Semiconductor nanomaterials for Sensors and environmental remediation Applications

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Abstract

Nanoscale materials, the foundation of Nanoscience and Nanotechnology, has created great excitement and expectations over the last few years since they provide a very high surface area and possess chemical and physical properties those are distinct from both the bulk phase and individual molecules. The research on Nanoscale materials or nanomaterials expanded so fastly and now it is one the most popular research topic among the scientists and engineers due to their variety of structures, interesting properties, as well as high-technological applications in electronics, catalysis, chemical engineering, pharmaceutics, biology, magnetic recording, and so forth. Among versatile groups of nanostructures, the semiconductor nanomaterials stand out as one of the most common, most diverse and most probably richest class of materials due to their extensive structural, physical and chemical properties and functionalities. The unique and tunable properties of semiconductor nanostructures such as optical, optoelectronic, magnetic, electrical, mechanical, thermal, catalytic and photo-electrochemical, etc made themselves excellent candidates for various high-level technological applications, for instance, fuel cells, secondary battery materials, ceramics, chemical-, gas-, and biosensors, solar cells, alkaline and lithium ion batteries, pyroelectric, ferroelectric, piezoelectric, magnetic, actuators, supercapacitors, optical devices, lasers, waveguides, infrared (IR) and solar absorbers, pigments, catalysis, data storage, photochromics, gate-dielectrics, dielectrics in dynamic random access memories, ferroelectrics in non-volatile memories, high-TC superconductivity, decoupling capacitors, magneto-resistance, and so on. This talk will demonstrate the synthesis, characterization and applications of various semiconductor nanomaterials and their sensing and environmental remediation applications. Various sensing (chemical, bio and gas) and photocatalytic applications of semiconductor nanomaterials will be presented in this talk.

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