

# Effect of thermal annealing on the depth distributions of the atoms and optical constants of near surface layers the implanted GaAs with In<sup>+</sup> ions

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## Abstract

SI (100) GaAs surfaces were irradiated with indium ions. The dose and energy of implanted ions were  $3 \times 10^{16} \text{ cm}^{-2}$  and 250 keV. The implantation process was performed at room temperature. The surfaces of all samples were covered with layers of Si<sub>3</sub>N<sub>4</sub>. The protective layers had the thickness about 100 nm. Thus prepared samples subjected to thermal annealing. The heating time was equal to 2h and the annealing temperatures were 700 °, 750 °, 800 °, 820 ° and 850 ° C. The material prepared in this way was subjected to Spectroscopic Ellipsometry (SE) measurements and were obtained the optical constants for implanted and virgin GaAs. In the next step of the investigations carried out Rutherford Backscattering Spectrometry (RBS) method measurements. Based on RBS spectra, the sub-surface atom depth profiles for the all samples were determined. As the annealing temperature increases, the optical constants values of the individual samples are changing. This effect can be attributed to the reconstruction of the material after the implantation process and possibly the formation of new chemical compounds. The last problem will be the subject of further research.

**Keywords:** ion implantation, Rutherford backscattering spectrometry (RBS) Spectroscopic ellipsometry (SE).

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