PEROXIDE-CATALYZED ADDITION OF IODOFORM TO OLEFINS

Sir:

In a recent publication[1] Kharasch and coworkers described the peculiar observation that in the peroxide-catalyzed addition of chloroform to olefins the carbon–hydrogen bond of the former is broken and the $\cdot CCl_3$-radical attached to the terminal carbon atom of the olefin, whereas bromoform is split at a carbon–bromine linkage. Therefore, in the addition of bromoform the $\cdot CHBr_2$—group attacks the terminal methylene group of the olefin.

We wish to report analogous observations which we have made during the last year on the behavior of iodoform. Limonene and iodoform, in a molar ratio of 2:1, reacted under the influence of acetyl peroxide to yield a 1:1-addition product in 35% yield, b.p. 75° (25 mm.).

Anal. Calcd. for $C_{11}H_{17}I_3$: C, 24.9; H, 3.2; I, 71.8. Found: C, 24.6; H, 3.2; I, 72.1.

That iodoform added as CHI_2- and I-radicals is indicated by the presence of *one* iodine atom which can be titrated with alcoholic silver nitrate and which can be removed by reduction over Adams catalyst to give a di-iodo compound of b.p. 70° (30 mm.).

Anal. Calcd. for $C_{11}H_{20}I_2$: C, 32.5; H, 4.9. Found: C, 32.7; H, 4.6.

Hydrolysis experiments of the iodoform-addition product gave, however, complex and unexpected results, which will be reported in a comprehensive paper in THIS JOURNAL.

Allyl benzoate likewise forms with iodoform a 1:1-addition product, which cannot be purified but which can be hydrolyzed by refluxing with ethanolic sodium hydroxide. Under these conditions the benzoyl group remains untouched, but all the iodine atoms are removed to yield an aldehyde, b.p. 70° (10 mm), characterized by formation of a crystalline 2,4-dinitrophenylhydrazone of m.p. 193–194°.

Anal. of the aldehyde. Calcd. for $C_{11}H_{10}O_3$: C, 69.5; H, 5.3; mol. wt., 190. Found: C, 69.0; H, 5.3; mol. wt., 182.

Anal. of the 2,4-dinitrophenylhydrazone. Calcd. for $C_{17}H_{14}O_6N_4$: N, 15.1. Found: N, 14.9.

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[1] Kharasch, Jensen and Urry, THIS JOURNAL, **69**, 1100 (1947).

NEW BOOK

Nuclear Physics Tables, by J. MATTAUCH, Kaiser Wilhelm-Institut für Chemie, Berlin–Dahlem, and **An Introduction to Nuclear Physics**, by S. FLUEGGE, Kaiser Wilhelm-Institut für Chemie, Berlin–Dahlem. Translated from the German by EUGENE P. GROSS and S. BARGMANN. Published and Distributed in the Public Interest with the Consent of the Alien Property Custodian under License No. A-1136. Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y., 1946. 173 pp. + 28 figs. + 8 plates. 20 × 28 cm. Price, $12.00.

This volume is an authoritative survey of the properties of stable and radioactive nuclei and of the phenomena associated with nuclear transformation. About two-thirds of the space is devoted to Fluegge's concise textbook presentation of the main features of nuclear science with emphasis on experiment and its interpretation. The remainder of the space is devoted to Mattauch's comprehensive tables of nuclear properties and nuclear reactions, with more than a thousand references giving complete literature coverage until the middle of 1941.

The textbook on nuclear physics is an outstanding contribution to the modern technical literature. The approach is distinctive, and the point of view fresh and modern. Understandable qualitative coverage is given to a large number of relevant topics in the small monograph, with a judicial choice of quantitative derivations and correlations. Some difficult concepts are presented effectively with the aid of an appeal to scientific intuition rather than with the esoteric theoretical development so often used in texts on the subject.

The properties of stable nuclei are presented first, with adequate coverage of mass spectrography, packing fraction, and mass defects, and of the role of nuclear mass, spin, magnetic moment, and electrical dipole moment in nuclear and atomic physics. The phenomena associated with nuclear reaction are presented from a general standpoint with good sections on the yields of nuclear reactions with high speed charged projectiles (Gamow factor) and with slow neutrons. The section on unstable nuclei is brief but generally to the point. The application of the Gamow theory to the phenomenon of alpha decay is good, as is the qualitative picture of the Fermi theory of beta decay and the Yukawa extension to include meson interactions in the nucleus, and the pictures of K-capture and of isomeric transition. Chemists will be interested in the last section on Systematics of Stable Nuclei for the existence rules, abundance rules, and the general equation for binding energy as a function of mass number and nuclear charge.

Quantitative discussion of the distribution of energies in beta decay is missing in the section on radioactivity, as is a discussion of range-energy relations of electrons or beta rays, treatment of specific problems of alpha, beta, and gamma counting, the problem of internal conversion of gamma rays, and the use of nuclear energy equations to predict decay energies of nuclei. Since the text was not designed to serve as a detailed introduction to laboratory investigations in nuclear science, similar omissions will be noted in the other sections. No literature citations or general references are given, and an index is lacking.

The specific data of nuclear physics are given in six