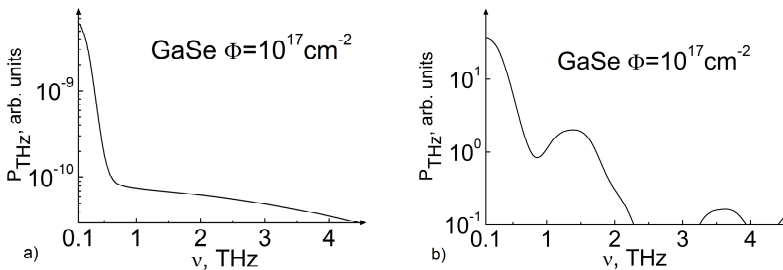


irradiated III-V and III-VI semiconductors are compared. Examples of terahertz spectra emitted from surface of electron irradiated GaSe are demonstrated on figures below.



Model (a) and experimental (b) terahertz emission spectra from electron irradiated GaSe sample.

PHOTOELECTRICAL CHARACTERISTICS OF TiO₂-n-Si HETEROSTRUCTURES

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The influence of thermal annealing on photoelectrical properties of TiO₂-n-Si structures is studied. Titanium oxide film with thickness of 70 nm were prepared by magnetron sputtering on Si epitaxial layer with the donor concentration of $N_d = 7 \cdot 10^{14} \text{ cm}^{-3}$. Before deposition of dielectric film the Si wafer was exposed to chemical cleaning. Then, the Si-substrate with dielectric film was separated into several parts. One part was not subjected to annealing, and the two parts were annealed in Ar atmosphere for 30 min at temperatures $T_a = 500^\circ$ and 750°C . In the study of the photoelectric characteristics the structures were irradiated by LED at $\lambda = 400 \text{ nm}$ from the titanium oxide film side. Unlike photodiodes with Schottky barrier and metal-SiO₂-n-Si structures the currents at positive potentials on the gate increase during exposure to radiation, starting with the low voltages. The currents at negative potentials at the gate show significantly greater sensitivity to light. In structures without annealing and after annealing at 500°C , there is a threshold voltage of reverse-

current growth at the light exposure. The value of voltage depends on annealing temperature. A characteristic feature of reverse currents after switching off the light is the appearance of residual currents. However, after one month the dark currents of the samples annealed at 500°C become 2 times lower in comparison to the dark current baseline values. This effect can be used for practical purposes as a method for leakage current reduction in MIS structures with dielectric TiO₂ films. The curve for the dark current immediately after switching off the light is significantly higher than the initial one. This phenomenon is known as a frozen photoconductivity (persistent photoconductivity). At a fixed voltage the value of the current decreases exponentially and it can be described by the formula:

$$y = A_1 \cdot e^{\frac{-x}{t_1}} + A_2 \cdot e^{\frac{-x}{t_2}} + y_0,$$

where $A_1 = 1.11$, $A_2 = 1.32$, $t_1 = 2.60$, $t_2 = 21.58$, $y_0 = 1.08$.

The samples annealed at 750°C show the reverse current increase on light exposition starting from $U = 0$ V. The persistent photoconductivity is observed only in TiO₂-n-Si structures where the TiO₂ film contains anatase crystallites.

A COMPARISON OF TERAHERTZ GENERATION AND DETECTION IN ZnTe, GaP, GaSe AND GaSe:S CRYSTALS

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During two last decades GaSe crystals are widely used in terahertz time-domain spectroscopy as terahertz nonlinear optical emitters and electrooptic detectors. These crystals have advantage with respect to ZnTe or GaP when a broadband spectral range is required (up to 100 THz). Besides, GaSe nonlinear properties and unique damage threshold for terahertz and IR radiation allow to generate high-intensity terahertz transients. In the present work, we compare terahertz generation and detection in several crystals, namely ZnTe, GaP, GaSe, GaSe:S 0.9 mass % and GaSe:S 7 mass %. The former possesses higher hardness as is compared to that of pure GaSe. The