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Internal quantum efficiency of UV µLED chips for display

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Micro light emitting diode (µLED) displays have been in development. When using three-color, i.e., red, blue, and green LEDs, or blue LEDs that excite red and green phosphors, many challenges arise in mass production, cost, and quality. Our group has devised an ultraviolet (UV)-excited red, green, and blue (RGB) display that excites red, green, and blue phosphors using UV-LEDs. Tests confirm that the display's efficiency is improved by the use of the micro-sized UV-LED chips that emit in the near-ultraviolet range. The UV µLED chip emitting at 385 nm exhibited a more linear output than a 400-nm purple µLED chip. This study examines how the composition and crystal defects of a light-emitting layer affect the light emission efficiency of a UV µLED chip from the perspective of internal quantum efficiency (IQE).

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