Color science and photometry for lighting with LEDs and semiconductor nanocrystals

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This book reviews the application of semiconductor nanocrystals also known as colloidal quantum dots (QDs) to LED lighting for indoors and outdoors as well as LED backlighting in displays, summarizing the color science of QDs for lighting and displays and presenting recent developments in QD-integrated LEDs and display research. By employing QDs in color-conversion LEDs, it is possible to simultaneously accomplish successful color rendition of the illuminated objects and a good spectral overlap between the emission spectrum of the light source and the sensitivity of the human eye at a warm white color temperature-something that is fundamentally challenging to achieve with conventional sources, such as incandescent and fluorescent lamps, and phosphor-based LEDs.