

P08

EFFECT OF VARYING THERMAL ANNEALING TEMPERATURE ON THE CHARACTERISTICS OF LOWER AND HIGHER Mg-DOPED GaN

A.M. Hanafiah^{1,*}, Z. Hassan¹, W.F. Lim¹, N. Ibrahim¹, E.A. Alias¹, M.A. Ahmad¹, N.A. Hamzah¹, R.I.M. Asri¹

¹*Institute of Nano Optoelectronics Research and Technology (INOR), Universiti Sains Malaysia, Penang, MALAYSIA.*

(E-mail: mohdhanafiah.1@osu.edu, zai@usm.my, way_foong@usm.my, norasmidaibrahim@gmail.com, ezazimah@student.usm.my, anasahmad@usm.my, atiqahhamzah@usm.my, rahilizati@usm.my)

ABSTRACT- Gallium nitride (GaN)-based light emitting diodes (LEDs) are widely used to produce blue light that, with phosphor, is converted into white light for everyday applications. Despite its high efficiency, the performance of GaN based LEDs is limited by the low electrical conductivity and mobility of magnesium (Mg)-doped GaN due to the presence of magnesium-hydride (Mg-H) complex, which may passivate Mg as an acceptor. In this study, the efficacy of thermal annealing treatment at different temperatures (550°C, 650°C, 750°C and 850°C) was investigated to activate Metal-Organic Chemical Vapor Deposition (MOCVD) grown Mg-doped GaN of different doping levels. Characterization of the treated samples were carried out using Hall effect measurement, atomic force microscopy (AFM) and X-ray diffraction (XRD) for electrical, surface and structural evaluation, respectively.

Keywords: thermal annealing, Mg-doped GaN, activation.