

Title: Defects limiting charge collection in semiinsulated CdZnTe

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Abstract: We achieved to detect photoluminescence transitions deep in the band gap in 4 samples cut from 2 different crystals of semiinsulating $\text{Cd}_{1-x}\text{Zn}_x\text{Te}$ ($x = 0,02 - 0,18$) in a row of points along the growth axis. The spectral peaks give evidence of the presence of deep levels in the sample and the intensity of the photoluminescence peaks is to a certain extent proportional to the concentration of these levels. A comparison between resistivity and photoconductivity that were measured by a contact-less method showed that the change of photoluminescence intensity of deep levels does not bring about an unambiguous change of neither resistivity nor photoconductivity. Correlation analysis of resistivity and photoconductivity of 6 samples from 4 different crystals confirmed the following model: A shift of the Fermi level within the band gap induced by a change of donor-acceptor compensation is accompanied by an unambiguous change of resistivity and results in a change in occupation of the deep levels. This causes a change in the photoconductivity of the crystal because the occupation factor of deep levels determines their ability to trap photogenerated charge carriers.

Keywords: CdZnTe, Resistivity, Photoconductivity, Deep level occupation, Photoluminescence