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Investigations of the energy-fine structure related to different nitrogen nearest-neighbor environments in GaInNAs layers and GaInNAs/GaAs quantum wells ROBERT KUDRAWIEC, JAN MISIEWICZ, Institute of Physics, Wroclaw University of Technology, Poland — A formation of In-N bonds instead Ga-N ones in GaInNAs compound after annealing is one of the most interesting features of this compound. The aim of this paper is to investigate this issue for sets of different GaInNAs layers and GaInNAs/GaAs quantum wells by photoreflectance (PR) and contactless electroreflectance (CER). Five possible nitrogen nearest-neighbour environments, i.e. short-range-clusters, lead to five discrete band gap energies. In this work the temperature dependence of the band gap energy $E(T)$ related to the individual clusters has been investigated. In addition, we show a first CER evidence of the energy-fine structure of the band gap for GaInNAs system. Besides GaInNAs samples series of GaNAs and GaNAsSb samples have been investigated in PR and CER. It has been shown that after annealing a blueshift of the band gap energy appear also for these samples. However, no energy-fine structure of the band gap energy has been observed for these compounds.

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