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 TiO_2 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 TiO_2-n-Si structures where the TiO_2 film contains anatase crystallites.

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

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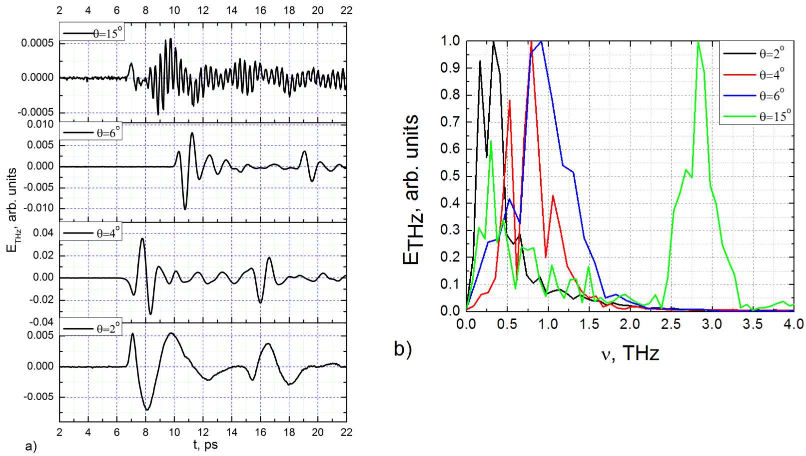
During two last decades GaSe crystals are widely used in terahertz time-domain spectroscopy as terahertz nonlinear optical emitters and electrooptic detectors. These crystals have advantage with respect to ZnTe or GaP when a broadband spectral range is required (up to 100 THz). Besides, GaSe nonlinear 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 influence of GaSe doping with sulfur on phase-matching conditions and efficiency of terahertz generation by optical rectification of femtosecond laser pulses is evaluated. Basing on analysis of phase matching conditions we demonstrate also a narrowband tunable electro-optical detection in a centimeter size GaSe crystal at optical probe and pump pulses having time duration about 12 fs, as it is shown in figure.



Temporal (a) and wave (b) forms of terahertz pulses generated in InAs and detected in thick GaSe sample tilted at different angles. The detection efficiency is tuned by tilting the crystal.

DOPING AS A MEAN TO IMPROVE MECHANICAL PROPERTIES FOR GaSe

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In last two decades the birefringent GaSe crystal was the mostly used in laboratories as (non-phase matched) optical rectifier and phase matched difference frequency generator (DFG) operating in extreme wide spectral band