

Photoresponse of Epitaxial GaN Films Grown by Plasma-Assisted Molecular Beam Epitaxy

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Abstract : Group-III nitride semiconductors (GaN, AlN, InN and their ternary and quaternary compounds) have attracted a great deal of attention for the development of high-performance Ultraviolet (UV) photodetectors. Any midgap defect states in the epitaxial grown film have a direct influence on the photodetectors responsivity. The proportion of the midgap defect states can be controlled by the growth parameters. To study this we have grown high quality epitaxial GaN films on MOCVD- grown GaN template using plasma-assisted molecular beam epitaxy (PAMBE) with different growth parameters. Optical and electrical properties of the films were characterized by room temperature photoluminescence and photoconductivity measurements, respectively. The observed persistent photoconductivity behaviour is proportional to the yellow luminescence (YL) and the absolute responsivity has been found to decrease with decreasing YL. The results will be discussed in more detail later.

Keywords : gallium nitride, plasma-assisted molecular beam epitaxy, photoluminescence, photoconductivity, persistent photoconductivity, yellow luminescence

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