Pyramidal microLEDs: a novel etch-free approach to deliver RGB emission in single materials system

Per Olof Holtz

Chi-Wei Hsu, Ivan Martinovic, Andrei Vorobiev, Ashutosh Kumar and Lisa Rullik

Polar Light Technologies AB
Kunskapslänken 36, 583 26 Linköping, Sweden
and
IFM, Linköping University, 581 83 Linköping, Sweden

A novel concept for next-generation display and optical communication technologies with bright and power efficient pyramidal μLEDs based on InGaN/GaN multiple quantum wells is presented. This concept is obtained by a bottom-up approach based on selective-area growth and address several fundamental challenges typically associated with μLEDs. Polar Light Technologies (PLT) has demonstrated that this approach enables the realization of μLEDs with R, G, and B emissions within a single material system. The technology is also well-suited for hybridization of the μLED front-plane with the silicon CMOS back-plane, performed with extremely high accuracy using a cold-bonding flip-chip method, and recently showcased in a monochrome μ-display.

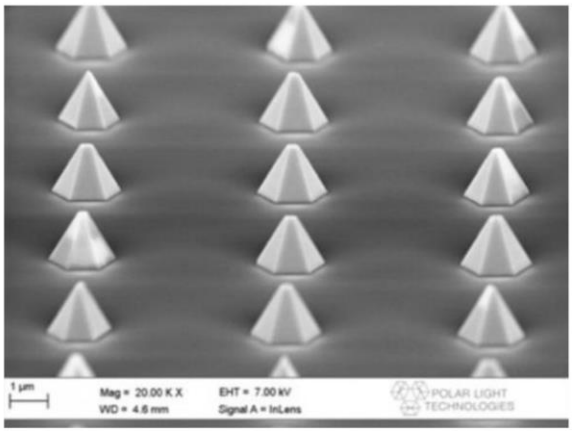

Fig. 1. Pyramidal microLEDs