Editorial

Surface Modification of Carbon Nanotubes

Due to the combination of their remarkable properties, carbon nanotubes (CNTs) have been the focus of intensive investigation and a great deal of effort has been given toward maximizing their potential as reinforcing agents in polymer matrix composites. Despite this effort, the full potential of CNTs has yet to be reached. Common methods for the synthesis of CNTs yield samples contaminated with impurities such as catalytic particles and amorphous carbon. Hence purification becomes a rational step before further processing. Additionally, the manufacture of composites with superior properties requires the individualization of CNTs and subsequent dispersion and stabilization. Surface modification of CNTs can overcome these issues and can also be used to tailor the compatibility between CNT and hosting matrix enabling an efficient load transfer. Currently there is a lack of fundamental knowledge about the structure of modified CNTs at the atomic scale and the density and distribution of attached functional moieties. A better understanding of the surface modification of CNTs and development of new techniques will extend the application spectrum of CNTs and increase their attractiveness to industrial applications.

In this special issue of Current Organic Chemistry it's given a glimpse of the recent advances on the modification of carbon nanotubes from scientists whose research is geared toward application of CNTs.

Moreno-Bárcenas *et al*. report about the effect of the G to D Raman band intensity ratio, percentage of Sp_2 hybridization and amount of impurities on the electrical resistivity of nanocomposites reinforced with multi-walled carbon nanotubes (MWCNTs). Different purification methods are compared and related to the final properties of the composites prepared.

Bertoncini *et al.* present a novel route for the amine functionalization of CNTs using hexabromoacetone (HBA) aiming to improve the interaction among CNTs and an epoxy matrix. Composites prepared using the modified CNTs display enhanced mechanical properties.

Becker *et al.* give a concise review of recent advances in the use of surfactants and block copolymers (BCPs) for dispersion and stabilization of CNTs in different media. Some attention is also given to applications with nanocomposites where thermosets are used as matrices.

Manzano-Ramírez *et al.* describe the different and more commonly used synthesis, purification and characterization methods applied to the science of CNTs and how these techniques have driven to the development of the structures of CNTs and the growth of their applications. A historical analysis of the number of publications on the topic CNTs is presented.

Albuerne *et al.* gives a general introduction about CNTs and the incorporation of CNTs in polymer based composites. The authors give an overview of the recent strategies to produce functionalized CNTs by *grafting from*, *grafting to* and *grafting through* reactions. By analysis of the market volume of CNTs it is shown the tremendous increasing industrial interest in CNT based composites. Finally, it is pointed out that the environmental impact after the life cycle of composite material usage is still not studied thoroughly and this may have major impact in the future applications of CNTs.

Loos *et al.* describe several studies on plasma modification of CNTs and the current status of this area. The results presented emphasize the advantages of plasma functionalization such as being fast, green and attractive for application in an industrial scale. Plasma treatment can also provide a wide range of functional groups depending on the reaction parameters.

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