



## Nitride Phosphors and Solid-State Lighting (Series in Optics and Optoelectronics)

Rong-Jun Xie, Yuan Qiang Li, Naoto Hirosaki, Hajime Yamamoto

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Nitride Phosphors and Solid-State Lighting provides an in-depth introduction to the crystal chemistry, synthesis, luminescence, and applications of phosphor materials for solid-state lighting, mainly focusing on new nitride phosphors. Drawing on their extensive experimental work, the authors offer a multidisciplinary study of phosphor materials that encompasses materials science, inorganic chemistry, solid-state chemistry, solid-state physics, optical spectroscopy, crystal field theory, and computational materials science.

The book begins with an introduction to the principles, semiconductor/phosphor materials, and characterizations of solid-state lighting and white light-emitting diodes (LEDs). It then discusses the optical and luminescence processes occurring in optically active centers of solid materials and presents the photoluminescence properties of traditional phosphors for white LEDs, including garnets, aluminates, silicates, sulfides, oxysulfides, phosphates, and scheelites.

The remainder of the text focuses on newly developed nitride phosphors. The authors describe the crystal chemistry of general nitride compounds, the crystal structure and photoluminescence properties of new nitride phosphors, and synthetic methods for preparing nitride phosphors. They detail the structural analysis of nitride phosphors and present experimental and computational results of typical nitride phosphors. The authors also examine key issues, such as excitation and emission spectra, thermal quenching, and quantum efficiency. The final chapter explores applications of nitride phosphors in white LEDs for general lighting and LCD backlight purposes.

Covering novel luminescent materials, this book brings you up to date on the evolving field of solid-state lighting. It illustrates the fundamentals, synthesis, properties, and applications of the latest nitride phosphor materials.



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