

Preface

This is one of the first books to provide an overview of uniquely shaped nanomaterials (anisotropic) (Part I) and their ongoing state-of-the-art applications in different fields (Part II). The reader will become familiar with a variety of top-down and bottom-up approaches to prepare nanoparticles with exquisite geometries and properties. The challenges and benefits associated with each method will allow the reader to select the best preparation approach for the targeted application based on the sample's composition, size, shape, scalability, and cost. The current characterization techniques used to evaluate nanomaterials' physico-chemical properties and how these properties could lead to diverse applications in different fields will be described in detail. This book provides an overview of the effect of the morphology and the nanometric dimension of materials on their physico-chemical properties and how this can lead to novel applications (Part II). Specifically, this book highlights current and emerging applications of nanomaterials, including sensing and imaging, catalysis, biological and environmental implications, plasmonics, energy, and national security missions. Some of the best-known, highly experienced, and well-published experts in the field will describe the most recent developments in their laboratories.

This book is designed to inform readers who are seeking a broader perspective related to shape-selective nanomaterials science and technologies. Technical readers (researchers, scientists, engineers, business developers, technology managers) will stay abreast of the latest state-of-the-art developments in nanotechnology with focus on the broad applications of these technologies at the laboratory and/or industrial scale. General readers will get the benefit of seeing the big picture of anisotropic nanostructures and a greater understanding as to why there is so much excitement in this area. Advanced readers will broaden their knowledge base and benefit from an update on the latest characterization methods and applications in the field.

It is our hope that this book will provide a detailed, interesting, and inspiring perspective of nanotechnology (particularly anisotropic nanostructures) and encourage readers to further explore this emerging area.

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