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Photoluminescence Observation of GaN Thin Films Treated by Inductively-Coupled Plasmas KEIJI NAKAMURA, NORIYOSHI ITOH, YOSHITAKA NAKANO, HIDEO SUGAI, Chubu Univ. — This paper reports observations of photoluminescence from plasma-treated GaN thin films. A 10 mTorr Ar ICP was used, and irradiation of 313 nm ultraviolet (UV) light from Hg-Xe light source induced the photoluminescence of the GaN film. In both in-situ and ex-situ observations, significant yellow luminescence was observed visually, and the ex-situ observed luminescence ranges in a wavelength of 500-800 nm corresponding to defect-states-related transition. The measurements also revealed that the luminescence also contains UV emission at a wavelength of ~ 365 nm attributed to transition related to near band edges. In order to examine effects of the plasma on the luminescence, the ex-situ observation was made as a function of the plasma treatment time. As the treatment time increased, both the UV and the luminescence intensity decreased, and the decrease in the emission became significant when the 313 nm UV light was irradiated onto the plasma-exposed GaN surface. These results suggested that plasma-induced defect formation leads to the luminescence degradation, and that the photoluminescence observation will be useful for damage monitoring of the GaN surface. This work is partly supported by the 2nd stage Knowledge Cluster Initiative and Grant-in-Aid for Scientific Research (C) from the Ministry of Education, Culture, Sports, Science and Technology of Japan.

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