Evidently the chemical proof of structure[2] of our isopropylthiophene (based on the oxime and *p*-nitrophenylhydrazone of 2-isopropyl-5-acetylthiophene[3]) accounted for only the major component (*ca.* 75%) of the mixture.

(3) Scheibler and Schmidt, *Ber.*, **54**, 139 (1921).

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The Apparent Ionization Constants of Acethydrazide and Glycylhydrazide

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In considering the reactions of glycylhydrazide with nitrous acid[2] the apparent ionization constants of acethydrazide and glycylhydrazide have been determined at 24 ± 1° and 25 ± 2°, respectively. With the former compound potentiometric titration of approximately 0.1 formal solutions, which were also 0.05, 0.10 or 0.20 formal in sodium chloride, with standard hydrochloric acid indicated that pK'_{A} was independent of the ionic strength over the range studied and had a value of 3.24 for the reaction

$$[CH_3CONHNH_3]^+ \rightleftharpoons CH_3CONHNH_2 + [H]^+$$

The titration data for glycylhydrazide, obtained as described below, were evaluated by the method of Britten[3] because preliminary calculations indicated that the two constants were not sufficiently separated to permit evaluation on the basis of assumed non-interaction. pK'_{A_1} was found to have a value of 2.38 and pK'_{A_2} a value of 7.69. From these data and those available for other derivatives of glycine[4] it is not unreasonable to assume that $pK_{A_1} = 2.38$ for the reaction

$$[H_3NCH_2CONHNH_3]^{++} \rightleftharpoons [H_3NCH_2CONHNH_2]^+ + [H]^+$$

and $pK'_{A_2} = 7.69$ for the reaction

$$[H_3NCH_2CONHNH_2]^+ \rightleftharpoons H_2NCH_2CONHNH_2 + [H]^+$$

since the ionization constants of all the simpler α-amino acid esters and amides are in the neighborhood of $pK'_{A} = 7.7$.[4] The greater acidity of the hydrazinium group in the doubly protonated glycylhydrazide relative to the singly protonated acethydrazide appears to be a logical consequence of the presence of the positively charged ammonium group in the former compound though the difference ($\Delta pK = 0.86$) is only approximately one-half of that obtaining in the case of $[CH_3CH_2CH_2NH_3]^+ - [NH_3CH_2CH_2CH_2NH_3]^{++}$ ($\Delta pK = 10.6 - (8.6 + 0.3) = 1.7$) if 0.3 is added to the observed pK'_{A_1} of the latter species to correct for a statistical factor of two.[5]

Experimental

Reagents.—Acethydrazide, prepared from redistilled ethyl acetate and 85% hydrazine[6] was recrystallized twice from an ether–chloroform mixture and dried over potassium hydroxide. Glycylhydrazide was prepared essentially as described by Curtius and Levy,[2] the product recrystallized as described above and dried over phosphorus pentoxide.

Procedure.—Solutions were prepared which were approximately 0.10 formal in acethydrazide or 0.05 formal in glycylhydrazide and 0.05, 0.10 or 0.20 formal in sodium chloride. Five-ml. aliquots of these solutions were titrated with standard 0.10 normal hydrochloric acid using a Beckman Model G *p*H meter equipped with a Beckman type E glass electrode. In every case the *p*H meter was calibrated against a standard buffer solution before a titration.

Results.—With acethydrazide five determinations using solutions 0.20 formal in sodium chloride gave a value for pK'_{A} for the first half of the titration curve of 3.21 ± 0.10; five determinations using solutions 0.10 formal in sodium chloride a value of 3.25 ± 0.10; and three determinations with solutions 0.05 formal in sodium chloride a value 3.23 ± 0.05. The average of all determinations was 3.24. With glycylhydrazide the following values were obtained for pK'_{A_1} and pK'_{A_2} in the order named: with 0.2 formal sodium chloride 2.38 and 7.68, 2.36 and 7.68; with 0.1 formal sodium chloride 2.42 and 7.68, 2.40 and 7.73; and with 0.05 formal sodium chloride 2.36 and 7.69; 2.38 and 7.67. The average of all of the above was pK'_{A_1} 2.38 and $pK'_{A_2} = 7.69$.

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(1) Present address: Department of Chemistry, University of California at Los Angeles.

(2) T. Curtius and L. Levy, *J. prakt. Chem.*, **70**, 89 (1904).

(3) H. T. S. Britten, "Hydrogen Ions," 3rd edition, Vol. I, Van Nostrand, New York, N. Y., 1943, pp. 197–200.

(4) E. J. Cohn and J. T. Edsall, "Proteins, Amino Acids and Peptides," Reinhold Publ. Corp., New York, N. Y., 1943.

(5) The authors are indebted to Dr. J. T. Edsall for bringing this relation to their attention.

(6) T. Curtius and T. S. Hoffman, *J. prakt. Chem.*, **53**, 513 (1896).

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The Preparation of 2-Nitro-3,4-xylenol

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A need for 2-nitro-3,4-xylenol, for which no preparation has been described, prompted its synthesis in this Laboratory. The method selected was the sulfonation of 3,4-xylenol in the 6-position and nitration in the 2-position, followed by desulfonation. The well-known exchange of nitro- for sulfo-group during nitration of phenolsulfonic acids occurred here, and some 2,6-dinitro-3,4-xylenol was always formed. However, by varying the temperature and the amounts of nitric and sulfuric acids used, conditions were found which permitted yields of 40% to be obtained.

It was observed that the 2,6-dinitro-3,4-xylenol, m.p. 125–126°[2] separating during nitration carried 2-nitro-3,4-xylenol with it to form a molecular compound, m.p. 67–68°. The presence of 2-nitro-3,4-xylenol here indicates that the reaction conditions bring about nitration and some desulfonation without introducing a second

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(1) This note was taken from the thesis submitted by Walter S. Pelton to the Committee on Graduate Study of the University of Tennessee in partial fulfillment of the requirements for the M.S. degree.

(2) Datta and Varma, THIS JOURNAL, **41**, 2039 (1919).