Anal. Calcd. for $C_6H_6O_4(CNS)_6$: N, 17.14. Found: N, 17.05.[1]

The synthesis of this addition compound of kojic acid was the result of an attempt to prepare the 6-thiocyanokojic acid.

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RECEIVED MARCH 18, 1947

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[1] Analysis by Dr. Carl Tiedcke.

COMMUNICATIONS TO THE EDITOR

INFRARED SPECTRA AND STRUCTURE OF NATURAL AND SYNTHETIC POLYPEPTIDES

Sir:

We wish to report the main features of the infrared spectrum that we have obtained of a synthetic polypeptide recently prepared by Woodward and Schramm.[1] There is a very close resemblance between this spectrum and that of a film of denatured keratin,[2] as can be seen from Fig. 1.

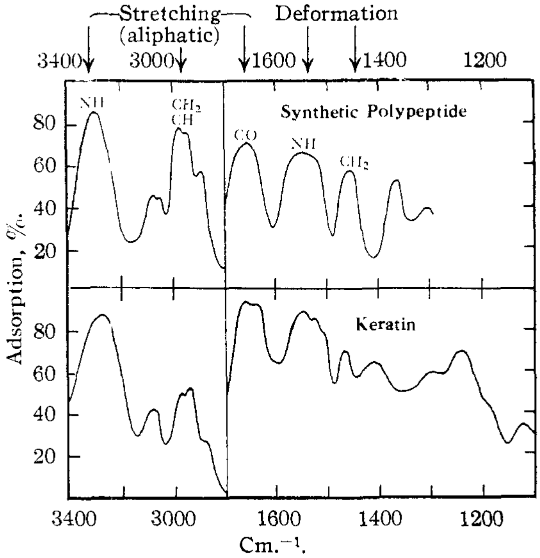

Fig. 1.—Infrared aborption spectra of Woodward and Schramm: synthetic polypeptide, and of keratin, 3400–1100 cm.$^{-1}$.

The interpretation of the principal bands is indicated on the curves. At the high frequency end of the spectrum the strong band at 3300 cm.$^{-1}$ arises from the stretching vibration of the NH bond. Its position and width show that the hydrogen atom is loosely bonded, presumably to the oxygen atom of the C=O group in a neighboring chain. The group of bands between 2970 and 2880 cm.$^{-1}$ arise from stretching vibrations of the CH groups in the methylene group and the "lone" CH of the side chain. The band at 1650 cm.$^{-1}$ arises from the C=O of the peptide link, while that at 1550 cm.$^{-1}$ is due to the deformation vibration of the NH group. The band at 1450 cm.$^{-1}$ is due to a well-known deformation vibration of the CH_2 group. The weak band near 3060 cm.$^{-1}$ is partly due to the CH stretching frequencies of the phenyl group but is also connected either with the NH or the C=O since it is associated with hydrogen with hydrogen bonding effects in simple amides.

The great similarity with the spectrum of keratin is thus fully explained and the fact that differences begin to appear only at frequencies below 1450 cm.$^{-1}$ is just what might be expected since it is in this region that skeletal and other frequencies characteristic of the residues in the polypeptide chain will occur. Indeed this illustrates another very important aspect of the use of these new synthetic polypeptides for by comparison with the spectrum of the parent amino acid it should be possible to identify with certainty the frequencies characterizing the residue of a given amino acid in a protein. We have found that this is not feasible with the smaller polypeptides hitherto available (*e. g.*, leucylglycylglycine) where the end groups still dominate the spectrum.

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[1] Woodward and Schramm, THIS JOURNAL, **69**, 1551 (1947). We thank Professor H. Mark for a small sample of this material supplied to him by Professor Woodward.

[2] Kindly supplied by the Wool Industries Research Association.

SYNTHESIS AND STRUCTURE OF TETRAHYDROPYRETHROLONE

Sir:

LaForge and Soloway[1] assigned the α-ketol structure (Ia) to the synthetic hydroxydihydrocinerone not identical with natural *dl*-dihydrocinerolone and proposed the β-ketol structure (IIa) for the other synthetic isomer identical with racemic natural material. Assignment of these structures was based on reinterpretation of earlier experimental evidence and on rational interpretation of the reactions employed, with the belief that N-bromosuccinimide characteristically brominates on the allylic position.[2] N-

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[1] LaForge and Soloway, THIS JOURNAL, **69**, 186, 979 (1947).

[2] Ziegler, *et al.*, *Ann.*, **551**, 80 (1942).