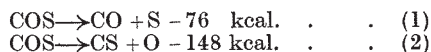


violet. This spectrum is interpreted as corresponding to the dissociation of the COS molecule, which was also indicated by the deposit of sulphur on the walls of the absorption tube. The products of dissociation may be CO and S, or CS and O. The energies of these processes as calculated from thermochemical data are:



The determined photochemical dissociation energy is 4.84 volts or 111 ± 1 kcal. and hence the dissociation must proceed according to (1). The difference between the observed and calculated dissociation energy is 35 kcal. and corresponds to the excitation energy of the sulphur atom, since the first excitation potential of the carbon monoxide molecule, as obtained from band spectra analysis, is 5.9 volts above the ground-level. The energy of 1.5 volts (35 kcal.) corresponds to the difference in energy between the 3p ground-level and the 1d metastable state, as the lowest possible excitation energy of the sulphur atom. The position of the latter term has not yet been established directly. Christy and Naudé¹ have recently suggested 1.6 volts from a study of the predissociation spectrum of the sulphur molecule. This is in excellent agreement with the above value.

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¹ Christy and Naudé, *Phys. Rev.*, **37**, 907; 1931.

Rotation of Molecules in Crystals

AN investigation on the relation between the crystal structure and optical properties of organic crystals has revealed further cases of 'rotating' and 'fixed' molecule forms in aliphatic compounds. A hexagonal rotating form has been observed between 16° and 24° C. in dodecyl alcohol $\text{C}_{12}\text{H}_{25}\text{OH}$. The distance between chains is 4.76 Å., corresponding to the 4.85 Å. found by A. Müller¹ for paraffins. The low temperature form, however, differs by being monoclinic with inclined chains corresponding to the high temperature form of the monobasic acids. The transitions between these forms could be followed for single crystals in the polarising microscope.

A non-rotating form of alkyl-ammoniohalide has been found for $\text{C}_{18}\text{H}_{37}\text{NH}_3\text{Cl}$. It is orthorhombic with a base 5.2 Å. \times 5.15 Å. as against 5.0² Å. for the tetragonal 'rotating' lower members studied by S. P. Hendricks and others,² but with the hitherto unobserved feature of four layers per cell in alternate pairs inclined approximately 48° to the *c* plane. This leads to a negative birefringence unlike that of all other long chain compounds.

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¹ NATURE, **129**, 436, March 19, 1932.

² *Ibid.*, **128**, 410; 1931.

Heat of Dissociation of Nitrogen

THE value of the heat of dissociation of nitrogen has formed a lively subject of controversy in the past few years. All values from 19 to 7 volts have been given by various workers for the dissociation potential. I have recently determined this value by examining the absorption spectrum of N_2O in a manner which has already been explained in my note on the spectrum

of SO_3 .¹ The value comes out to be 8.8 volts or 203 kcal.

The absorption spectrum of N_2O is perfectly continuous, with no trace of bands, as in most saturated compounds. From microphotometrical study of the absorption spectra taken at different pressures, I found that the absorption begins at $\lambda 2740$, corresponding to 104.4 kcal. Assuming that this corresponds to a photochemical breaking up of N_2O into NO and N (this assumption is supported by other arguments), and utilising other thermochemical data, the heat of dissociation comes out as 203 kcal. This value is in good agreement with the most recent results of Turner and Samson,² and Tate and Lozier,³ obtained by other methods, and is certainly the most accurate value of the heat of dissociation of N_2 obtained so far.

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Department of Physics,
Allahabad University,
March 31.

¹ Datta, NATURE, **129**, 317, Feb. 27, 1932.

² Turner and Samson, *Phys. Rev.*, **34**, 747; 1929.

³ Tate and Lozier, *Phys. Rev.*, **39**, 254; 1932.

Decomposition of Hydrogen Peroxide by Catalase

IN his recent statistical calculations on the decomposition of hydrogen peroxide by catalase, Prof. J. B. S. Haldane estimated¹ that the mean life of an active catalase-hydrogen peroxide molecule is about 10^{-7} second, and the velocity constant for the union of catalase and hydrogen peroxide exceeds 7×10^6 .

Work at present in progress, consisting of a comparison of the *photochemical* decomposition with the enzyme reaction, indicates that the latter may have to be regarded as a *chain reaction*, in which the active centres of the enzyme function only by starting the chains, which then continue in the bulk of the solution, or on other surfaces.

This view becomes more credible in the light of recent work by Allmand and Style, who conclude that even in dilute aqueous solutions of hydrogen peroxide "the photochemical, and hence presumably the thermal reaction, is a chain reaction", and "the reaction chains must be exceedingly long—of the order of 10^4 to 10^7 links".

According to this view, the inhibition of enzyme reactions may be due in some cases to the breaking of the reaction chains by the inhibitors, as in numerous photochemical reactions.

Zeile and Hellström have shown that iron-porphyrin compounds form the active centres in catalase, and, in 1931, I observed that the action of iron compounds in certain inorganic systems analogous to enzyme systems can best be explained by the chain-reaction hypothesis,² a view which was put forward independently by Prof. Haber a few weeks later.⁴

I conclude that in view of these facts a modification may have to be introduced into Prof. Haldane's interesting calculations on catalase.

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Dyson-Perrins Laboratory,
Oxford, May 12.

¹ *Proc. Roy. Soc.*, B, **108**, 559; 1931.

² *J.C.S.*, 621; 1930.

³ *Ber.*, **64**, 1240; 1931.

⁴ *Naturwiss.*, **22**, 450.

Electrochemical Periodicities

THE interesting observation of periodicity at a platinum anode in a solution of dilute sulphuric acid containing dissolved hydrogen, recently reported by Butler and Armstrong,¹ recalls an unpublished experiment which I made in 1927 during the course of a series of investigations of this subject.