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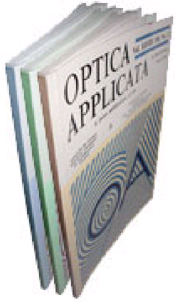

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# Investigation of deep defects using generation-recombination noise

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Keywords

generation-recombination noise, deep defects, GaN, AlGaN, GaAs

Abstract

Noise spectroscopy is an effective tool to characterize the quality of semiconductor bulk and surface and a figure of merit for device quality as a whole. In certain cases, low-frequency noise can be used for the evaluation of device reliability. Further, measurements of the noise characteristics of GaAs materials are a useful technique when it comes to studying deep defects exhibiting a thermally activated capture. In the paper we present the technique of noise spectroscopy and illustrate it with some applications. They include photocapacitive and noise measurements on a deep DX-like defect which gives rise to persistent photoconductivity in Mg-doped *p*-type GaN films. We also apply DLTS, photoconductivity and noise spectroscopy to characterize *n*-type bulk GaAs and an EL2-related metastable defect. The third example illustrates experimental results on the photoconductivity and noise of forward and reverse biased $Al_{0.3}Ga_{0.7}N$/GaN-based Schottky barriers. In the light of these results the nature and origin of the responsible centers are discussed.

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