

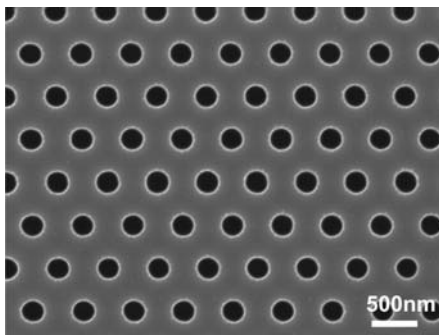
smaller better nanostructures

## EULITHA introduces PHABLE technology for photonic patterning



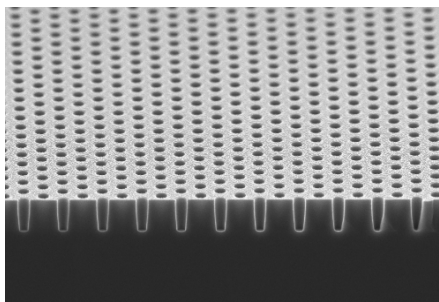
Improvement of light extraction efficiency from GaN- based LEDs has been a major challenge for the LED industry. The high refractive index of the semiconductor layers means that a significant portion of the light is trapped inside which is eventually absorbed and lost. Patterning the surface of the LEDs with a photonic crystal pattern can improve the efficiency of these devices by a factor of 2-3. It also gives significant control over the angular distribution of the emitted light. The economic and environmental gains that may be derived from higher-efficiency LED devices are immense.

Similar photonic patterns are also needed for other applications such as nanowire-based LEDs and photovoltaic devices. Heteroepitaxy on patterned Si substrates and epitaxial layer overgrowth (ELO) methods also require periodic patterns. The list of emerging applications in the photonics sector that require nanostructures continues to grow. However, the currently available lithographic technologies either do not have the necessary performance such as the resolution or the ability to print over non-flat surfaces, or their cost is prohibitively high.



**600 nm period hole array etched in silicon.**

PHABLE (from "photonics enabler") is a patented technology platform that has been developed by Eulitha to address this important manufacturing problem. PHABLE is a mask based UV photolithography technology that takes full advantage of the existing infrastructure such as photoresists and masks. It enables the creation of periodic structures like arrays of holes on a hexagonal lattice, or linear gratings. The unique advantage of PHABLE is its ability to form an optical image with a practically unlimited depth of focus. This makes it possible to print on non-flat surfaces, such as LED wafers. It also enables simultaneous printing of various patterns on a single chip or a wafer in much the same way different circuits are printed on silicon wafers.



**Cross-section of the pattern shown above.**

Eulitha now offers samples and wafer batch processing services to companies and researchers developing nanostructure-based products who are interested in taking advantage of this breakthrough technology. Laboratory lithography tools for 2"-4" wafers that are suitable for product development and pilot production are also available from Eulitha.

We expect many future photonic devices to shine even brighter with the introduction of our PHABLE technology. Contact us for solutions to your photonic patterning needs.

**PHABLE™**