

## AN ADDITION COMPOUND OF DIETHYLAMINE AND PHENYLBORIC ACID

Sir:

An addition compound has been prepared with diethylamine and phenylboric acid. It was expected that these should combine in a one to one ratio since boron trifluoride forms stable one to one addition compounds with ammonia or amines<sup>1</sup> and triphenylboron behaves in a similar manner.<sup>2</sup> Analyses, however, have shown that this substance contains three molecules of phenylboric acid to one of diethylamine.

This compound is readily prepared by allowing equal molal quantities<sup>3</sup> of the two substituents to react in anhydrous ether solution. There is a slight initial rise in temperature and after a few minutes a white solid (m. p. 85°) is precipitated. It is readily soluble in alcohol, acetone, benzene, chloroform, glacial acetic acid and dioxane, and sparingly soluble in diethyl ether, petroleum ether, water and carbon tetrachloride. When heated with water it decomposes, giving off diethylamine quantitatively.

The nitrogen content was obtained by heating the substance in dilute alkali and titrating the diethylamine which was volatilized with the vapors. It was observed that phenylboric acid could be titrated in the presence of glycerine just like boric acid itself, so the phenylboric acid (or possibly boric acid) residue in the Kjeldahl flasks was titrated in this manner. Independent boron analyses were obtained by heating the substance in bomb tubes with nitric acid, neutralizing the nitric acid to the methyl red end-point, and titrating the boric acid to the phenolphthalein end-point in the presence of glycerine.

Determination	Found, %		Calculated for (C <sub>6</sub> H <sub>5</sub> B(OH) <sub>2</sub> ) <sub>3</sub> ·(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> NH, %
Nitrogen	3.20	3.18	3.19
Boron from residue of N <sub>2</sub> analysis	7.63	7.37	7.40
Boron, Carius determination	7.21	7.28	7.40

It should be pointed out that these analyses do not preclude the possibility that this compound may have lost one molecule of water. This work is being continued.

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<sup>1</sup> Mellor, "Comprehensive Treatise on Inorganic and Theoretical Chemistry," Longmans, Green and Co., London, 1924, Vol. V, p. 122; Kraus and Brown, THIS JOURNAL, 51, 2690 (1929).

<sup>2</sup> Stock and Zeidler, *Ber.*, 54, 531 (1921); Krause, *ibid.*, 57, 813 (1924).

<sup>3</sup> It was first prepared in this manner since the one to one addition compound was expected.