

# Optical Properties and Energy Band Structure of $Zn_3P_2$ and $Cd_3P_2$ Crystals

Sobolev V. V., Syrbu N. N.

<https://doi.org/10.1002/pssb.2220640202>

## Abstract

Edge absorption, photoconductivity, and reflectivity spectra are investigated of  $Zn_3P_2$  crystals in the range from 1 to 12.5 eV and reflectivity spectra of  $Cd_3P_2$  crystals in the range from 1 to 12.5 eV. The  $E_g$  value of  $Zn_3P_2$  has been experimentally determined at 293 and 77 OK. Its nature has been found to be due to direct transitions. Three peaks of exciton and interband character have been observed in the photoconductivity spectrum of  $Zn_3P_2$  single crystals. Complex structures (about 12 peaks) have been observed in the reflectivity spectra of both compounds. Most of these structures may be accounted for in terms of the well-known theoretical calculations of their bands. Several peaks have been observed in the most thoroughly studied spectrum of  $Zn_3P_2$ . These peaks cannot be explained by the theoretical band scheme and are probably caused by the peculiarities of the bands of real crystals of the  $Zn_3P_2$  type, which have been lost in the well-known theoretical model because of the accepted simplifications of the crystal lattice.