

Carrier transport property of photo-chemically etched a-plane GaN and its hydrogen response for gas sensor

이소현, 정선우, 이미라, 백광현<sup>1</sup>, 장수환<sup>†</sup>  
단국대학교 화학공학과; <sup>1</sup>홍익대학교 재료공학부  
(jangmountain@dankook.ac.kr<sup>†</sup>)

The PC (photo-chemical) etching technique is a widely used method in conventional c-plane GaN based light emitting diode fabrication to enhance the light extraction through surface texturing. This facile wet etching of GaN is a repetitive process involving the formation of gallium oxide and dissolution of the oxide in an alkali etchant solution under UV illumination. After PCE of GaN, most of the stable specific crystal planes are exposed, resulting in the textured morphology with huge increased surface area. Hence, the PC etching is one of effective methods to enhance the sensitivity of GaN based sensor devices by offering more active sites for target sensing molecules. In this work, carrier transport property of PC etched a-plane GaN and its hydrogen sensing response were studied. The PC etched a-plane GaN surface showed a striated surface morphology with triangular prisms along c-axis direction with m-plane facets. The sheet resistance of etched GaN along c-axis was lower than m-axis regardless of basal stacking faults. The remarkably improved hydrogen response of the PC etched a-plane GaN sensor was observed with maximum sensitivity of  $10^7\%$ .