

## *Preface*

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Even the most cursory inspection of the current literature is enough to convince oneself that micro- and nanoparticles have assumed unprecedented importance, e.g., in the field of catalysis and adsorbents. This volume is in response to these emerging fields, nanoscience and nanomaterial engineering. The ability to work at the atomic or molecular level to create large structures with fundamentally new organization is perfecting our understanding and control of the basic building blocks of all materials. Systems possessing structural features in the range 1–100 nm display important differences in their physical properties and behaviour from either isolated molecules or bulk materials, which are not explained in traditional models and theories. The range of applications of these systems multiplies daily. Developments in this emerging arena are likely to revolutionize not only the scientific world from biomedicine, materials science and engineering but also our very lifestyle.

Since nanoparticles possess very high specific areas, their assemblies generate large interfaces. The knowledge of the structure of these interfaces as well as their local chemistry is essential to determine the interaction between the nanoscale building blocks and their surroundings. In the presence of such high interfacial areas, stability becomes an important issue. It must be determined whether natural stability is sufficient or whether additional stabilization is required to prevent undesirable changes in these colloid-like systems.

Although the performance of each nanomaterial is determined through its specific physical, chemical or biological activity and is measured using appropriate specialized methods, the fundamental properties are reflected in the thermodynamics.

Thermal analysis and moreover calorimetry provides a direct route to study either the thermodynamical or kinetic properties of these nanosystems. Coupling of the modern concept of nanoscience with classical techniques such as thermal analysis and calorimetry may bring a sound basis to the understanding of the governing phenomena of the nanoworld.

For this reason the Editorial Staff of the Journal of Thermal Analysis and Calorimetry decided to publish a Special Chapter dedicated to this topic. I believe that the papers collected in this chapter are convincing examples that these traditional techniques have not lost their importance.

I would like to express my gratitude to all the authors who contributed to this issue. I am indebted to the referees, whose role is essential in ensuring the quality of the chapters. I wish particularly to thank the Editorial Office for their devoted assistance.

Guest Editor