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Determination of electron concentration by IR reflection spectra in *n*-GaAs samples doped with tellurium and silicon

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Infrared reflectivity and Hall measurements of free electron concentration have been carried out on n-GaAs samples, doped with tellurium and silicon (~10^{18} cm^{-3}). For every sample the value of characteristic wave number has been determined and the value of electron concentration N_{opt} has been calculated. Van der Pau measurements have been carried out on these very samples also and electron concentration values N_{Hall} have been obtained. All measurements have been carried out at room temperature. The correlation between N_{Hall} and N_{opt} values has been established. Tellurium and silicon as doping impurities were shown to be analogical. It was shown also that for all measured samples Hall concentration values exceed optical ones. The suggestion has been made that it may be connected with the presence of natural oxide layer on sample surfaces. Skin-layer thickness has been calculated for n-GaAs sample with free electron concentration 1.0×10^{18} cm^{-3} and it was shown to be equal to 0.69 micrometers.

Keywords: gallium arsenide, conductivity electron concentration, infrared reflectivity spectra, Van der Pau method.

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