

Carrier dynamics of GaN-based micro-LEDs

The implementation of GaN-based micro-LEDs is a promising technology for next-generation displays. However, the e-h recombination on the sidewalls of device deteriorates the efficiency due to surface defects leading to Shockley-Read-Hall recombination. We demonstrate the carrier dynamics of Ga and N vacancies found on nonpolar GaN m-planes, which can greatly affect the efficiency of the device because they are produced in one-dimensional GaN structures. Using hybrid functional, we elucidate that N vacancies are crucial for device efficiency by calculating the formation energy and carrier capture coefficients. This study provides a potential solution for the creation of successful GaN-based micro-LEDs and was published in Physical Review Applied 2023 19, 014018.

