

Errata: The PhotoChemical Reduction of Water by Europium (II) Ion, and the Magnetic Susceptibilities of Europium (II) and Europium (III) Ions

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than the latter at higher temperatures, so that these two lines cannot be considered to arise from the same kind of molecular motion. An examination of the lattice structure² suggests that the energy required for the rotation or tunneling of benzene molecules about their hexagonal axes would be much less than that for the rotation about the axes in the molecular plane. Such motions would considerably affect the potential field described in our previous paper³ and in consequence the corresponding Raman lines would become diffuse. Since the tunneling or the non-uniform rotation about the hexagonal axes occurs very probably at higher temperatures,⁴ it seems more reasonable to assign ν_1 to II rather than to I.

If such an argument be admitted, we cannot assign ν_1 to II, since the intensity of this line increases with rising temperature. The fact that the intensity of ν_1 is very weak at low temperatures might suggest that this frequency corresponds to a forbidden line to be assigned to a translational vibration which tends to appear in the Raman effect at higher temperatures. (The potential field in the benzene crystal has a center of symmetry and, therefore, all the translational oscillations are forbidden in the Raman effect.⁵ The large anharmonicity in the molecular oscillation in the lattice which would give rise to the considerable temperature dependence of the lattice frequencies would also be responsible for the appearance of the forbidden Raman lines at higher temperatures.)⁶

This conclusion would be supported by our experimental result on the Raman effect of pyridine crystal whose potential field has no center of symmetry and which would, therefore, show the Raman lines of the translational oscillation. At -190°C we found

four lattice frequencies in the Raman effect which are practically equal to those of the crystalline benzene at the same temperature and the lowest frequency (ν_1) was found to be considerably stronger in intensity than that of benzene.

¹ A. Fruhling, *J. Chem. Phys.* **18**, 1119 (1950).

² E. G. Cox, *Proc. Roy. Soc. A* **135**, 491 (1932).

³ I. Ichishima and S. Mizushima, *J. Chem. Phys.* **18**, 1420 (1950).

⁴ E. R. Andrew, *J. Chem. Phys.* **18**, 607 (1950).

⁵ In this connection we want to point out the strong distortions of the ellipsoid of polarizabilities due to the large mobility of the π -electrons which was already reported by Fruhling (see reference 1).

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AN error has been found in the calculation of the quantum yields tabulated in Table I. The numbers of quanta absorbed should be, reading from top to bottom: 34.0×10^{19} , 31.2×10^{19} , 27.7×10^{19} , and 29.7×10^{19} . The corresponding corrected values of the quantum yield are: 0.15 ± 0.02 , 0.16 ± 0.02 , 0.18 ± 0.02 , and 0.20 ± 0.02 .