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Optoelectronic Nanodevices

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During the last decade, novel graphene related materials (GRMs), perovskites, as well as metal oxides and other metal nanostructures have received the interest of the scientific community. Due to their extraordinary physical, optical, thermal, and electrical properties, which are correlated with their 2D ultrathin atomic layer structure, large interlayer distance, ease of functionalization, and bandgap tunability, these nanomaterials have been applied in the development or the improvement of innovative optoelectronic applications, as well as the expansion of theoretical studies and simulations in the fast-growing fields of energy (photovoltaics, energy storage, fuel cells, hydrogen storage, catalysis, etc.), electronics, photonics, spintronics, and sensing devices. The continuous nanostructure-based applications development has provided the ability to significantly improve existing products and to explore the design of materials and devices with novel functionalities. This book demonstrates some of the most recent trends and advances in the interdisciplinary field of optoelectronics. Most articles focus on light emitting diodes (LEDs) and solar cells (SCs), including organic, inorganic, and hybrid configurations, whereas the rest address photodetectors, transistors, and other well-known dynamic optoelectronic devices. In this context, this exceptional collection of articles is directed at a broad scientific audience of chemists, materials scientists, physicists, and engineers, with the goals of highlighting the potential of innovative optoelectronic applications incorporating nanostructures and inspiring their realization.

