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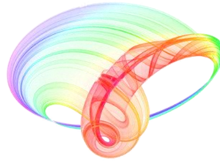

PHOTONICA2019

The Seventh International School and Conference on Photonics, 26 August – 30 August 2019, Belgrade, Serbia

& Machine Learning with Photonics Symposium (ML-Photonica 2019)

& ESUO Regional Workshop

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Editors: Milica Matijević, Marko Krstić and Petra Beličev

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Influence of In^+ ions implantation in GaAs and Si on their optical characteristics

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In this work we studied the influence of In^+ ion implantation on structural and optical characteristics on semiconductors with direct (GaAs) [1] and indirect (Si) [2] band gap. A plenty of information on physical properties of various semiconductor materials can be obtained from optical spectra. In order to determine optical parameters, refraction index and extinction coefficient, we employed spectroscopic ellipsometry as a very useful technique. The parameters of the implantation process and the optical properties of the implanted GaAs and Si wafers are discussed with particular emphasis on the SWIR (Short Wavelength Infrared) region.

In^+ ions were implanted into n-type GaAs (100) and n-type Si (100) at an acceleration energy of 60 keV with doses of $1x10^{14}$ ion/cm^2, $5x10^{14}$ ion/cm^2, $1x10^{15}$ ion/cm^2 and $2x10^{15}$ ion/cm^2 in both cases.

The change of the optical parameters in the subsurface region of the GaAs and Si wafers caused by implanted In^+ ions is observed comparing the values of ellypsometric data and energy gap (Eg) of unimplanted and implanted wafers.

In order to evaluate the crystallinity of the samples we used TEM microscopy.

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