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Preface

There is a growing awareness that nanotechnology can have a profound impact on various fields by exploiting the significant differences of energy states and transport in nanostructures and macrostructures. Nanotechnology, in its original sense, refers to the projected ability to manipulate matter at atomic and molecular level, giving rise to desired and high performance products (materials or devices). The matter as a starting material usually has sizes between 1 and 100 nm in at least one dimension. Ever since gaining its name three decades ago, nanotechnology has undergone rapid development and now has permeated most fields of science and technology, including microelectronics, optoelectronics, polymer composites, sensors, energy, catalysis, biochemistry, etc. The concepts of nanotechnology are very diverse, ranging from extensions of conventional device physics to completely new approaches based upon molecular self-assembly, and from developing new materials with dimensions on the nanoscale to investigating whether control of matter on the atomic scale is feasible.

Nanomaterials are basis of nanotechnology and can be classified by dimensions. Zero-dimensional (0D) nanomaterials refer to the materials whose all three dimensions are limited to nanoscale, including nanoparticles and quantum dots. One-dimensional (1D) nanomaterials always have two dimensions in nanoscale just like nanowires, nanofibres, nanorods and nanotubes. Two-dimensional

(2D) nanomaterials, like nanofilms, have only one nanoscale dimension. The studies of nanomaterials consist of synthesis, characterization, properties and applications.

Nanomaterials are one of the key areas in today's material and engineering researches. After two decades of intensive researches that predominantly aim at synthesis, various kinds of nanoparticles, nanotubes and nanowires have been obtained. These researches have steadily evolved into exploring applications of such materials in various industries, many of which are imminent. With all the potentialities held, it is a timely endeavour to dedicate a theme issue of "Crystallization and Nanotechnology" to recent developments in nanomaterials and their applications. Considering permeation of the related studies into so many areas, in this issue, we only cover the studies associated with nanoparticles, nanotubes and nanowires, and their applications as photocatalysts, industrial catalysts, etc.

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