

## Dissertation Abstract

Report no.	(Course-based) No.1202	Name	MD. ZAMIL SULTAN
Dissertation title	Study on Photoluminescence Intensity Change of Dilute Nitride Semiconductors by Laser Irradiation (レーザー照射による希釈窒化物半導体のフォトルミネッセンス強度変化に関する研究)		
<p>In Chapter 1, the background and objective of this dissertation are described. In particular, unique features and potential optoelectronic device applications of dilute nitride semiconductors are summarized. Since the improvement of reliability of dilute nitride semiconductor-based optoelectronic devices is a challenging issue, it is described that this study aims to investigate the photoluminescence intensity changes of dilute nitride semiconductors by laser irradiation.</p> <p>Chapter 2 explains micro photoluminescence measurements to obtain high laser power density, and dilute nitride semiconductors investigated in this dissertation, GaPN alloys, InGaAsN alloys, and InGaAsN/GaAs quantum wells.</p> <p>Chapter 3 presents experimental results about the influence of laser irradiation on the photoluminescence intensity change of GaPN alloys. This chapter also discusses possible effects of laser irradiation on the photoluminescence intensity change and concludes that the PL intensity degradation is due to the generation or multiplication of nonradiative defects in GaPN alloys. In addition, the laser power density and nitrogen concentration dependence of the PL intensity degradation is discussed.</p> <p>In Chapter 4, experimental results about the time evolution of the photoluminescence intensity of InGaAsN alloys during laser irradiation are shown. The cause of the increase and decrease in the photoluminescence intensity observed during laser irradiation is discussed in terms of nitrogen and indium concentration dependence.</p> <p>In Chapter 5, experimental results about the photoluminescence intensity change of InGaAsN/GaAs quantum wells during laser irradiation are presented. The improvement in the photoluminescence intensity observed for the sample with a higher nitrogen concentration at lower laser power densities is discussed.</p> <p>In Chapter 6, the findings in this study are summarized.</p>			