Chip-scale Integration of RGB LED Pixels for Microdisplay, Lighting and Biophotonics Applications

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Abstract: The ability to integrate light emitters of different colors on a single chip platform is highly desirable for applications in microdisplays, lighting, biosensors, and optogenetics. Despite the remarkable efficiency, reliability, and high output brightness achievable by semiconductor LEDs, the development of chip-scale integration of multi-color emitters has been largely dominated by organic LEDs. Existing techniques for integrated RGB LED pixels include pick and place of different color emitters or phosphors on the same plane or stacking of multiple emitter planes. These approaches are limited in their manufacturability and the density of emitter pattern. In this talk, we will discuss a new approach utilizing local strain engineering in GaN materials. The strain field is locally modulated to shift the LED emission across the entire visible spectrum. The device design, fabrication and properties will be shown. Potential applications in microdisplays (including contact lens displays), LED lighting, and optogenetics will be discussed.

No Summary Provided