

traene (C. O. T.) in the photopolymerization products of acetylene and a theory on the mechanism of its formation have already been reported.⁽¹⁾ Extending this to the thermal polymerization, the author found C. O. T. here also in the products. Reppe,⁽²⁾ too, supposed that it might exist in the thermal polymerization products, but he failed to demonstrate it.

The apparatus, the analysis of C. O. T., and others were the same as in the former experiment, except that an electric furnace (12 cm. in length) was used in place of a mercury lamp. The linear flow rate of acetylene through the reaction tube was maintained at 2.6 cm. /

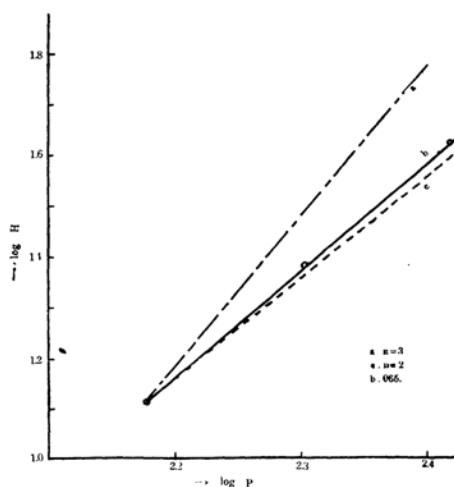


Fig. 1.—H: Rate of formation of C.O.T.
P: Pressure of acetylene.

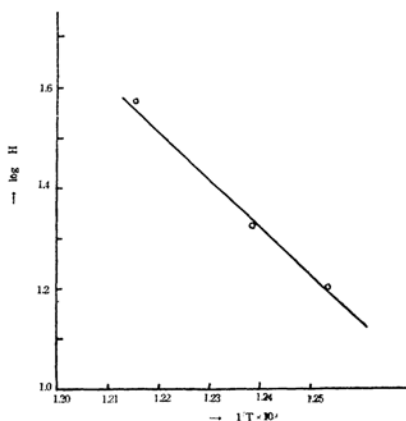


Fig. 2.—H: Rate of formation of C.O.T.
1/T: Reciprocal of the temperature
°K.

The Formation of Cyclooctatetraene in the Thermal Polymerization of Acetylene

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(Received April 28, 1953)

The success of the detection of cyclooctate-

(1) Z. Kuri and S. Shida, *This Bulletin*, **25**, 116 (1952).
(2) J. W. Reppe, *Acetylene Chemistry* (P. B. Report 18852-s) p. 151 (1945).

sec. (A) The pressure was changed from 150 to 250 mm.Hg. The temperature was kept constant at 550°C. Fig. 1 shows the logarithm of the rate of C. O. T. formation (expressed in the height, mm, of the polarographic diffusion current) vs. the logarithm of pressure of acetylene, where $n=2$ and $n=3$ means the second and the third order reaction, respectively, in respect to acetylene. The slope indicates the reaction to be practically of the second order. (B) The temperature was changed from 525° to 550°C. The pressure of ace-

tylene was kept constant at 250 mm.Hg. Fig. 2 shows the logarithm of the rate of C. O. T. formation vs. the reciprocal of the temperature. From the slope one gets the activation energy of C. O. T. formation, 44.3 Kcal. Details of the experiment and the reaction mechanism will be published later. The author is grateful to Dr. S. Shida for his helpful discussion.

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