THE DIRECT INTRODUCTION OF DEUTERIUM INTO BENZENE BY HIGH FREQUENCY CURRENT.

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It is known that deuterium can be directly introduced into benzene with heavy water at 200°C. in the presence of a metallic catalyst.[1] This method has been successfully applied by H. S. Taylor to the preparation of C_6D_6.[2]

We have found now that under the influence of the electromagnetic oscillator of high frequency deuterium can be introduced into benzene at room temperature, metallic catalyst being used.

In a vessel of 20 c.c. capacity with a flat bottom 0.25 c.c. of pure benzene was sealed together with 0.2 c.c. of 8% heavy water and 0.5 g. of platinum black prepared by reducing platinum chloride with formaldehyde. After the contents were subjected to the influence of high frequency wave for some time, the benzene was burnt and the formed water was analysed for the deuterium content.

In our first experiment the vessel was kept on a pole of a Tesla coil for ten hours and the benzene was found to have been shifted to 0.69% in the deuterium content. No temperature change was observed during the treatment. In the second experiment the vessel was kept between poles of the high frequency oscillator of 4 meter wave length. The vessel was cooled with water during the treatment. The deuterium content of the benzene was 0.41%.

Benzene was also treated similarly with ordinary water and it was found that physical constants were unaffected within the limit of the experimental errors: the density and the freezing point agreed with those of untreated benzene within 10^{-4} and 1/10°C. respectively.

It was found that even under the influence of the high frequency oscillator the exchange reaction did not take place without the catalyst. Further studies on the introduction of deuterium into organic compounds by this simple method will be carried on in our laboratory.

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1) J. Horiuti and M. Polanyi, *Nature*, **134** (1934), 377; *Trans. Faraday Soc.*, **30** (1934), 1164.

2) P. I. Bowman, W. S. Benedict, H. S. Taylor, *J. Am. Chem. Soc.*, **57** (1935), 960.