

The Reflectivity Spectra of Zinc and Cadmium Diarsenides and Diphosphides

Sobolev V. V., Syrbu N. N., Ugai Ya. A.

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Short Notes

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Institute of Applied Physics, Academy of Sciences of the Moldavian SSR, Kishinev (a),
and State University, Woronesh (b)

The Reflectivity Spectra of Zinc and Cadmium Diarsenides and Diphosphides

By

V. V. SOBOLEV, N. N. SYRBU (a), and YA. A. UGAI (b)

The present note reports reflectivity spectra investigated on oriented cleaved crystals of tetragonal CdAs₂, CdP₂, and ZnP₂ and monoclinic ZnAs₂ and ZnP₂ in the energy range 0.8 to 12.5 eV at 300 and 77 °K (Figs. 1 to 4). The experimental conditions were described earlier (1).

The reflectivity spectra of CdAs₂ ($\ell \perp c$) at 300 and 77 °K have two doublet bands, $E_1-E'_1$ and $E_2-E'_2$; the distances between the peaks in these bands are 0.28 eV ($E_1-E'_1$) and 0.18 eV ($E_2-E'_2$). When the temperature is lowered to 77 °K the bands shift to higher energies by 0.12 eV on the average. The maxima E_3 , E_4 , and E_5 ($T = 300$ °K) are at the energies 6.2, 7.2, and 9.5 eV respectively.

The simplicity of the spectra and their evident resemblance with those of GaAs type crystals do not exclude the possibility, that the doublet structure observed may be due to the spin-orbit interaction.

The reflectivity spectra of the tetragonal form of ZnP₂ and CdP₂ are analogous to each other and are composed of the peaks E_1 to E_{12} ; an exception are the peaks E_{10} and E_{11} , which are shifted in CdP₂ to the short-wavelength region.

The maxima E_{10} , E_{11} , and E_{12} for ZnP₂ and CdP₂ ($\ell \perp c$, $T = 300$ °K)

Fig. 1. The reflectivity spectra of cleaved CdAs₂ ($\ell \perp c$) at $T = 300$ °K (a) and $T = 77$ °K (b)

