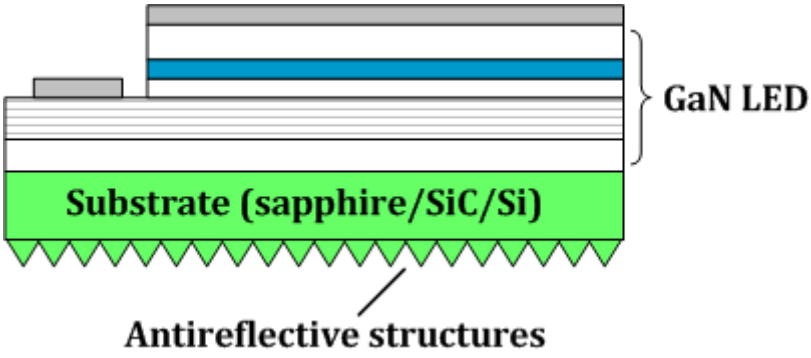
Surface nanostructuring for light extraction enhancement of LEDs



Background:

Light-emitting diodes (LEDs) are currently the most important light sources to replace the traditional lamps as energy efficient devices. However, the overall quantum efficiency of the LEDs is usually limited by the large internal reflection loss caused by the large refractive index contrast between the semiconductor substrate material and air interface. To enhance the light extraction, surface antireflective structures in a sub-wavelength scale are commonly applied.

Objectives:

A nanofabrication process of antireflective structures needs to be developed on different LED substrate materials (sapphire, SiC, Si). The fabrication will be contacted in DTU-Danchip cleanroom facilities. Optical characterization by means of surface reflection and transmission measurements will be done in the optical lab.

Qualifications:

Student is expected to have studied on fundamental photonics and nanotechnology course before. Knowledge of cleanroom processing would be considered as a merit.

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