Technology Opportunity

The CUNY Center for Advanced Technology In Photonics Applications (CUNY CAT)

Designated by NYSTAR, the New York State Foundation for Science, Technology and Innovation

ZnSe-based Red-Green-Blue Emitters

Full color display devices and white light sources

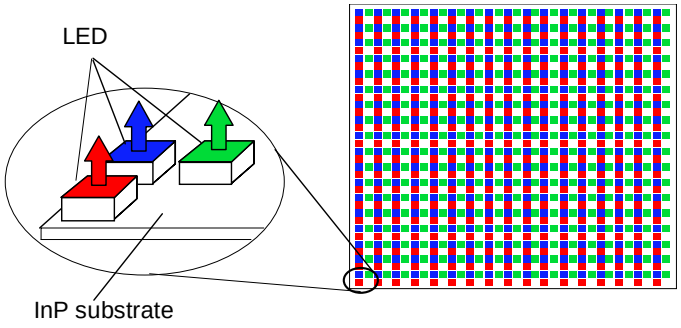
ZnSe-based II-VI semiconductors structures, grown lattice-matched to InP have been fabricated into optically pumped lasers that emit at 497 nm, 540 nm, and 604 nm, representing the blue, green and red regions of the visible spectrum. The three structures are identical except for the width and/or composition of the ZnCdSe quantum well active region. This result enables the growth and fabrication of fully integrated white light sources and full color display arrays for a variety of applications. Currently, no other single semiconductor material system has been shown to provide this full color visible emission.

Potential Applications:

- Flat panel displays
- White light sources
- Tunable visible emitters

Benefits:

- Full-color emitter arrays
- Compatible with InP-based III-V electronics
- High brightness sources and displays



Array of RGB pixels in LED-based full color display

The Technology:

Blue and blue-green semiconductor lasers have been demonstrated recently from ZnSe-based materials grown on GaAs. Blue and green LEDs have also been made from GaN-based III-V semiconductors. Red emitters are typically obtained with InGaP-based materials. Each of these materials require drastically different growth conditions and starting materials and thus are not able to be integrated into a single device. We have grown ZnCdMgSe, lattice-matched to InP substrates. Structures of these quaternary layers have been fabricated into laser structures. Light emission in the red, green and blue has been obtained. N- and p-type doping of ZnSe-based materials has been previously demonstrated, so that injection lasers and LEDs can be fabricated. Using selective area epitaxy, the three devices can be fabricated in a single substrate to produce one and two-dimensional arrays of individually addressable emitters that are fully tunable throughout the visible range.

This technology opportunity sheet describes continuing efforts in this area. Several patents may have been issued or are pending and which may be available for licensing.

For Details, contact Alan Doctor; email: alan.doctor@qc.cuny.edu; Phone: 718-997-4279 Fax: 718-997-4278
Queens College • Razran 314 • 65-30 Kissena Boulevard • Flushing, NY 11367 www.cunyphotonics.com