EFFECT OF INTERFACE DEFECT STATES ON PHOTOELECTRIC PROPERTIES OF $In_xGa_{1-x}As/GaAs$ HETEROSTRUCTURES WITH QUANTUM DOTS

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S u m m a r y

Properties of the lateral photocurrent in $In_xGa_{1-x}As/GaAs$ heterostructures with quantum dot (QD) chains at various indium concentrations x are investigated. At the interband excitation of QDs by quanta with $h\nu = 1.2$ eV, the structures have revealed a long-term rise and the relaxation kinetics of the photocurrent as well as the effect of residual conductivity after the exciting radiation is turned off. Analyzing the data on thermostimulated conduction (TSC) after the excitation by optical radiation in the region of QD absorption, the following energy levels of defect states with respect to the GaAs conduction band were found: 0.11 eV, 0.16 eV, 0.21 eV, 0.24 eV, and 0.35 eV. Investigations of the lateral photoconduction (LPC) made it possible to discover transitions involving the levels of electron traps of $EL2$ and $EB3$ GaAs intrinsic defects. In the simplest case of a nanostructured photoconductor with one trapping center, we obtained an analytical expression for the photocurrent kinetics of conduction electrons that was confirmed by experiments with $In_{0.4}Ga_{0.6}As/GaAs$ samples. The kinetics of $In_{0.5}Ga_{0.5}As/GaAs$ photoconductors is more complex and described only qualitatively.