observed for the samples annealed at 900 °C which were exposed to the oxygen plasma during 20 min. The sensitivity increases from 240 nm to 200 nm; in this spectral region the β-Ga_2O_3films are not transparent and absorb the radiation. The relation is established between the oxygen plasma treatment duration and the of β-phase crystallite emergence with different crystallographic orientation. It is shown that after high-temperature annealing the films become transparent in visible range and photocurrent is explained by the generation of charge carriers in the space charge region of the semiconductor.

CONDUCTION MECHANISM OF METAL-TiO_2-Si STRUCTURES

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The conduction mechanism in metal-TiO_2-Si structures was studied. Titanium oxide film with thickness of 70 nm was prepared by magnetron sputtering on silicon epitaxial layer with a donor concentration $N_d = 7{\cdot}10^{14}$ cm^{-3}. The Si-substrate with dielectric film was separated into several parts. One part was not subjected to annealing and two pieces of the plate were annealed in Ar for 30 min at temperatures T_a = 500°C or 750ºC.

Regardless of the annealing temperature, on the direct current-voltage characteristic (CVC) in double logarithmic scale there are three sections, each section can be fitted by function $I \sim U^m$. The first section of CVC is observed at bias voltages up to 0.1 V with $m \approx 1$. In the second section ($0.1 \leq U \leq 1.0$ V), the m value depends on the annealing temperature and is equal to 2.8 – 4.9. At the third section, m reduces to 2 at voltages >0.9 V. In the voltage range corresponding to the second section of the CVC direct current (I_{dir}) depends weakly on temperature. Similar results were obtained for the structures annealed at T_a = 500 and 750°C. At negative potentials on the gate, the dependence of current (I_{rev}) on voltage is represented by a straight line with a slope of m = 0.5 in over the voltage range of $1{\cdot}10^{-3}$ – 10 V in the double logarithmic scale. With increasing temperature the reverse current increases exponentially.

At the positive potentials on the gate, the electrons are injected from silicon into titanium oxide. Even at small voltage bias the barrier at the TiO_2-n-Si interface become insignificant and all voltage is applied to the dielectric. Current through the sample is determined by processes in TiO_2 film. From the analysis of current-voltage characteristics it follows that the conductivity of TiO_2 films is determined by the space charge limited current in a dielectric with traps which are exponentially distributed in band gap. At negative potentials on the gate, the space charge region (SCR) is formed in the silicon and the bias voltage is distributed between the TiO_2 film and SCR in silicon. Current through the structure is determined by the electron-hole pairs generation in the SCR.

TERAHERTZ GENERATION FROM SURFACES OF ELECTRON AND NEUTRON IRRADIATED SEMICONDUCTORS

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Terahertz generation from semiconductor surfaces is one of the most simple and efficient methods of obtaining terahertz radiation within 0.1-3.5 THz range for terahertz time-domain spectroscopy (THz-TDS). Terahertz pulse arises from ultrafast current transient produced by non-equilibrium charge carriers excited by femtosecond laser pulse and accelerated by surface built-in field or by diffusion process. This process is complex and depends on different fundamental properties of semiconductor crystal. It is still difficult to extract the semiconductor properties from terahertz emission data. On the other hand, a qualitative characterization can be performed. In the present study, we test the terahertz emission from semiconductors (InAs, GaAs, GaSe, InP, InSb) with important parameters, like carrier lifetimes or mobilities, differing by orders of magnitude. We perform also simple modeling of the terahertz emission spectra. One of the ways to change these parameters is a high-energy particle irradiation. In this work, the electron- and neutron-