

UVC LEDs Based on Nanowires and Graphene

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The need for efficient disinfection and purification has accelerated the growth of the UVC illumination market, with LEDs positioned to take increased market-shares from conventional lamp technology due to using less energy and having non-toxic and more environmentally friendly materials. UVC LED devices based on traditional planar technology faces many challenges and limitations, most significantly because of high defect densities caused by lattice mismatch between the LED layers and the substrate[1]. By combining nanowire growth and a graphene substrate, some of these fundamental challenges can be addressed, as graphene has a low sheet resistance combined with transparency for all wavelengths[2]. We are developing UVC LEDs (275 nm) for the water disinfection market, based on high percentage aluminum AlGa_N nanowires grown on a graphene substrate.

REFERENCES

- [1] Amano, H. et al., J. Phys. D: Appl. Phys., 53 (2020), 503001
- [2] Høiaas, I.M., Liudi Mulyo, A., Vullum, P. E., Kim, Dong Chul, Ahtapodov, L., Fimland, B.-O., Kishino, K., Weman, H., Nano Letters, 19 (2019), 1649-1658

FIGURES

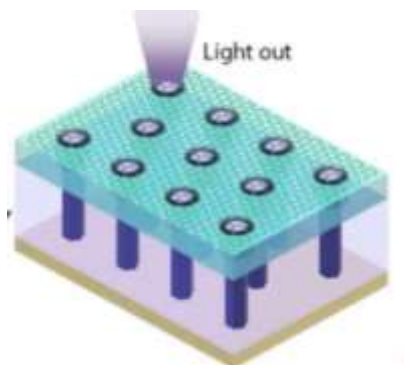


Figure 1: UV LED utilizing graphene as substrate and transparent electrode.

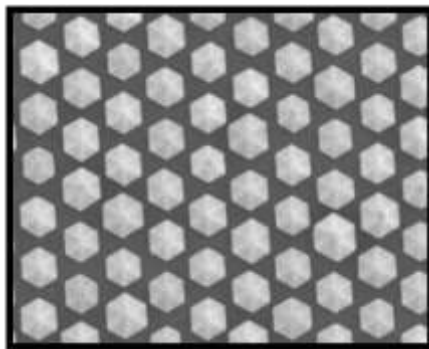


Figure 2: Position-controlled AlGa_N nanowires grown on graphene substrate.