Preface by the Guest Editors

This special issue includes manuscripts contributed by experts from around the world in the general area of nano- and self-assembled structures. The journey begins with an in-depth and incisive review of GaN-based light-emitting diodes (LEDs), which form the backbone of general lighting by LEDs, which then segues into optical processes in highly confined structures and nanoscale defect characterization of the same, followed by use of GaN in nanoscale membranes. The pages of the issue then lead the reader into the world of another versatile semiconductor, ZnO. Its application to transparent thin-film transistors, nanostructures, and sensors of various kinds is followed by insightful treatment of optical processes, and then on into ferromagnetism in the same. The reader is then treated to energy storage and other properties of nanoparticles in the form of oxides. What follows then is an in-depth discussion of the next generation of active channel layers for Si-based ubiquitous metal oxide semiconductor field effect transistors (MOSFETs), which form the foundation of the remarkable electronics technology without which we cannot seem to function. The MOSFET treatment paves the way for looking even further ahead to monolayer constructs for future electronics. The journey takes a notable turn into the world of organic materials for field effect transistors with applications in flexible electronics, inexpensive light emitters, and solar cells requiring little energy to produce, which is rounded up by amorphous and micromorph thin solar cells. The issue is completed by a discussion of GaN- and ZnO-based nanotips for vacuum electron emitters for potential applications in the generation of compact and functional short wavelength sources.

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