CHARACTERIZATION OF INDIUM GALLIUM NITRIDE MULTIPLE QUANTUM WELLS FOR POTENTIAL USE AS GREEN LASER DIODES

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Optical characterization is used to measure several GaInN multiple quantum well (MQW) samples. The mechanisms explored include peak emission wavelength, lasing threshold, optical gain, and optical absorption. It is also determined whether or not the sample exhibits stimulated emission (SE). A variety of experiments are performed to determine these characteristics. Photoluminescence (PL) measurements are used to determine the peak emission wavelength and, if applicable, the excitation threshold for stimulated emission. The variable stripe length method and the point excitation method are then used to determine the optical gain and absorption, respectively. The results conclude that GaInN MQW samples can be grown such that they exhibit stimulated emission at a peak emission wavelength as long as 480 nm with an optical excitaiton threshold density as low as 24 kW/cm^2.