EFFECT OF γ-IRRADIATION ON THE PHOTOLUMINESCENCE OF $Cd_{1-x}Zn_xTe$ CRYSTALS

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S u m m a r y

We study the effect of γ-irradiation (with doses in the range 10–100 kGy) on the low-temperature (T = 5 K) photoluminescence of $Cd_{1-x}Zn_xTe$ (x = 0.05) crystals. The following phenomena induced by γ-irradiation were observed: a) essential decrease of the intensities of the initial (as-grown) luminescence bands – the defect band ($h\nu_m$ = 1.409 eV), these caused by donor-acceptor pairs ($h\nu_m$ = 1.547 eV) and shallow acceptors ($h\nu_m$ = 1.556 eV), as well as bands related to excitons bound to shallow neutral acceptors and donors ($h\nu_m$ = 1.592 eV and $h\nu_m$ = 1.599 eV, respectively), which results from the decrease of the concentration of the corresponding luminescence centers due to their interaction with radiation-induced defects; b) appearance of new luminescence bands probably caused by radiation-induced cadmium vacancies V_{Cd} bound to other defects (donor-acceptor pairs, $h\nu_m$ = 1.548 eV) and isolated cadmium vacancies ($h\nu_m$ = 1.557 eV) as well as excitons bound to the indicated cadmium vacancies ($h\nu_m$ = 1.590 eV). The intensity of the radiation-induced bands changes non-monotonically with increase in the dose of γ-irradiation: it firstly grows at low Φ_γ ($\leq$ 50 kGy) due to an increase of the concentration of cadmium vacancies and then considerably decreases at high Φ_γ > 50 kGy due to the generation of a large number of effective centers of radiationless recombination of excess charge carriers.