leads to the same formula derived by Chandrasekhar on the basis of an elementary model. On the experimental side the formula has been found to explain the rotatory dispersion, its temperature and pressure variation, of a number of crystals.[4-13] In this communication, the applicability of the formula to two more cases, *viz.*, sodium periodate ($NaIO_4.3\,H_2O$; belonging to the space group $C_3^4$) and guanidine carbonate [$(CN_3H_5)_2.H_2CO_3$; belonging to the space group $D_4^4$ ($D_4^8$)] is discussed. Previous data on these crystals are scanty[14,15] and no attempts have been made to express the data in terms of any formulae.

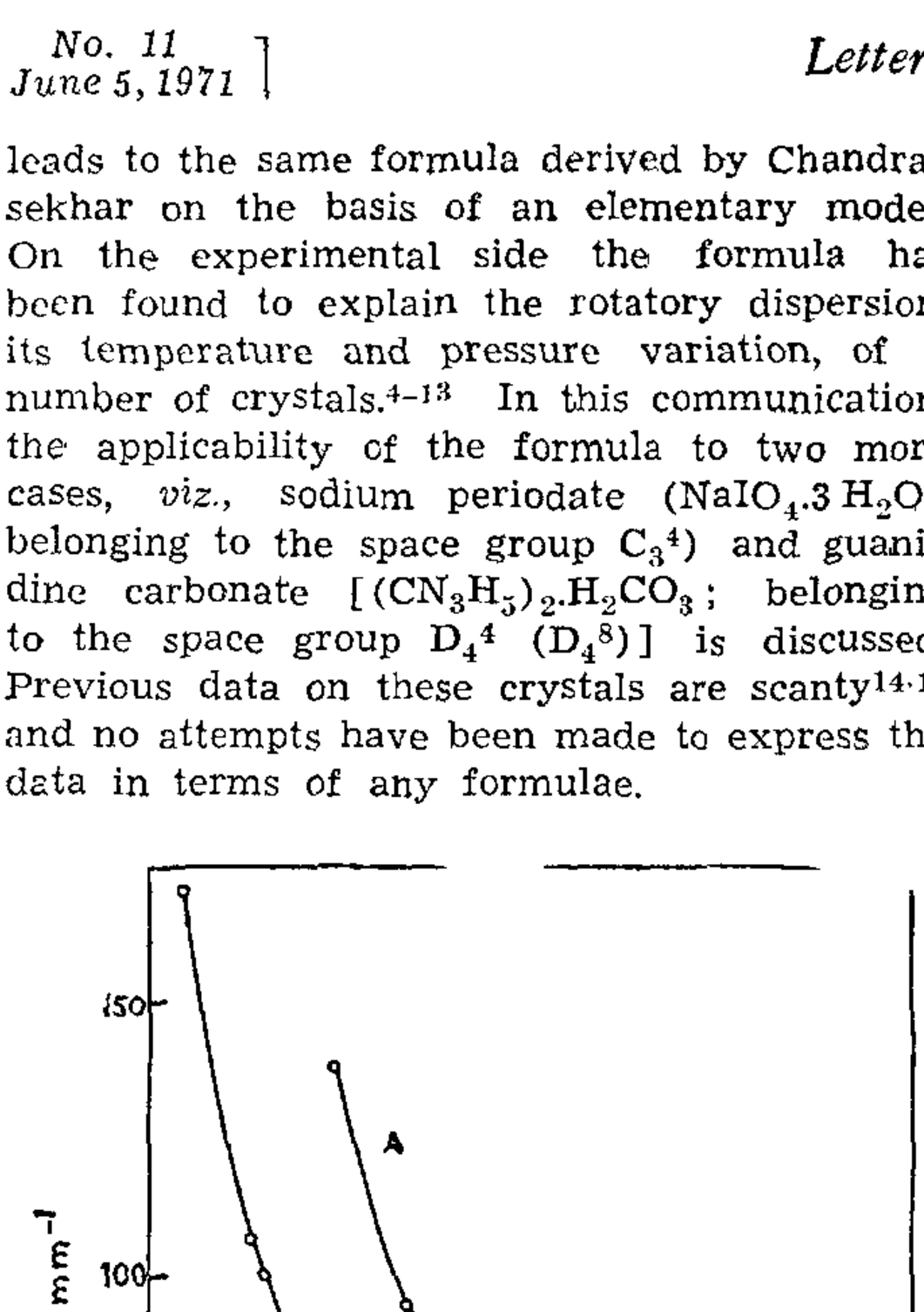


FIG. 1. Rotatory dispersion of (A) Sodium periodate; (B) Guanidine carbonate.

The crystals were grown from solution at room temperature by the slow evaporation technique and cut with faces perpendicular to the optic axis. The faces were ground and polished, and their parallelism was tested optically. The crystals were sandwiched between two fused silica discs with a drop of paraffin. The spectropolarimeter arrangement was the same as described in an earlier paper.[7]

Measurements on sodium periodate were made for 10 wavelengths from $\lambda\,0{\cdot}5790\,\mu$ to $\lambda\,0{\cdot}33415\,\mu$ and could not be extended to shorter wavelengths because of high absorption; measurements on guanidine carbonate were made for 16 wavelengths from $\lambda\,0{\cdot}5790\,\mu$ to $\lambda\,0{\cdot}2652\,\mu$. The rotatory power of both crystals are expressible by a single term Chandrasekhar formula

$$\rho = \frac{K\lambda^2}{(\lambda^2 - \lambda_0^2)^2}$$

with the following constants:

| | K | $\lambda_0$ |
|---|---|---|
| Sodium periodate | 5·641 | 0·21 |
| Guanidine carbonate | 4·637 | 0·1625 |

The rotatory dispersion curves are presented in Fig. 1 and as can be seen the agreement is satisfactory. For $NaIO_4.3\,H_2O$ the r.m.s. deviation between calculated and experimental rotatory power is 0·41 deg/mm and the maximum deviation 1·7%; for guanidine carbonate the corresponding values are 0·51 deg/mm and 1·5%.

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## EXPERIMENTAL MEASUREMENT OF THE K-CONVERSION COEFFICIENT OF 80 keV TRANSITION IN $^{144}Pr$

THE K-conversion coefficient of the 80 keV transition has been determined using a 2·5 cc Ge (Li) detector for the gamma intensity measurements. Several groups have reported conflicting results for the K-conversion coefficient of this line. Hicock *et al.*[1] combining their X-ray and $\gamma$-ray intensity measurements with scintillation spectrometers and the internal conversion line measurements with magne-

tic lens beta spectrometer found for the 133 and 80 keV transitions—$\alpha_K$ values $0{\cdot}76 \pm 0{\cdot}15$ and $1{\cdot}40 \pm 0{\cdot}24$ respectively. As the transitions involved are pure $M_1$ in character, these values differ from the theoretical conversion coefficients for such transitions. Zuk and Gustaffsson[2] combining their gamma singles measurements with a scintillation spectrometer and internal conversion line intensities of Geiger *et al.*[3] found for the 80 keV transition an $\alpha_K$ value of $1{\cdot}3 \pm 0{\cdot}2$. Iwashita *et al.*[4] from the gamma-gamma coincidence measurements found a value of $\alpha_K = 2{\cdot}0 \pm 0{\cdot}4$ for the 80 keV transition with respect to an $\alpha_K$ value of 5·6 for the 53 keV transition. Mangal and Trehan[5] found for the same transition $\alpha_K$ value of $2{\cdot}8 \pm 0{\cdot}6$ relative to $9{\cdot}4 \pm 1{\cdot}0$ for the 53 keV transition from the coincidence spectrum gated with the 35 keV Pr-X rays. Geiger *et al.*[6] found quite conflicting results for the K-conversion coefficient of the 53 keV transition from different measurements.

Thus the results are far from satisfactory and necessitate redetermination of these conversion coefficients. We have measured the gamma intensity of the 80 keV transition relative to the intensity of the 133 keV transition with a 2·5 cc Ge (Li) detector. The K line electron intensities for these transitions have been taken from the paper by Geiger *et al.*[3] Combining the electron and gamma intensities and taking $\alpha_K$ (133) = 0·495,[7] and using the following relation:

$$\alpha_K(80) = \alpha_K(133)\,\frac{I_\gamma(133)}{I_K(133)}\,\frac{I_K(80)}{I_\gamma(80)} \qquad (1)$$

we obtain for the 80 keV transition $\alpha_K = 2{\cdot}09 \pm 0{\cdot}16$ which agrees well with the theoretical conversion coefficient 2·1.[7] We conclude that the conversion coefficient is quite normal and is explained without involving any penetration effects as suggested by Mangal and Trehan.[5]

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## INTERESTING EVIDENCE OF STRATOSPHERIC DUST FROM ELECTRICAL CONDUCTIVITY MEASUREMENTS

SINCE 1958, a number of measurements have been made to study the nature and properties of aerosol layers in the stratosphere. Particle samples have been taken by aircraft and balloon-borne collecting devices and indirect measurements of stratospheric dust have been made using optical techniques, such as twilight sky intensity measurements, searchlight probing, laser probing, stratospheric daytime sky brightness measurements and solar extinction measurements made from rockets, satellites and balloons (Rosen, 1969).

Kroening (1960) used a different technique, *viz.*, small ion density measurements to detect the presence of stratospheric dust. He found a large decrease from about $4 \times 10^3$ ions per $cm^3$ to $2 \times 10^3$ ions per $cm^3$ above 18 km. Similar decreases in the small ion concentration had been earlier observed by Gish and Sherman (1936) and later by Paltridge (1965, 1966).

The electrical conductivity in the stratosphere should also be affected by the presence of dust, since the conductivity is proportional to the small ion concentration. Gish and Sherman (1936) found a considerable drop in conductivity above 18 km, but this was attributed to the ozone layer and the presence of condensation nuclei at these levels. McDonald (1953) pointed out that this observed decrease in conductivity with height is supported by some earlier measurements by Idrac (1928) and urged that these be repeated using more modern sounding techniques. Stergis *et al.* (1955), Woessner *et al.* (1958) and Bourdeau *et al.* (1959) did not, however, observe any decrease in the conductivity at high altitudes that could be attributed to the effect of dust. Paltridge's (1965) measurements were made soon after the 1963 Bali eruption.

Figures 1, 3 and 4 show the vertical profiles of electrical conductivity obtained over Poona on 5, 12 and 14 March 1971, and Fig. 2 over