

of the mixed crystals have pressure coefficients measurably less than the respective band gap. As concluded previously¹ this fact makes it unlikely that the luminescent transition originates directly from the conduction band. Apparently, donor-acceptor luminescence is the dominant mode of radiative recombination.

A qualitative understanding of the observed intensity changes with pressure for the mixed crystals can be achieved through a donor-acceptor model. As has been stated the donor depth becomes shallower as the cadmium concentration is increased. The acceptor level is unaffected. Experimental results presented for the ZnS phosphors have shown the effect of pressure to be to increase the ionization energy of the chlorine donor ($\sim 32 \text{ cm}^{-1}/\text{kbar}$). Experimental data from Böer *et al.* have indicated that donor ionization energies in CdS increase by roughly $64 \text{ cm}^{-1}/\text{kbar}$.⁸ These observations make it likely that the donor pressure coefficient in a zinc-cadmium sulfide mixed crystal will be somewhere between these limits. If this is the case, then it is expected that pressure will decrease the emission intensity to a

greater extent as the Cd^{2+} concentration is increased. This argument follows from the overlap considerations presented in the previous paper¹ for the ZnS donor-acceptor type emissions. The data for the silver-doped sample at all pressures and the copper-doped sample at pressures greater than 20 kbar bear this out. The anomalous behavior in the copper-doped sample below 20 kbar is not understood.

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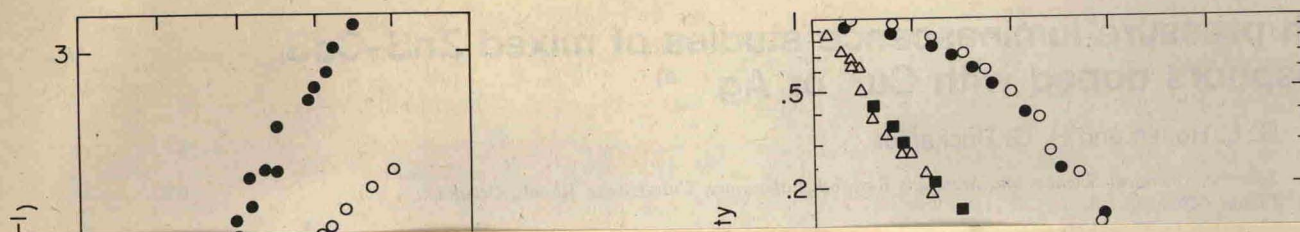


Fig. 1. Effect of pressure on the luminescence of ZnS-CdS.

of the initial crystals have greater concentrations of impurities than the reaction product. As indicated previously, this fact makes it unlikely that the luminescence of the reaction product is due to the same mechanism as the luminescence of the initial crystals. The luminescence of the reaction product is due to the same mechanism as the luminescence of the initial crystals.

A qualitative indication of the effect of pressure on the luminescence of ZnS-CdS is shown in Figure 1. The luminescence of ZnS-CdS increases sharply with pressure, and the effect of pressure is more pronounced at higher pressures. The luminescence of ZnS-CdS increases sharply with pressure, and the effect of pressure is more pronounced at higher pressures.

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