Absorption Spectrum of Methyl Iodide

THE excited state or states, designated by Mulliken as $^1,^3E$, that are concerned in the ultra-violet absorption continuum of methyl iodide, have been compared with the $^1,^3\Pi$ states of the ICl molecule¹. The absence of a band system accompanying the continuum has led to the assumption that the upper state is unstable, whereas a comparison with the $^3\Pi$ states of I_2 , IBr and ICl suggests that a 3E state of CH_3I might possibly have a potential curve with a shallow minimum, and that there might exist a band system the convergence limit of which would occur at a wave-length much longer than that of the absorption maximum near λ 2600. The discovery of such a convergence limit would have the additional interest of providing an accurate value of the energy of the C-I bond.

To test this possibility, the absorption spectrum of gaseous methyl iodide at 220 mm. pressure was photographed through an absorption tube 6.6 metres long, the methyl iodide having been fractionated twice immediately before use. No bands were found; but the continuous absorption was found to extend practically to λ 3600, which is some distance beyond the absorption 'limits' of λ 3360 and λ 3100, found by Iredale and Mills² and by Hukamoto³ respectively, using columns of gas 1 metre long. Although the

conditions in the long absorption tube made accurate intensity measurements impossible, it was found that the absorption limits in equivalent columns of gaseous and liquid methyl iodide (6.6 metres at 220 mm. and 0.6 cm. respectively) occurred at about the same wave-length, indicating that the absorption coefficients of liquid and gas in this region are of the same order of magnitude. Since Iredale and Wallace⁴ found that 4 cm. of the liquid absorbed as far as λ 3950, a result that was confirmed in this laboratory, an equivalent column of the gas of the rather impracticable length of 40 metres should absorb at wave-lengths considerably longer than λ 3600, so that the existence of a band system in this region, though improbable, cannot be entirely ruled out.

The experiments also emphasise the fact that the determination of absorption limits by extrapolation from results obtained with short columns of gas may lead to values which are in error by many hundreds of Angstrom units, and that results so obtained have no thermochemical significance.

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July 11.

¹ Mulliken, *Phys. Rev.*, **47**, 415; 1935.

² Iredale and Mills, *Proc. Roy. Soc., A*, **133**, 430; 1931.

³ Hukamoto, *J. Chem. Phys.*, **3**, 164; 1935.

⁴ Iredale and Wallace, *Phil. Mag.*, (7), **8**, 1093; 1929.

Points from Foregoing Letters

Prof. G. Beck discusses the forces binding the constituent parts of the nucleus of the atom and inquires into the reasons why two electrons are not emitted simultaneously in radioactive changes; he considers that this would involve the simultaneous occurrence of two neutrinos (neutrino and anti-neutrino).

The half-life periods and the maximum energy of the electrons emitted by a number of artificial radio-elements obtained by neutron bombardment are given by Prof. A. I. Alichanow, A. I. Alichanian and B. S. Dželepov. The authors point out that their findings do not agree with Fermi's theory of beta ray decay and do not fit in Sargent's diagram, which connects the maximum energy of emitted electrons with the disintegration constant.

In order to determine the velocity of slow neutrons, Dr. O. R. Frisch and E. T. Sørensen have investigated the effect of passing the neutrons through the marginal part of a rotating wooden disc, and observing the effect of the emerging neutrons upon boron-lined ionisation chambers at two different angles; the results indicate that a large part of the neutrons have velocities of the order of 200 metres per second, and further experiments with cadmium screens show that the main part of those neutrons which are strongly absorbed in cadmium have such thermal velocities.

Dr. E. Tschopp finds that androstendione surpasses other known male hormones in its action upon the growth of the sex organs of the male rat, though, as is the case with the testicular extract, its effect upon the growth of the capon's comb is inferior to that of androsterone. This and other evidence supports the view that androstendione is a constituent of the male hormone of the testes.

Thin films (mono-molecular) of myosin, a constituent of muscle protein, floating upon water solution, are expanded by potassium lactate at pH 7, and the expansion increases at higher pH (alkaline solutions). A. A. Moss, Jr., Prof. Eric K. Rideal and E. C. Bate Smith consider that these phenomena may throw some light on the changes which take place in the muscle, the lactate helping in the relaxation of the fibrils during recovery.

Hydrogen molecules are more readily dissociated by the impact of electrons moving parallel to the molecular axis, according to Prof. N. Sasaki and T. Nakao. The authors give a diagram of the apparatus used in measuring the angular distribution of the resulting ions.

The influence of a magnetic field upon the viscosity of an anisotropic liquid (*p*-azoxyanisole at 125°C.) has been re-determined by M. Miesowicz, from the damping effect upon an oscillating plate. He finds that the viscosity is increased 3.5 times by a magnetic field of 2,400 gauss.

Clover plants have been grown by Prof. P. W. Wilson in a closed system under pressures of 0.12–1.8 atmospheres. At pressures greater than atmospheric the development of plants appeared to be normal; between 0.20 and 1.00 atmosphere, stimulation of growth was evident. Below 0.20 atmosphere, development was restricted, apparently because of low pressures of oxygen available. At extremely low pressures occasional freak growths were encountered.

N. S. Bayliss describes the ultra-violet absorption spectrum of methyl iodide, photographed through 6.6 metres of the gas. The continuous spectrum was found to extend to at least λ 3600, and although no accompanying band system was found, the possibility of one cannot be entirely dismissed.