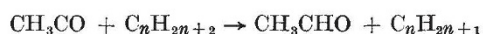


presence of acetaldehyde which we were able to estimate. These results suggest that the reaction



can occur in paraffinoid solution.

Aldehydes differ from ketones in that photo-decomposition according to type I occurs in solution at room temperatures, and further in that the gaseous products are for the most part the same as those in the gas phase. Thus in the case of acetaldehyde the main products are methane and carbon monoxide, with a slight excess of the former. Butaldehyde and isovaleraldehyde behave similarly giving practically equal volumes of carbon monoxide and saturated hydrocarbon. Both compounds decompose simultaneously according to types I and II, the proportion of each type being approximately the same as in the gas phase, and unchanged in the liquid between 20° and -80° C.

Since with aldehydes less than 2 per cent of hydrogen is found, and but little unsaturation is developed in the solvent, the mode of type I decomposition is strikingly differentiated from that of the ketones. Thus independent evidence is furnished for the conclusion at which we have already arrived³, that the hydrocarbon is produced from aldehydes mainly in one act, namely, $\text{RCHO} \rightarrow \text{RH} + \text{CO}$, whereas in ketones free radicals are first formed. This conclusion can also be shown to be in accord with the fact that, with ketones in solution, the type I decomposition is subject to a marked temperature coefficient, while with aldehydes it is not.

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¹ Norrish and Appleyard, *J. Chem. Soc.*, 874 (1934). Bamford and Norrish, *J. Chem. Soc.*, 1504 (1935).

² Norrish and Bamford, *NATURE*, **138**, 1016 (1936).

³ Norrish and Kirkbride, *J. Chem. Soc.*, 1518 (1932). Norrish, *Trans. Farad. Soc.*, **30**, 107 (1934); *Acta Physica Chemica URSS*, **3**, 171 (1935).

Elementary Cell and Space Group of Ethyl-chlorophyllide

CHLOROPHYLL itself prepared after Stoll¹ is amorphous, giving in X-ray photographs only one broad ring corresponding to a distance of 4.2 Å. However, by replacing the phytol group by the ethyl group, a crystallizable compound can be obtained. Ethyl-chlorophyllide was prepared from leaves of *Heracleum*, following also the method of Stoll. By evaporation from ethereal solutions small crystals, weighing about 2 γ, were obtained in the form of thin equilateral triangles. The crystal form was, as already remarked by Willstätter and Stoll¹, clearly trigonal hemiedric (symmetry class C_3).

X-ray diagrams with copper $K\alpha$ -rays were obtained by oscillation through various angles about the a -axis $[10\bar{1}0]$ and about $[11\bar{2}0]$, the a -axis being parallel to the side of the triangle.

The dimensions of the elementary cell are: $a = 8.90 \pm 0.02$ Å.; $c = 38.4 \pm 0.2$ Å. For the density, the value 1.11 as found for chlorophyll was taken. The number of molecules of $\text{C}_{32}\text{H}_{30}\text{ON}_4\text{Mg} \cdot \text{CO}_2\text{CH}_3 \cdot \text{CO}_2\text{C}_2\text{H}_5 \cdot \text{H}_2\text{O}$ (the crystals were most probably those of the a -component) contained in the

cell was thus found to be 2.7 or approximately 3; so the exact value of the density is 1.24.

The X-ray diagrams confirmed the presence of a threefold axis, with no symmetry plane through the c -axis or at right angles to this axis. So only the symmetry classes C_3 and C_{3i} are possible, the latter being improbable from the external form of the crystals. As only those reflections 000 l for which $l = 3n$ are found and, further, many of the reflections are inconsistent with a rhombohedral lattice, the space group will be one of the pair of enantiomorphic groups C_3^2 and C_3^3 . In these space groups the centres of the molecules, that is, the magnesium atoms, will be arranged in spirals around the c -axis.

A discussion of the observed intensities in relation to the shape of the molecules will be given later. We intend to investigate also the compounds derived from ethyl-chlorophyllide by replacing the magnesium atom by other bivalent metals such as copper and zinc.

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¹ Willstätter, R., and Stoll, A., "Untersuchungen über Chlorophyll" (Berlin, 1913).

Œstrous Reactions, including Mating, Produced by Triphenyl Ethylene

DODDS and his co-workers have described a number of synthetic substances with Œstrogenic activity.

We have found that 1.0 mgm. of triphenyl ethylene¹, dissolved in oil, produced full vaginal cornification when injected into ovariectomized mice. A dose of 10 mgm. injected in two doses on two successive days produced cornification lasting for some eight to nine weeks, and partial cornification was present for a further period. The injections also caused Œstrous distention of the uterus. Ten ovariectomized mice injected with 10 mgm. of the substance were placed with potent males and five of these have mated, as judged by the finding of vaginal plugs; one of these animals mated twice, namely, 5 and 15 days after the injections.

Œstrous changes in the uterus and in the vulva and also mating have been induced in each of two hypophysectomized rabbits.

Although the Œstrogenic activity of triphenyl ethylene, as estimated by vaginal cornification, is only about 1/10,000 that of œstrone, yet it can produce effects of remarkable duration, and its power to produce mating is also noteworthy.

The minimum amount of the substance necessary to produce vaginal cornification when given by mouth in solution of oil is approximately the same as when given subcutaneously. Larger doses given by mouth produce cornification lasting for about a week.

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¹ Klages and Heilmann, *Ber. deutsch. chem. Ges.*, **37**, 1455 (1904).