

LUMINESCENCE OF GaN:Zn FILMS
PROCESSED BY NITROGEN RADICALS
OBTAINED FROM HIGH-FREQUENCY
AMMONIA PLASMA

*G. A. Sukach, V. V. Kidalov¹, A. I. Vlasenko,
E. P. Potapenko*

Institute of Semiconductor Physics,
Nat. Acad. Sci. of Ukraine
(45, Nauky Prosp., Kyiv 03028, Ukraine),
¹Berdiansk State Pedagogical Institute
(4, Schmidt Str., Berdiansk 71118, Ukraine)

S u m m a r y

We investigated the effect of annealing in the atmosphere of nitrogen radicals (obtained by treatment of ammonia in high-frequency discharge) on luminescent properties of GaN:Zn films MOCVD-grown on sapphire (0001) substrates. As the annealing temperature was increased, both the violet (2.88 eV) and near-edge (3.48 eV) photoluminescence bands monotonically decreased. After annealing in the atmosphere of nitrogen radicals at temperatures of 500–750 °C, new bands (with radiation peaks at 3.27 and 3.42 eV) were detected. Their intensities increased with the annealing temperature. A critical analysis of the mechanisms for appearance and nature of all bands has been performed. It was found that the luminescence bands 2.8, 3.42, and 3.27 eV are characteristic of GaN films obtained with practically any technique and are related to simple structural defects. Involvement of oxygen in the formation of the band 3.42 eV has been experimentally proved.