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Study of two-subband population in Fe-doped AlxGa1-xN/GaN heterostructures by persistent photoconductivity effect[1] JENN-KAI TSAI, Department of Electronics Engineering and Computer Science, Tung-Fang Institute of Technology, Hunei Shiang, Kaohsiung County 829, Taiwan, R.O.C., IKAI LO, M. H. GAU, Y. L. CHEN, J. Z. CHANG, W. T. WANG, J. C. CHIANG, Department of Physics, Center for Nanoscience and Nanotechnology, National Sun Yat-Sen University, Kaohsiung, Taiwan, Republic of China — The electronic properties of Fe-doped $Al_{0.31}Ga_{0.69}N$/GaN heterostructures have been studied by Shubnikov-de Haas measurement. The lowest two subbands of the two-dimensional electron gas in the heterointerface were populated. After the low temperature illumination, the electron density increases from 11.99x10^{12} cm^{-2} to 13.40x10^{12} cm^{-2} for the first subband and from 0.66x10^{12} cm^{-2} to 0.94x10^{12} cm^{-2} for the second subband. The persistent photoconductivity effect ($\sim$13% increase) is mostly attributed to the Fe-related deep-donor level in GaN layer. The second subband starts to populate when the first subband is filled at a density of 9.40x10^{12} cm^{-2}. We obtained the energy separation between the first and second subbands to be 105 meV.

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