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ELECTRODE-LESS PHOTO-ASSISTED ETCHING OF P-TYPE AND N-TYPE GaN

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ABSTRACT- Poor light extraction due to total internal reflection (TIR) phenomenon has become a major problem in InGaN/GaN light-emitting diode (LED) [1-2]. Surface texturing by photoelectrochemical (PEC) etching gives access to more than 70% improvement in light extraction as reported in [3]. In this work, an electrode-less photo-assisted etching is demonstrated on Ga-polar face of *n*-type and *p*-type GaN layers. Two type of etchant solutions, H_3PO_4 with KOH and H_3PO_4 with HNO_3 were used and the surface morphology of all samples were measured using scanning electron microscopy (SEM). Hexagonal pit on the surface of all samples were observed. Interestingly, the pits were formed in various uniformity, density and size depending on the type of solution. Surface roughness of etch samples is improved after etching as measured using atomic force microscopy (AFM).

Keywords: wet etching, gallium nitride, p-GaN, n-GaN.