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Native C-plane Devices Demonstrate Superior High-Luminance and Spectral Stability at Elevated Current Operations, Advancing Monolithic RGB Technology



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PRESS RELEASE

For Immediate Release
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MILWAUKEE, WI, UNITED STATES, September 22, 2026 -- Ingantec Corporation today announced a significant advance in native red Indium Gallium Nitride (InGaN) microLED technology, demonstrating greater than 20% peak external quantum efficiency (EQE) from 5-µm-class red InGaN microLEDs fabricated on conventional c-plane epitaxial structures.

The results, presented by Ingantec Co-Founder and CEO Alan Yeung at TechBlick's MicroLED Connect in Eindhoven, demonstrate red InGaN emission near 620-625 nm, with peak EQE occurring at 4-5 A/cm², the current density at which the devices reach their reddest emission. The devices subsequently maintain high single-digit efficiency (5-8% EQE) at elevated current densities spanning 40-140 A/cm².

"The significance of this result is not simply achieving a high EQE number," said Dr. Alan Yeung, Chairman and CEO of Ingantec. "We are demonstrating a combination of high efficiency, red emission, micron-scale dimensions, current-density robustness, and spectral control on a conventional c-plane InGaN platform. This is an important step toward making native red InGaN a practical foundation for monolithic RGB microdisplay architectures."

Unlike approaches based on quantum dots, nanowires, nanopyramids, or photonic-crystal structures, Ingantec's devices utilize a conventional planar InGaN architecture, providing a pathway toward scalable wafer processing and full integration with green and blue InGaN microLED emitters.

Addressing the Red InGaN Challenge

Producing efficient red emission from InGaN has historically been challenging because increasing indium incorporation introduces strain, defects, carrier localization, quantum-confined Stark effect (QCSE), efficiency degradation, and strong current-dependent wavelength shifts. Ingantec's approaches combine proprietary Spectrally Stable Red (SSR) technology with epitaxial and strain-engineering methodologies developed in collaboration with UC Santa Barbara (UCSB).

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The resulting devices demonstrate an unusual combination of efficiency, wavelength behavior, and high-current-density robustness:

• 20+% Peak Efficiency: EQE exceeds 20% in 5-µm-class red InGaN microLEDs, with peak efficiency occurring near 4–5 A/cm² and emission near 625 nm.

• Controlled Spectral Shifts: The devices initially red-shift with increasing injection—reaching their reddest wavelength that coincides with peak EQE emission—before exhibiting controlled blue shifts across decades of current density.

• Useful Efficiency at High Injection: EQE remains in the 5–8% range over large portions of the 40–140 A/cm² regime, demonstrating the potential for high-brightness operations.

• 5-µm Pixel Scaling: Functional red InGaN microLEDs have been demonstrated, confirming device operations at dimensions relevant to ultra-high-pixel-density displays.

The optical results were obtained at UCSB using integrating-sphere measurements on planar InGaN devices, confirming true bulk efficiency.

From Red InGaN to Monolithic RGB

High-performance native red InGaN is a critical enabling technology for the development of monolithic RGB microLED displays based on a common III-nitride material platform.

A native InGaN red emitter offers the potential to reduce reliance on heterogeneous red-emitter architectures and the associated assembly, transfer, and integration complexity. Stable emission over a broad drive-current range can also reduce the burden on display CMOS systems to compensate for current-dependent color changes.

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Ingantec is extending the technology toward wafer-scale manufacturing and commercial foundry integration. The company's development platform includes 4-inch InGaN-on-sapphire wafers containing hundreds of millions of potential red-emitters.

Ingantec is actively inviting display manufacturers, semiconductor foundries, backplane developers, optical technology companies, and advanced-packaging partners to accelerate commercialization of its native InGaN red microLED technology.

Key collaboration areas include technology and application developments in microLED displays, medical diagnostics sensing, automotive HUDs, high energy photonic systems, CMOS backplane integration, wafer manufacturing, and advanced packaging.

About Ingantec

Co-founded by former Apple and Foxconn executives, along with UW-Madison faculty members, Ingantec Corporation is a fabless semiconductor company developing III-nitride materials and device technologies for next-generation microLED displays and photonic applications. The company's proprietary InGaN-based technologies target major pain points in microLED device performance and production, including the development of bright, efficient, and spectrally stable red microLEDs that are compatible with blue and green GaN emitters—potentially eliminating complex mass transfer process steps. For more information, visit http://www.ingantec.com/.

Ingantec's technology is being developed for applications including augmented-realty and mixed-reality (AR/MR) displays, automotive head-up displays (HUDs), mobile devices, high-brightness microdisplays, medical diagnostics devices, and advanced photonic systems.

Wafer-Scale Development and Collaboration

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