

Special Issue on  
**Multifunctional Ceramic Nanoparticles: From Fabrication to Applications**

# CALL FOR PAPERS

Technologically, multifunctional materials are assured to have an imperative role in the next-generation intelligent optoelectronic systems, sensors, smart homes, autonomous devices, and robotics. Due to the rigorous development of nanoscience, new horizons are opening, to explore nanopatterned materials and nanocomposites with the aim of achieving multifunctionality. An understanding of multifunctionality of materials is hence not only an exciting scientific opportunity but also technologically persuasive. Realization of materials with strong electric and magnetic order will be a milestone for modern electronics and will pave the way for intriguing applications. Very high density memory storage using both magnetic and electric orders is being considered, with the possibility of electrical read/write operations on magnetic memory devices and vice versa. The potential has already spurred much activity in magnetoelectronics and spintronics with phenomena such as spin-dependent transport in semiconductors and electron correlation effects in colossal magnetoresistive compounds being investigated. Multiferroics and composites enable harnessing of electrical energy from stray magnetic fields from minute but ubiquitous variations in the Earth's field.

Essential to exploit the advantages deriving from the nanoscale regime and to achieve a deeper understanding and control of relationships among synthesis, structure, and properties have been the identification of refined growth techniques and the development of appropriate structural and functional characterization tools at the nanoscale.

The development of higher-level multifunctional nanostructures integrating novel/multiple functionalities by controlled doping and compounding strategies featuring complex hierarchical and hybrid organic-inorganic heterostructures is actively pursued as a view to approach efficient nanoscale frameworks/devices design.

A particular interest will be given to papers exploring or discussing nanomaterials and nanotechnologies related to multifunctionality in interdisciplinary applications which not only fills a gap in the literature but also bridges the gaps between all the different areas in this field. Every research work submitted to this special issue could deal with ceramic nanoparticles from a different perspective according to the applications concerned by the authors and their field of specialization.

Original, high quality contributions that are not yet published and are not currently under review by other journals/peer-reviewed conferences are sought. We expect work from chemical engineers, pharmacologists working in nanodrugs, dentists, and physicians whose work is involved in nanodrugs as well as researchers and scientists in the fields of physics, chemistry, materials science, and electrical engineering.

Potential topics include but are not limited to the following:

- ▶ Recent developments in the production of multifunctional nanoparticles with different morphologies
- ▶ Potentials of magnetic nanoparticles in nanomedicine
- ▶ Biomaterials, biocomposites, and their applications
- ▶ Functionalization of nanoparticles to serve in energy production/storage/conversion devices
- ▶ Multifunctional nanomaterials in optoelectronic systems
- ▶ Multifunctional nanomaterials for water remediation and treatment
- ▶ Multifunctional nanoparticles in monitoring and managing environmental problems
- ▶ Safety and health hazards of multifunctional nanoparticles
- ▶ The use of specific materials expanding the use of multifunctional nanomaterials and how multifunctionality can compromise a stair further in the applications of all nanomaterials
- ▶ Tailoring the properties of nanomaterials using either chemical or physical changes to improve their use in different applications in a multimodal approach

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