

XXI.—*Dibenzoylaniline and its Isomerides.*

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By the action of benzoyl chloride upon monobenzylaniline Gerhardt is known to have obtained a dibenzoylaniline crystallising in needles, and melting at  $136^{\circ}$ . By the action of benzoic acid upon phenyl thiocarbimide at  $130$ — $150^{\circ}$  Losanitch also obtained (*Berl. Ber.*, 1873, 176) a phenyldibenzoylamide crystallising in plates melting at  $155^{\circ}$ .

At the instance of Prof. Merz I undertook, while at Zürich, an investigation of this subject. In the repetition of the first-named

method I heated 18 grams of phenylbenzoylamide with 14 grams of benzoyl chloride at  $230^{\circ}$  in a flask attached to an upright condenser. At the expiration of three hours, the evolution of HCl having ceased, the mass was boiled with solution of sodium carbonate, and the residue treated with alcohol. From the alcoholic solution I obtained colourless needles melting at  $136^{\circ}$ . Heated in a sealed tube with dilute hydrochloric acid at  $120^{\circ}$  for four hours, the substance was completely decomposed into benzoic acid and aniline, by which result its constitution is established. Moreover it yielded on combustion 79.6 per cent. carbon (calculated for phenyldibenzoylamide 79.73); Gerhardt's results therefore are fully established. I next repeated Losanitch's work, heating 13 grams benzoic acid and 6 grams phenyl thiocarbimide at  $220^{\circ}$  for six hours in a flask as before (not in sealed tubes as recommended by Losanitch). The mass being further treated as above described, I obtained colourless plates melting at  $160^{\circ}$ . The products of resolution by dilute hydrochloric acid were as before, aniline and benzoic acid. I am therefore able to confirm the statements of Losanitch.

I may observe that it is necessary to guard against using the phenyl-thiocarbimide in excess. In an experiment in which this condition obtained, the product was a substance crystallising in needles melting at  $145^{\circ}$ , having the properties of a base, and containing sulphur. My next endeavour was to prepare an isomeride in which one of the benzoyl-groups should enter the aromatic nucleus. For this purpose I employed benzoyl chloride and phenylbenzoylamide in the ratio and under the conditions given for my first experiment, but with the addition of a few grams of zinc chloride. By subsequent treatment of the product of the reaction as before, I isolated a body crystallising in colourless plates melting at  $150^{\circ}$ . The combustion of this product gave the following percentages:—

		Calc. $C_6H_4(C_7H_5O).NH(C_7H_5O)$ .
C .....	79.27	79.70
H .....	5.51	4.98

That the constitution of this body is that of a phenylbenzoylbenzoylamide is proved by the results of its decomposition by dilute hydrochloric acid in the ordinary way, the products being benzoic acid and a solid base, which separated out on addition of potash to the liquid contents of the tubes. Recrystallised from alcohol it formed opaque white needles melting at  $123^{\circ}$ . The following are the results of its combustion:—

0.237 gram yielded 0.125  $H_2O$  and 0.688  $CO_2$ .

		Calc. $C_6H_4(C_7H_5O)NH_2$ .
C .....	79.16	79.18
H .....	5.82	5.58

No further proof is needed that this body is a benzoylphenylamine. It yields extremely characteristic salts. The sulphate crystallised in plates, and yielded on analysis the following results:—

- (1.) 0.361 gram gave 0.1716 BaSO<sub>4</sub>.  
 (2.) 0.263 „ „ 0.1240 „ „

Per cent.			
	(1.)	(2.)	Calc. (C <sub>13</sub> H <sub>11</sub> ON) <sub>2</sub> .SO <sub>4</sub>
SO <sub>4</sub> .....	19.68	19.61	19.67

The hydrochloride formed a crystalline magma. On analysis—

0.3945 gram gave 0.2306 AgCl.

	Calc. C <sub>13</sub> H <sub>10</sub> ON.HCl.
Cl .....	15.2

It also gave a crystalline platinochloride, which gave on ignition 24.38 per cent. Pt (calc. 24.48).

On concentrating the alcoholic solution from which the phenylbenzoyl-benzoylamide had crystallised, I obtained in small quantity a body crystallising in rhomboïdal plates and melting at 170°. On heating with dilute hydrochloric acid at 120°, it was resolved into benzoic acid and a solid base melting at 103°. This body was therefore an isomeric phenylbenzoyl-benzoylamide.

In conclusion I would briefly express my thanks to Profs. Merz and Weith for their kind advice and assistance in carrying out the above work.

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