

very small as can be seen below from a calculation for the two  ${}^1G$ 's.

	Ostrofsky	Laporte	Difference	Per cent.
Mean value	20126.5	20126.5	0	0
${}^1G_+$	25490.2	24526.5	+963.7	4
${}^1G_-$	14762.8	15726.5	-963.7	

The error is about 4 per cent. This is practically negligible. Hence calculations for the other pair are not made. But it might be noted that in all future calculations Laporte's formulæ might be used. The formulæ given by the author for  $d^4$ s also might be modified accordingly.

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1. Laporte Otto, *Phy. Rev.*, 1942, 61, 302, 305.
2. Ostrofsky, *Ibid.*, 1934, 46, 604.
3. Ramakrishna Rao, V., *Ind. J. Phys.*, 1948, 22, 429.

#### ELASTIC CONSTANTS OF LITHIUM FLUORIDE

LITHIUM FLUORIDE is an ionic cubic crystal but its elastic constants as determined by Schæfer and Bergmann (1938), do not satisfy Cauchy's relation  $C_{12} = C_{44}$ . Sundara Rao (1949) has recently found better agreement but even according to him,  $C_{12}$  and  $C_{44}$  differ by as much as 16%. An exceptionally clear and artificially grown crystal was put at my disposal by Prof. Bhagavantam and it was thought desirable to repeat the measurements.

Sections (001) and (011) of different thicknesses (1.790 to 1.983 mm.) have been cut from this sample and used. Ultrasonic velocities in these plates are determined by the wedge method, using frequencies in the range 1 to 12 mc./sec. and the elastic constants are evaluated in the usual manner. The density of the substance as determined by the author is 2.635 gm./cm.<sup>3</sup>, and agrees well with the average value 2.640 given in Landolt-Börnstein Tables (1927). The bulk modulus K along with the elastic constants ( $10^{11}$  dynes/cm.<sup>2</sup>) and the elastic coefficients ( $10^{-13}$  cm.<sup>2</sup>/dyne) are given below.

No.	Observer	$C_{11}$	$C_{12}$	$C_{44}$	$S_{11}$	$S_{12}$	$S_{44}$	K
1	Schæfer & Bergmann	11.8	4.34	6.28	10.6	-2.85	15.9	6.82
2	Sundara Rao	11.9	4.58	5.42	10.7	-2.97	18.5	7.02
3	Author	11.9	5.38	5.34	11.7	-3.64	18.7	7.55
4	Slater	..	..	..	..	..	..	8.55

The author's values for  $C_{11}$  and  $C_{44}$  are in good agreement with those of Sundara Rao while that for  $C_{12}$  is higher. According to the present measurements, Cauchy's relation is satisfied to a high degree of accuracy. It is interesting to note that the author's value for K is nearer Slater's (1931) value determined by direct experiment.

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1. Landolt-Börnstein, *Physikalisch-Chemische Tabellen*, 1927, Erg. Bd., 1, 5, 176.
2. Schæfer & Bergmann, see "Ultrasonics" by Bergmann, 1938, 180.
3. Slater, J. C., see "The Physics of High Pressure" by Bridgman, 1931, 163.
4. Sundara Rao, R. V. G., *Curr. Sci.*, 1949, 18, 336.

#### RAMAN SPECTRUM OF METHYL METHACRYLATE GLASS

THE Raman spectrum of methyl methacrylate both in the liquid form and as glass has been investigated by Hibben<sup>1</sup> to elucidate the mechanism of polymerisation, but unfortunately, no photograph of the spectrum was reproduced. As a large transparent rectangular specimen of methyl methacrylate glass (plexi-glass) supplied by the Imperial Chemical Industries Ltd., was available in the laboratory, the author undertook an investigation of its Raman spectrum. The specimen not being transparent in the ultra-violet region, its spectrum had to be excited by using the visible radiations of the mercury arc. The spectrum exhibited weak fluorescence between  $\lambda$  4200 to  $\lambda$  5000, but satisfactory spectrograms were obtained by using a filter of a strong solution of sodium nitrite.

In the photograph (Fig. 1), taken with a Hilger 2-prism spectrograph, after twelve hours' exposure, fifteen Raman lines are easily discernible, the frequency shifts being 231 (0,d), 295 (0,d), 360 (1,d), 491 (1,d), 606 (3), 817 (7), 982 (4,b), 1129 (1), 1176 (0) 1455 (5), 1598 (1), 1729 (5) 2876 (0), 2934 (3), 3001 (1) cm.<sup>-1</sup> The figures