ANOMALOUS CONDUCTIVITY IN ZnSe SINGLE CRYSTALS BY X-RAY IRRADIATION

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S u m m a r y

We study experimentally the ability of ZnSe to be detectors in the mode of direct conversion of the ionizing radiation energy in that of an electric signal. We have established that, for a monocrystalline ZnSe-sample of the n-type ($E_d = 0.26$ eV) with the specific resistance $\rho \sim 10^9$ Ohm·cm at room temperature, a reduction of the conductivity under the action of X-ray radiation is observed, unlike the high-resistance single crystals with $\rho > 10^{12}$ Ohm·cm. We have discovered that the current-voltage characteristic (CVC) of such samples for the dark conductivity lies over the CVC with the X-ray conductivity, and the shapes of these CVC curves differ significantly. Obviously, the character of the X-ray-induced conductivity of ZnSe, under which free carriers of both signs are generated, differs substantially from that of the dark conductivity, when a sample contains only free electrons. Respectively, we have obtained a decreasing lux-ampere characteristic (LAC) for the X-ray-induced conductivity current. Till now, the scientific and technical literature sources contained no indications of such untypical behavior of the mentioned physical quantities and characteristics. We assume that such anomalous phenomenon can be caused by the heterogeneous recharge of deep centers near electric contacts and, therefore, by the appearance of volume charges reducing the X-ray conductivity of monocrystalline ZnSe.