

is correct, and if the molecular configuration of the tetramethylplatinum tetramer is unaltered,¹ γ -parameters of all platinum positions are determined. Intensities of (0k0) reflections can then be calculated, and are in good agreement with observation (Table I). One could not achieve this agreement if the molecular structure of the tetramer were seriously altered by complexing with benzene.

TABLE I
INTENSITIES OF (0k0) REFLECTIONS

k	Intensity		k	Intensity	
	Obsd.	Calcd.		Obsd.	Calcd.
2	S	1475	16	M ⁻	75
4	M ⁺	641	18	O	0
6	O	0	20	O	12
8	W	173	22	M ⁻	325
10	S	1178	24	M ⁺	573
12	VS	1575	26	M ⁺	630
14	S ⁺	722			

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HYDROLYSIS OF THE α -1,6-GLUCOSIDIC LINKAGE IN ISOMALTOSE BY CULTURE FILTRATE OF *ASPERGILLUS NIGER* NRRL 330

Sir:

The α -1,6-glucosidic linkage in the amylopectin fraction of starch is resistant to hydrolysis by the action of the more common amylolytic enzymes. Inasmuch as the linkage between the two glucose residues in isomaltose is of the α -1,6 type, it was of interest to test the ability of a culture filtrate of *Aspergillus niger* NRRL 330 to hydrolyze this disaccharide. Isomaltose is now available in crystalline form. The sample of sugar used in these experiments was prepared from starch by the method of Montgomery, Weakley and Hilbert¹ and characterized as 6-(α -D-glucopyranosyl)- α -D-glucose monohydrate, rotating $+120^\circ$ in water (anhydrous). This particular strain of *A. niger* was selected because it elaborates, when grown in submerged culture, an enzyme capable of hydrolyzing maltose in large amounts.

To 20 ml. of 0.06 M isomaltose monohydrate, buffered at pH 4.4 (acetate buffer, 0.3 M), was added 10 ml. of culture filtrate. The reaction mixture was held at 50°. The extent of hydrolysis was measured at two and five hours by the increase in reducing power as determined by the method of Somogyi.² The glucose formed in the reaction mixture after five hours was identified biologically by "fermentation" at pH 8.8 with an excess of yeast by the procedure of Somogyi.³ A collection of some of our experimental data is given in Table I.

(1) Edna M. Montgomery, F. B. Weakley and G. E. Hilbert, *THIS JOURNAL*, **71**, 1682 (1949).

(2) M. Somogyi, *J. Biol. Chem.*, **160**, 61 (1945).

(3) M. Somogyi, *ibid.*, **119**, 741 (1937).

TABLE I

Reaction mixture no.	1	2	3	
Culture filtrate diluted	Un-	1:1 50%	1:3 25%	
Two hr.	Isomaltose hydr./ml. culture			
	filt., mg.	27.4	19.4	14.3
Five hr.	Hydrolysis, %	63.4	44.9	33.1
	Isomaltose hydr./ml. culture			
filt., mg.	39.0	35.1	29.0	
	Hydrolysis, %	90.2	81.2	67.1
"Fermentable" glucose per ml. cult.				
filt., mg.	37.5	33.0	25.7	

It will be noted that the undiluted culture filtrate hydrolyzed 90.2% or 39.0 mg. of the isomaltose per ml. of culture filtrate in five hours. The amount of fermentable glucose produced, 37.5 mg., per ml. of culture filtrate checks reasonably well with this figure. (The hydrolysis of isomaltose proceeds more slowly than the hydrolysis of maltose as indicated by the fact that 38.2 mg. of maltose is hydrolyzed per ml. of culture filtrate in one hour at 30°). In addition, the sugar formed in a reaction mixture identical to No. 1 in Table I, but incubated for six hours, was isolated as crystalline α -D-glucose monohydrate; $[\alpha]^{25}_D +47.8^\circ$ (c, 4 in water); m. p., 82.8°; yield, 83.4%.

Further work on characterization of the enzyme system responsible for the hydrolysis of isomaltose is in progress.

(4) Cf. Nat. Bur. Stand. Circ. No. C440, p. 728.

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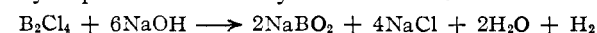
DERIVATIVES OF DIBORINE

Sir:

Although tetrachlorodiborane, B₂Cl₄, first prepared by Stock, Brandt and Fischer (*Ber.*, **58**, 855 (1925)) by striking an arc across zinc electrodes immersed in liquid boron trichloride, is a compound of considerable potential interest, the original preparative method gave such poor yields (about 1%) of material of such low purity (less than 90%) that detailed study of the compound was not feasible.

Much better results have now been obtained by passing gaseous boron trichloride at 1 to 2 mm. through a glow discharge established between mercury electrodes. The mercurous chloride and other non-volatile products remain in the discharge tube; the volatile material is passed through a -78.5° trap, which retains the tetrachlorodiborane and allows the unchanged trichloride to pass. The latter is repeatedly subjected to the action of mercury in the discharge tube, since the amount converted per pass is small. The yield, however, is approximately 50%. There is evidence that other less volatile boron-chlorine compounds are obtained.

Tetrachlorodiborane is completely hydrolyzed by aqueous sodium hydroxide at 70°.



Determination of the amounts of hydrogen, boron and chlorine in the hydrolysate of an unweighed sample by the usual methods gave the following results: H, 74.64 cc.; B, 0.0727 g.;