

Investigation of free electron concentration distribution along tellurium doped GaAs single crystal axis

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The distribution has been investigated of free electron concentration along the axis for two n-GaAs single crystal ingots, grown by Cz method and doped with tellurium. Free electron concentration values have been determined using two methods: by traditional Hall effect with four-contact geometry (Van der Pau method) and with the help of developed by authors optical method, based upon infrared reflectivity spectra analysis. All measurements have been carried out at room temperature.

It has been shown, that the dependencies of Hall and optic free electron concentrations upon the coordinate along ingot axis may be described by linear functions. Thus, the values of real tellurium distribution coefficient by the ingot may considerably differ from accepted (tabled) value.

It has been established, that Hall concentration exceeds optic one, i. e. surface layers of investigated samples are depleted of electrons (compared to the volume), and the discrepancy between Hall and optic concentrations increases along the ingot axis.

Keywords: gallium arsenide; tellurium; free electron concentration distribution along ingot axis; Van der Pau method; infrared reflectivity spectra.

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