Nano and micro porous GaN characterization using image processing method

Abstract

This work reports the fabrication of porous N-GaN structures and their quantitative structural characteristic study based on mathematical morphology analysis using scanning electron microscope (SEM) images. The evaluation of N-GaN quality is carried out by performing a nondestructive investigation of its micro and nanostructures, which in turn is performed by adapting image analysis techniques to obtain rapid, objective, and quantitative information. The algorithm used in this work was implemented using the MATLAB software. Using the algorithm made obtaining the distribution of maximum, minimum, and average radius of the pores in the N-GaN structures possible. Calculating the area occupied by the pores allowed the porosity of the structures to be obtained. The quantitative results were obtained and related to the fabrication process characteristics, showing their reliability and potential to be used for controlling the pores in the formation process. Thus, this technique can provide a more accurate determination of pore sizes and pore distributions.