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**MATERIALS RESEARCH SOCIETY  
SYMPOSIUM PROCEEDINGS VOLUME 1284**

# **Fundamentals of Low-Dimensional Carbon Nanomaterials**

Symposium held November 29–December 3, Boston, Massachusetts, U.S.A.

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## PREFACE

Symposium C, “Fundamentals of Low-Dimensional Carbon Nanomaterials,” was held Nov. 29–Dec. 3 at the 2010 MRS Fall Meeting in Boston, Massachusetts. This resultant proceedings volume comprises 27 manuscripts with topics including growth techniques for CNTs and graphene, structural characterization, novel properties, and interface & surface structures. This was the first symposium at the MRS meeting which was devoted solely to fundamental issues of low-dimensional carbon nanomaterials. Device applications of carbon nanostructures were excluded from this symposium.

Low-dimensional carbon nanostructures exhibit a rich structural diversity from zero-dimensional C<sub>60</sub>, one-dimensional carbon nanotubes (CNTs), and two-dimensional graphene and graphite oxides. These low-dimensional carbon nanostructures are at the forefront of materials science and provide a platform for understanding the growth mechanisms and properties of nanostructures in general. They exhibit novel properties with endless potential applications from high-speed electronics to high-performance composites.

Although low-dimensional carbon nanomaterials have attracted great interest in the research community, the applications and commercialization of graphene and CNTs have, to date, not been as successful as anticipated. The need for significant improvements in material quality and structural uniformity exists. Other areas that need further understanding include the atomic scale growth mechanisms, structural control of various graphitic nanostructures, the chemistry of graphitic hexagonal structures, and graphitization engineering in low dimensions. Without comprehending the basic growth mechanisms and techniques to control atomic structure, the promise of future applications will be difficult to achieve.

The editors would like to thank the authors of the manuscripts. MRS meetings have become one of the most important forums for carbon nanomaterials. The challenges in fundamental issues of low-dimensional carbon nanomaterials have a great impact not only on carbon material science but also on the general fields of nanoscience and nanoengineering. This volume is a useful resource to share interests within this broad research community.

John J. Boeckl  
Mark Rümmeli  
Weijie Lu  
Jamie Warner

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