EFFECT OF UNIAXIAL STRESS ON LOW-FREQUENCY DISPERSION OF DIELECTRIC CONSTANT IN HIGH-RESISTIVITY GaSe CRYSTALS

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S u m m a r y

Low-frequency dielectric spectra of high-resistivity GaSe layered crystals have been studied on the samples clamped between two insulating parallel plates at frequencies up to 100 kHz. The measurements have been carried out at different uniaxial stresses up to 2.4×10^5 Pa applied along the c-axis normal to crystal layer's plane. It is revealed that the dielectric spectra of high-resistivity GaSe layered crystals with insulating plates obey a universal power law $\sim\omega^{n-1}$, where ω is the angular frequency and $n \approx 0.8$, earlier observed on high-resistivity GaSe crystals with indium-soldered contacts. The same type of spectra on the crystals with different types of contacts (insulating and ohmic) confirms the bulk character of the observed polarization caused by hopping charge carriers. It is shown that the frequency-dependent dielectric constant increases linearly with the uniaxial stress characterized by the coefficient $\Delta\epsilon/(\epsilon\Delta p) = 8\times10^{-7}$ Pa^{-1}. A slight increase of power $1 - n$ with the stress is observed, that leads to a stronger dielectric dispersion. The strong stress dependence of the low-frequency dielectric constant in high-resistivity GaSe crystals may be referred to the presence of the formations of elementary dipoles, rotations of which correspond to hops of localized charge carriers.