussion of higher empty fullerenes, as they lead to materials with electronic properties of special value for some devices and other applications. This monograph is focused on the derivatization of empty fullerenes and some aspects of endohedral fullerenes. For the latter it would have been more valuable to have a broader presentation covering both the endohedral species and the reactions of the endohedral structures. On the other hand, the discussion of derivatives and their synthesis is extended to carbon nanotubes and treated in several chapters, which makes the review especially valuable. There is no doubt that the derivatization of carbon nanostructures will remain an important subject for many applications, not only in polar media. That is also true for supramolecular systems, which are treated in two chapters. The reviews of the latter topics provide the reader with a very useful picture of developments in the functionalization of carbon nanostructures.

The most valuable part of the work is that which reports on current research by outstanding groups throughout the world on photoinduced charge transfer in fullerenes, as the use of this effect in solar cells is of great importance. However, it is surprising that the treatment of such electron transfer processes does not include a separate chapter on the electrochemistry of carbon nanostructures. Both editors are well-known experts in the field of electrochemistry, especially in connection with carbon nanostructures, but it seems that their modesty has prevented them from including

their own contributions on the subject. Although that reticence might seem laudable to some extent, where an editor fails to use the opportunity in such a publication to fully describe his own contributions, the omission is regrettable, as molecular electrochemistry is essential for a complete understanding of the electron transfer process, the electronic structure, and the background to applications. The short contributions on the electrochemistry of fullerenes in some chapters of the work underline the importance of the field. The extensive discussion of the photoinduced charge transfer process is enjoyable to read. The different donor–acceptor systems based on fullerenes are treated in several chapters, providing a deep insight into structures that chemistry makes available for possible applications of nanostructures. It is quite probable that these developments open the door for many new applications of carbon nanostructures. Readers interested in electrochemistry will welcome the chapter on photoelectrochemistry of fullerenes. This also covers research on the properties of Langmuir–Blodgett films of fullerenes on electrodes.

A short review of the fascinating topic of molecular electronics based on fullerene derivatives is followed by several contributions on nanotubes, including composites in which they are combined with synthetic polymers or biopolymers. There is no doubt that such polymer composites offer great potential for applications in sensors and electrodes, as well as supercapacitors.

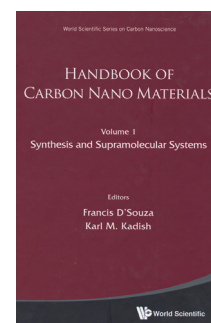
The second volume contains, at its end, an extensive subject index for both volumes, giving easy access to the material on the different nanostructures. In general, this well-designed two-volume work provides an up-to-date review of research on carbon nanostructures. Due to the fast pace of development and the rapid growth of the field, which encompasses chemistry, physics, and materials research, it has not been possible to include graphenes research or to cover research on fullerenes and nanotubes comprehensively. It might be possible, by adding further volumes, to also include the recent developments of the field in a condensed form. These two volumes provide a review that covers all the most interesting aspects of carbon nanostructures, and should be on the bookshelves of all scientists interested in the subject.

Lothar Dunsch

Department of Electrochemistry and
Conducting Polymers

Leibniz Institute for Solid State and Materials
Research, Dresden (Germany)

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