FIG. 8. Absorption spectra of acridine yellow in boric acid—1.8×10^{-4} g/g.

FIG. 10. Shift of monomer absorption peak at 27720 cm^{-1} vs pressure—acridine yellow in boric acid—1.8×10^{-4} g/g.

S states. Since the S_1 state is much closer to the T_1 state than any other S state it probably contributes effectively all of the singlet character present in the T_1 state. As shown in Eq. (5), the part of the decay time associated with this process is proportional to the square of the energy difference between the T_1 and S_1 states. The emission spectrum also shows that there is no large change in peak heights between the alpha and beta emission with pressure, indicating that the alpha emission process is also being enhanced by pressure. This means that the energy crossing, point y, is moving to lower energy along with the S_1 state.
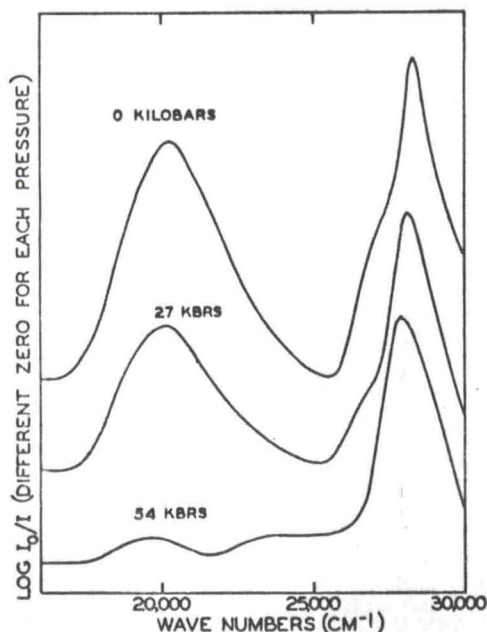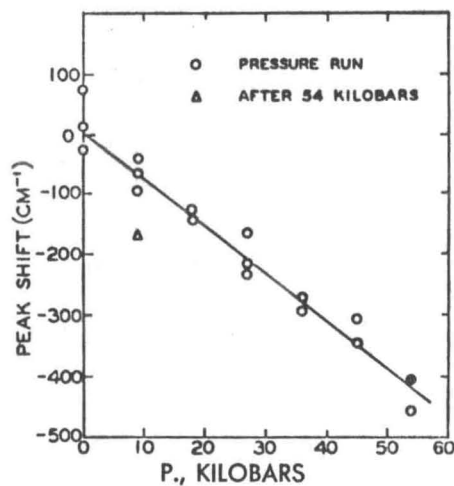
A rough estimate can be made as to how much the change in the energy difference between the S_1 and T_1 states affected the decay rate of the phosphor. Since this energy difference can be related to the beta decay only, the decay will be assumed to be completely of the beta type. From Eq. (3) the following relationship would hold:

$$\frac{\tau(P=0)}{\tau(P=54 \text{ kbar})} = \frac{\Delta E(P=0)^2}{\Delta E(P=54 \text{ kbar})^2}. \quad (4)$$

Using the ΔE's measured from the emission spectra and the atmospheric τ_n's, the τ_n's at 54 kbar can be calculated and compared with the measured values. As seen in Table I, if the decay were all of the beta type, the change in the energy difference between the S_1 and
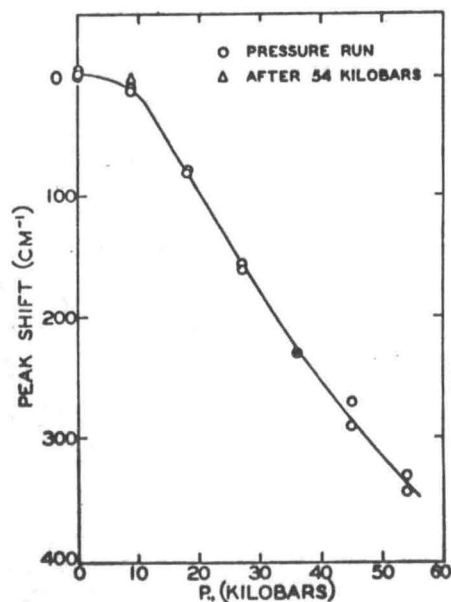

FIG. 9. Absorption spectra of acridine orange in boric acid—5.4×10^{-4} g/g.

FIG. 11. Shift of monomer absorption peak at 28285 cm^{-1} vs pressure—acridine orange in boric acid—5.4×10^{-4} g/g.