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Nota di contenuto	Role of Magnetic Doping and Strong Disorder on Surface States of Topological Insulator Nanostructures -- Recent Development of Magnetocaloric Effect in Pyrochlore Oxides -- Plasmonic Nanoparticles and Nanostructures for High Performance Optoelectronic Applications -- Magnetic Nanoparticles and its Application in Oncological Disease Detection and Therapeutics -- A Theoretical Study on Two of the Bias-based Methods of Optical Beam Defocus Measurement Involving Zernike Modes -- Advancements in Optical Fiber & Photonics Crystal Fibers -- Smart Soft Materials: A Versatile Frontier in Modern

Technology -- Liquid Crystal Spatial Light Modulators for Beam Shaping and Wavefront Sensing -- Hydrostatic Pressure Effects on Transmittance and Reflectance Spectra in 1D Defective Semiconductor Photonic Crystals under TE Mode -- Understanding Photoluminescence Spectroscopy: Principles, Applications, and Insights into Material Properties -- The Relationship Between Optical Imaging and Spatial Frequency -- A Comprehensive Analysis of Optical System Design by Geometrical Ray Tracing -- Metal Oxide Nanostructures for Optoelectronic Applications -- New Materials for New Age: Magneto-dielectric and Multiferroic Materials.

Sommario/riassunto

This book brings together a curated selection of research in the broad field of smart materials, emphasizing their properties, functionality, and transformative potential. Covering diverse applications, from energy systems to biomedical advancements, it offers a snapshot of current innovations across multiple disciplines. The chapters begin with an introduction to smart material properties and their applications, progressing to in-depth discussions on topics like magnetocaloric effects in pyrochlore oxides, topological insulators, and magnetoelectric perovskites. Key studies examine magnetic nanoparticles for cancer biology, soft materials for sustainable technologies, and Pb-free perovskite ceramics with giant dielectric constants. Advanced research on nano-structured materials, material oxides in thin-film technologies, and photonic crystals further enrich this collection. A special focus is given to topological spin textures, such as skyrmions, and their applications in spintronic devices. From theoretical models to experimental insights, this book encompasses a wide range of topics that appeal to both established scientists and emerging researchers.