Preface

For the past decade, we have witnessed tremendous advances in nano- and bio-related science, with enormous technical information and literature published worldwide. However, limited numbers of commercialized and industrialized items have appeared. Reproducibility, low yield, and difficulties in packaging, which are critically needed to manufacture usable devices and systems, are issues that researchers strive to resolve.

This book provides comprehensive reviews and overviews on the latest developments and cutting edges on nano- and bio-packaging technologies and their science, including nano- and biomaterials, devices and thermal issues for nanobio-packaging, and the molecular or atomistic scale modeling to predict those small world phenomena.

This book is composed of 20 Chapters written by well-recognized world experts in this field. Chapters 1–4, 8, and 10 review various nanomaterials for nanopackaging technologies and their most recent research including nanomaterials for electrical and thermal interconnections and nanosurface manipulation for nanopackaging. Chapter 5 addresses a novel combustion method for nanoparticle synthesis and nanosurface coating. Novel nanomaterials for renewable energy and energy conversion devices are reviewed in Chapters 6 and 7. Chapter 9 addresses passive devices by using nanomaterials, and Chapter 11 reviews structural analysis of nano-electronics and optical devices. Latest reviews on nano-thermal science are presented in Chapters 12 and 13. Some of the hot issues in the health care arena are the biomedical device and NEMS packaging, and the biosensor device and materials. Their recent development and research are reviewed in Chapters 14–17. Computational molecular and atomistic scale simulations could provide us with a profound insight on the understanding of nano- and bio-related systems which are difficult to realize without high-cost equipment. These modeling efforts are reviewed in Chapters 18 to 20.

We are indebted to all the contributions and efforts of the authors who share their expertise in these vital areas in delivering this book to our readers.

Atlanta, Georgia, USA  
C.P. Wong

Atlanta, Georgia, USA  
Kyoung-Sik (Jack) Moon
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Wong, C.P.; Moon, K.-S.; Li, Y. (Eds.)
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