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Sommario/riassunto	This book explores upconversion nanoparticles (UCNPs) at both, the fundamental as well as applied levels, for functional applications. It provides a broad perspective about the synthesis approaches of UCNPs with the preferred size, improved and tunable upconversion luminescence, along with the combined multifunctionality for various applications. It highlights the fundamentals and systematic

developments in the tuning of UC emission and surface engineering of UCNPs that make UCNPs convenient for use in a large range of applications. Moreover, it gives an understanding of the imposed limitations and challenges associated with these methods to achieve the desired performance in targeted applications. It also includes the latest multifunctional lanthanide-based UCNPs, which efficiently convert low-energy photons into high-energy photons, and their applications in fluorescent microscopy, deep-tissue bioimaging, nanomedicine, optogenetics, solid-state lighting, solar cells, security labeling, and volumetric display.