

phenyl-1,2,3,4-tetrahydronaphthalene. This carbinol is identical with that made three years ago. The addition of a few drops of concentrated hydrochloric acid to a solution of the carbinol in ethanol caused the immediate precipitation of 1,2-diphenyl-3,4-dihydronaphthalene melting at 76°. After three weeks this material changed completely to the high melting form.

My explanation would be that these two forms are physical isomers, and Dr. Bergmann got the high melting form. I got the low melting, less stable form, both at Minnesota and at Vassar, and it is gradually changing to the more stable form after three years.

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RECEIVED OCTOBER 8, 1941

THE INTRODUCTION OF TERTIARY BUTYL GROUP INTO ETHYL ACETOACETATE BY MEANS OF BORON TRIFLUORIDE

Sir:

It was shown recently¹ in this Laboratory that ethyl acetoacetate is alkylated by isopropyl alcohol or ether in the presence of boron trifluoride. Other alkylations effected by boron trifluoride were also described recently.² It has now been shown that ethyl acetoacetate is alkylated by

(1) Hauser and Breslow, *THIS JOURNAL*, **62**, 2389 (1940).

(2) Hauser and co-workers, Ninth National Organic Chemistry Symposium, December 29-31, 1941, Ann Arbor, Michigan.

t-butyl alcohol or *t*-butyl ethyl ether in the presence of boron trifluoride. This reaction should be of special value because of the well-known difficulty of introducing tertiary alkyl groups into active methylenic compounds by the common method in which a base is employed.

In a typical experiment, a mixture of 0.5 mole of *t*-butyl alcohol and 0.5 mole of ethyl acetoacetate was saturated with boron trifluoride at 0°. After standing for six hours at room temperature, the reaction mixture was worked up essentially as described previously.¹ Thirteen grams (14%) of alkylated β -keto ester boiling at 101-102° at 20 mm. was obtained. In this experiment an ester-alcohol exchange apparently occurred, the product analyzing for *t*-butyl α -*t*-butylacetoacetate (*Anal.* Calcd. for C₁₂H₂₂O₃: C, 67.25; H, 10.34. Found: C, 67.38; H, 10.40). The *t*-butyl derivative on ketonic hydrolysis yielded methyl neopentyl ketone which was identified as the semicarbazone and 2,4-dinitrophenylhydrazone.

These experiments will be described in greater detail later. It seems quite likely that the yield of the *t*-butyl derivative can be improved. Studies are now in progress on the introduction of various tertiary alkyl groups into various active hydrogen compounds by means of boron trifluoride or other acidic reagent.

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RECEIVED FEBRUARY 19, 1942

NEW BOOKS

An Introduction to Organic Chemistry. BY ROGER J. WILLIAMS, Ph.D., D.Sc., Professor of Chemistry, the University of Texas. Fourth edition. D. Van Nostrand Company, Inc., 250 Fourth Avenue, New York, N. Y., 1941. xiii + 628 pp. Illustrated. 14 × 22.5 cm. Price, \$4.00.

Old friends of this time honored text will be pleased to note that it has been brought up to date without essential change either in the character of the subject matter or in its organization. Electronic structure has been stressed to a somewhat greater extent but aspects of the subject involving more advanced training in physical chemistry than the average student usually has, are omitted. Although considerable statistical information is given, detailed discussion of industrial processes is not included.

The work remains, then, neither an advanced theoretical treatise nor a compendium of information, but, true to its title, a well constructed and clearly presented introduction to organic chemistry.

C. E. BOLSER

Industrial Instruments for Measurement and Control. By THOMAS J. RHODES, Engineer, The Procter and Gamble Company. First edition. McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York, N. Y., 1941. ix + 573 pp. 282b figs. 15.5 × 23.5 cm. Price, \$6.00.

This addition to the "Chemical Engineering Series" gives an excellent description of the design and a discussion of the theory of instruments for measuring, recording and