special case $\triangle i = 0$, the system shows especially under H.F. excitation, a characteristic instability.

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November 13, 1946. S. S. Joshi.

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ASYMMETRY OF SHAPE AND PERIODS OF OSCILLATION IN ELECTRIC FIELDS

Krishnan, Guha and Banerjee* showed that the period of oscillation of an isotropic body suspended in a uniform magnetic field is not appreciably affected even when there is a considerable asymmetry of shape. Different results are to be expected in an electric field. In accordance with such an expectation, the following interesting observations have been made by the author.

The period of oscillation of a rectangular glass plate, with sides in the ratio 1:2 and suspended by a silk fibre about an axis perpendicular to the plate in a uniform electric field, is determined at various field strengths. A definite relationship between the period and the field strength is found to exist.

The period, provided the torsion of the fibre is nil, may be expected to be inversely proportional to the voltage employed for obtaining the field between two parallel plates. If there is a finite torsion of the suspending fibre, which is the case in the experiment conducted, the period may be corrected for the torsion by forming a quantity T′ equal to $T\sqrt{\frac{T_0^2}{T_0^2 - T^2}}$ where T and T_0 are respectively the periods in the field and out of the field. T′ is found to vary inversely with voltage. Graphs between $\frac{1}{T'}$ and the voltage, obtained in several typical experiments with rectangular bits of glass, are found to be straight lines. It is also observed that T′ is the same whether the voltage applied is a direct or an alternating one.

The results are now published with a view to draw attention to the fact that this dependence of T′ on voltage applied between two fixed parallel plates offers a simple method of measuring voltages. Though it takes some time for making such measurements, this method has the advantage of using very simple apparatus available in any laboratory.

While seeking for the origin of the turning moment on suspended bodies which have only a shape asymmetry but no dielectric anisotropy, it has been found that $\frac{I}{T'^2 V^2}$ is the same for rectangular pieces of glass, ebonite and lead, provided the shape and dimensions are kept constant. I is the moment of inertia of the body about the axis of suspension, and V is the applied voltage. From this observation, it is to be concluded that the turning moment is due to an asymmetric distribution of the accumulated charge on the surface of the suspended body and not due to the asymmetry of the field within the body or to the dielectric nature of the body.

In the magnetic case, where there are no surface effects and where the difference in the internal fields arising out of demagnetisation is very small, effects analogous to the above cannot be expected.

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* *Phil. Trans.*, A, 1933, **231** 235.

MOLECULAR STRUCTURE OF CH_3CN

If the C—C≡N chain in CH_3CN is linear, that is, if the molecule is axially symmetric having a three-fold axis of symmetry, it should give rise to four totally symmetric and four doubly degenerate vibrations. All of them would be Raman-active. If the chain is not linear, each degenerate vibration splits up into two so that we should expect twelve fundamentals which are Raman-active.

The Raman spectrum of CH_3CN has been studied by a few authors. Ten Raman lines have been recorded. The number of the observed Raman lines alone will not help us to fix up the structure of CH_3CN molecule. The polarisation data are essential to decide the structure but they are not available.[1]

The author has undertaken the polarisation measurements of the Raman lines in CH_3CN. The usual condenser method of illumination has been used and a properly oriented Wollaston double-image prism placed in the path of the scattered beam enabled us to photograph the horizontal and the vertical components simultaneously. The polarisation measurements of six Raman lines have been made. The remaining four lines are extremely weak and their polarisation characters could not be studied. Four lines at 920, 1375, 2250 and 2940 $cm.^{-1}$ have been found to be well polarised. They can be taken as the four total symmetric lines. Two lines at 380 and 3000 $cm.^{-1}$ are depolarised. The observed polarisation characters of the Raman lines in CH_3CN are strongly in favour of the symmetrical model.

Details will be published elsewhere.

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1. Herzberg, *Infra-Red and Raman Spectra of Polyatomic Molecules*, p. 332.