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Using Polarization Effects in Deep UV Nitride Emitters G. BRUMMER, H. SUN, A. NIKIFOROV, T. MOUSTAKAS, Boston University — We numerically and experimentally investigate the effects of compositional grading in high Al content AlGaN, with applications to deep UV emitters. The large polarization fields create a fixed charge density in the graded regions, which by necessity, are screened by mobile electrons and holes. The net effect is a pn junction band structure in which bound polarization charge assumes the role of immobile ionized dopants, and the screening charge assumes the role of mobile carriers released from the dopants. Using this phenomenon it should be possible to overcome the difficulties in doping high Al content AlGaN, and make efficient deep UV light emitting diodes, and lasers.

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