

IVANOVA, G.N., NEDEOGLO, Dmitrii, NEDEOGLO, Natalia et al. Interaction of intrinsic defects with impurities in Al doped ZnSe single crystals. In: Journal of Applied Physics. 2007, Vol. 101, Issue 6. ISSN 0021-8979.

We report on the results of a complex study of electrical (77–300 K) and luminescence (10–300 K) properties of *n*-ZnSe single crystals annealed in a Zn melt containing Al impurity at concentrations ranging from 0.1 to 80 at. %. It was established that Al atoms form donor centers only at a low impurity concentration (≤ 0.5 at. %). The increase of the amount of Al atoms in the crystal results in the formation of $(V_{Zn}Al_{Zn})$ associative acceptor centers leading to the self-compensation of the shallow Al donor impurity. This process is accompanied by the emergence and development of a self-activated luminescence band associated with the $(V_{Zn}Al_{Zn})$ acceptor centers. We show that further increase of the Al content in the melt (≥ 10 at. %) leads to the dissociation of the acceptor complexes and to a recurrent donor doping effect. The photoluminescence spectra of such crystals are dominated by activated luminescence via the $(Cu_{Zn}V_{Se}Cu_i)$ and $(Cu_{Zn}Al_{Zn})$ associative centers.