

Preface

It is my privilege as the Editor-in-Chief to present to you an effort of our team of prominent contributors to this monograph on Carbon and Oxide Nanostructures. Over the past 20 years, carbon and oxide nanostructures evolved into one of the most studied objects and are presently entering in the transition phase from nanoscience to nanotechnology. Carbon and oxide nanostructures constitute an enormous topic which may only be described in a simplified manner, which in essence is the intent of this book. It is hoped that this book would provide valuable resources for researchers as well as postgraduate students of physics, chemistry and engineering. Related carbon-based materials such as fullerenes, carbon fiber, glassy carbon, carbon black, amorphous carbon, diamond, graphite, buckminsterfullerene, and carbon nanotubes (CNTs) are discussed. CNTs which have attracted the attention of the scientific community due to their fundamental and technical importance are elaborated. It also presents a review of the applications of fullerene and its derivatives as electron beam resists, as well as outlining the effects of catalyst on the morphology of the carbon nanotubes. Structural and optical properties of hydrogenated amorphous carbon (a-C:H) thin films prepared in a DC-plasma-enhanced chemical vapor deposition reactor is discussed in greater detail. Some of the works done on polymer-CNTs-based solar cells with a variety of device architecture and band diagram are summarized. Several irregular configurations of carbon nanofibers (CNF) such as coiled, regular helical, and twisted coil are elaborated. This book also includes the molecular modeling of carbon-based nanomaterials including discussions on some aspects of the issues related to the synthesis and characterization of diamond prepared via CVD techniques using the hot filaments and plasma. Oxide-based materials related to fuel synthesis and solar hydrogen production are also presented. The versatility of ZnO nanostructures and some of the novel applications such as solar cells and light-emitting devices are being highlighted. A brief introduction of Fe-FeO nanocomposites and some superparamagnetism studies in the form of particles and thin films are included. The benefits and drawbacks of the properties of some nanomaterials used in optical sensing applications are given, and the recently developed optical chemical sensors and probes based on photoluminescence are also rigorously overviewed. Aspects of nanocatalytic reactions, the types of catalyst, and also the preparation and characterization of the active catalyst for ammonia synthesis are scrutinized.

I am grateful to all authors who have contributed to the chapters of this book. All merits on overview of such an enormous topic as Carbon and Oxide Nanostructures in this concise monograph should be credited to all contributing authors, but any shortcomings to be attributed to the Editor-in-Chief. The book is dedicated with all sincerity to all whose work has not received due reference and recognition.

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Carbon and Oxide Nanostructures
Synthesis, Characterisation and Applications

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2011, VIII, 416 p., Hardcover

ISBN: 978-3-642-14672-5