

Quantum Dots for LED Downconversion in Display Applications

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Quantum dots (QDs) are now on the verge of widespread adoption in display applications, after 25 years of scientific research and over a decade of commercialization efforts. This is the result of a combination of industry trends such as liquid crystal displays (LCDs) and light emitting diode (LED) backlight units (BLUs), combined with improvements in QD performance and manufacturing that have taken place across the growing QD ecosystem of Universities, National Labs, and private and public companies. As QDs emerge as a viable choice as downconversion materials in LED backlit LCD displays, they have the potential to be employed in several geometries within these otherwise similar display systems. In all geometries, QD LCDs will provide the broadest available color gamut to the user, in addition to potential benefits in power efficiency, brightness, and contrast. This work will summarize QD properties and advantages in such LED backlit LCDs relative to other competitive downconversion materials, as well as compare and contrast the three primary geometries that will likely be explored during the pursuit of a potentially dominant design.