

# Preface

Solid state and liquid diffusion of atoms and molecules plays a very important role in the formation of nanoparticles and nanocrystalline materials. Since such materials are metastable, the degree of diffusion also effectively determines their functional properties and longevities. Moreover, because a large fraction of atoms resides at external and internal surfaces in such materials, the role of the surface energy becomes extremely important. As a result, diffusion processes differ considerably from those that have been established for bulk systems. Accordingly, this area, along with its associated technological applications, has attracted enormous attention in recent years.

This topical volume of the Journal of Nano Research captures a very broad cross-section of the synthesis and functional properties of nanomaterials that rely on solid and liquid diffusion processes. The materials covered range from carbon nanotubes, nanoparticles, nanorods, nanopowders to nanocomposites and nanofluids. The synthesis of these nanomaterials and their physical properties such as thermal, mechanical, electromagnetic and optical transport are reported on. We are grateful to the authors for their timely submission of manuscripts and to the referees for their efforts in efficiently reviewing the manuscripts.

Andreas Öchsner  
Irina V. Belova  
Graeme E. Murch

November 2013