

Letters to the Editor

The Board of Editors will not hold itself responsible for opinions expressed in the letters published in this section. The notes containing reports of new work communicated for this section should not contain many figures and should not exceed 500 words in length. The contributions must reach the Assistant Editor not later than the 15th of the second month preceding that of the issue in which the letter is to appear. No proof will be sent to the authors.

7

ON THE WING OF RAYLEIGH LINE DUE TO CARBON-DISULPHIDE AT DIFFERENT TEMPERATURES

K. V. RAMACHANDRA

OPTICS DEPARTMENT, INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE, CALCUTTA-32

(Received April 27, 1963)

Majumder (1949) while studying the Raman spectra of carbon disulphide in liquid and solid states at different temperatures, observed a broad band at a dis-

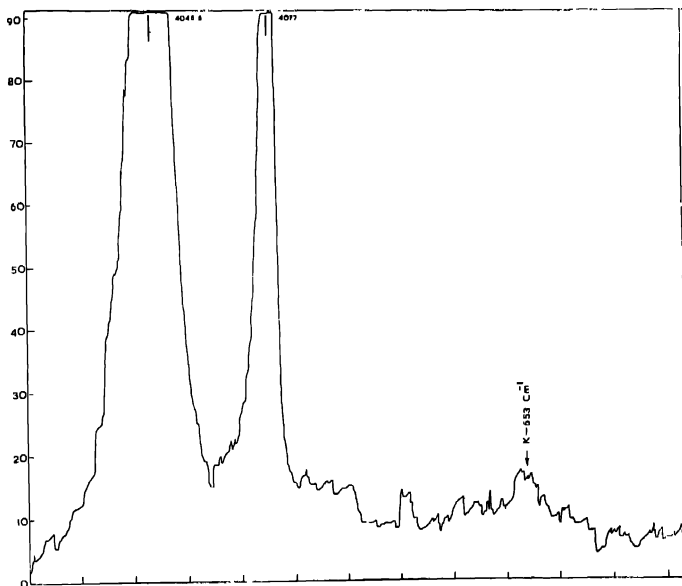


Fig. 1(a). Raman spectrum of carbon disulphide at 28°C.

tance of 45 cm^{-1} from centre of the Rayleigh line due to the liquid at -100°C . It was also observed by him that when the liquid was solidified and cooled to -125°C , the band was replaced by two discrete lines at 59 cm^{-1} and 70 cm^{-1} respectively. On further lowering the temperature of the solidified mass to -183°C , he found the lines to shift to 69 cm^{-1} and 80 cm^{-1} respectively. From these results he concluded that the band at 45 cm^{-1} due to the liquid at -100°C originates from vibration in dimers formed in the liquid at low temperatures and that the band splits up into two lines with the solidification of the liquid. The mean of the frequency shifts of the two lines due to the solid, however, is found to be much greater than 45 cm^{-1} deduced from the inflexion in the microphotometric record of the spectrogram due to the liquid. Recently, Sirkar *et al.* (1961) used a self-recording grating spectrophotometer for studying the wing accompanying the Rayleigh lines due to liquids and showed that the disadvantage due to scattering by grains in the photographic emulsion in the photographic method mentioned above can be avoided if a recording spectrophotometer is used. It was, therefore, thought worthwhile to investigate the wing of the Rayleigh line scattered by carbon disulphide at different temperatures with the recording spectrophotometer

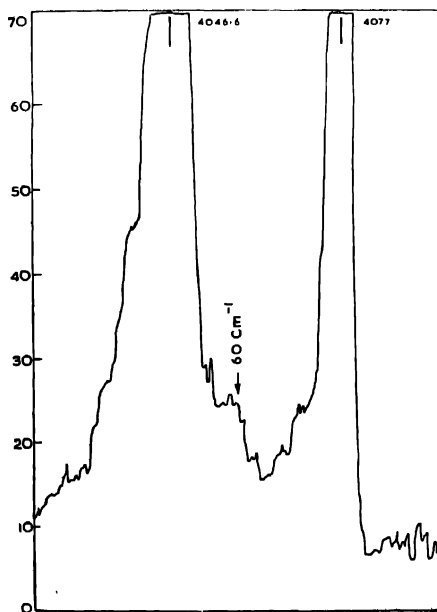


Fig. 1(b). Wing due to carbon disulphide at -80°C .

used by Sirkar *et al.* (1961) and to determine the position of the band mentioned above more accurately.

The arrangement used to record the spectrum of the light scattered by purified carbon disulphide at 28°C and -80°C was similar to that used by Sirkar *et al.* (1961) to record the wing due to benzene, but to cool the liquid to the desired low temperatures mixtures of alcohol and liquid oxygen in appropriate proportions were used as the coolant. The records of the Raman spectra are reproduced in Figs. 1(a) and 1(b) respectively.

It is seen from Fig. 1(a) that inspite of fluctuations in the background intensity the Raman line at 653 cm^{-1} due to carbon disulphide excited by the Hg line 4047A has been clearly recorded and the distribution of intensity in the wing of the Rayleigh line does not show any maximum. Fig. 1(b), on the other hand, shows a broad band at about 60 cm^{-1} in the wing, the sharp peak on its left side being due to fluctuation in the intensity of the background. The band was found to appear at the same place in several records taken for the liquid at the low temperature. Thus the appearance of the broad band is definitely established, but its Raman shift is 60 cm^{-1} instead of 45 cm^{-1} observed by Majumder (1949) and the origin of the band seems to be a mode a vibration in dimers as postulated by him.

The author is indebted to Professor S. C. Sirkar, D.Sc., F.N.I., for his constant guidance during the progress of the work.

REFERENCES

- Majumder, N. C., 1949, *Ind. J. Phys.*, **23**, 253
Sirkar, S. C., Roy, S. B. and Ghosh, D. K., 1961, *Ind. J. Phys.*, **35**, 377.