Flexible full color micro-LED display by use of quantum dots

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Abstract

Gallium Nitride (GaN) based blue light emitting diode (LED) is definitely an emerging technology which already grabbed attention from various fields, including indoor and outdoor lighting systems, displays, and medical devices because of its excellent quality of light illumination. GaN LEDs in micrometer scale can be driven at higher current densities and give promising energy efficiency in light emission. 错误!未找到引用源。 The outstanding performance of micro-LEDs have attracted many researches that study the potential applications of micro-LEDs. [2] In this report, we have studied method to realize full color RGB micro-LED display by patterning quantum dots (QD) on GaN micro-LED, which will convert blue light into either red or green light. We developed QD-PR that can be photolithographically patterned in micro scale using conventional method. By mixing high refractive index nanoparticles, TiO_2 as scattering enhancers into the QD-PR, the light output intensity can be improved and standard RGB can be achieved. In addition, in order to realize flexible micro-LED display, we released the devices from Si substrate by wet etching process and then transfer the devices onto ultrathin plastic substrate. Finally, flexible RGB micro-LED display was demonstrated.

References

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