

The Internuclear Distance in the Te₂ Molecule

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THE short-wavelength region of the visible and near-ultraviolet absorption system of Te₂ consists of bands of the transition $B\ 0_u^+ - X\ 0_u^+$. The region 4000—4115 Å has been photographed on a 3.4 m. Jarrell-Ash spectrograph and 900 lines of ¹³⁰Te₂ have been measured and assigned to seven consecutive bands of the $v'' = 0$ progression with provisional values of v' from 11 to 17. As in Se₂,¹ the bands consist of single *R*- and *P*-branches, with alternate lines, corresponding to odd values of J'' , missing.

The following expression for the rotational term values, cm.⁻¹, has been derived from the ground state combination differences:

$$F''(J) = [0.039602 \pm 0.000022] J(J+1) - [4.04 \pm 0.36] \times 10^{-9} J^2(J+1)^2$$

With $\mu(^{130}\text{Te}_2) = 64.9739$ a.m.u.² and $B = 16.8629/\mu r_0^2$, $r_0'' = 2.5600 \pm 0.0007$ Å, a little shorter than the value, 2.59 ± 0.02 Å, obtained by electron diffraction.³ Comparison with S₂ and Se₂ suggests that the component $\Omega = 1_g$ of the ground state may be high enough above 0_g^+ to be neglected in calculations of the thermodynamic functions of gaseous Te₂ at not too high temperatures.

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¹ G. G. Chandler, R. F. Barrow, and B. Meyer, *Phil. Trans.*, 1966, to be published.

² A. H. Wapstra, *Handbuch der Physik*, 1958, **38** (1), 7.

³ L. R. Maxwell and V. M. Molsey, *Phys. Rev.*, 1937, **51**, 684.