

Design and Characterization of 265 nm Deep Ultraviolet Nanowire & Nanostrip based Light Emitting Diodes

Anumeena Sorna

This study aims to look into nanoscale DUV LEDs, in particular at the 265 nm and 320 nm wavelength. The design for an efficient DUV LED was investigated and improved upon. The geometry of a nanowire based LED and Nanostrip LED was carefully studied in order to increase light extraction efficiency (LEE). The finite domain time difference method was used to compute the LEE. We have demonstrated that with the use of optimized nanowire arrays the light extraction efficiency of deep ultraviolet LEDs can be increased significantly. The diameter and spacing for an enhanced LED emitting light at 265 nm and 320 nm wavelength was found. The extraction efficiency and electric field distribution of nanostrip based LED were also looked into. Lastly, the characteristics of 320 nm LEDs were investigated in detail. Compared to conventional AlGaIn based LEDs, a significant enhancement was achievable by the use of an optimized nanowire structures.