

in various properties. From these results the structure of the photodecomposition product was established as 2,4,7-trihydroxy-6-methylpteridine (III) and consequently it is more likely that the V compound has the structure (IV).

The writers wish to express their grateful thanks to Prof. A. Albert, who recently visited this laboratory and gave valuable advices. Incidentally, the present work was reported by S. Kuwada, who is a member in charge of this series, at the Vitamin Committee meeting held on December 7, 1957.

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Characteristic Infrared Absorption Band of Organic Sulfate Esters

Organic sulfate esters are being taken up with increasing interest in medicine, biochemistry, and other fields but their characteristic absorption bands in the infrared region have not been clarified as yet.

The present writer measured the infrared absorption spectrum of monopotassium methyl sulfate in the region of $4000\sim 350\text{ cm}^{-1}$. By the consideration of Raman spectral data for alkyl sulfites of Simon and others,¹⁾ the absorptions at 1252 and 1215 cm^{-1} were assigned to $\nu(\text{SO})_{\text{deg.}}$, at 1183 and 1156 cm^{-1} to $\rho(\text{CH}_3)$, at 1063 cm^{-1} to $\nu(\text{SO})_{\text{sym.}}$, at 1022 to $\nu(\text{CO})$, at 750 cm^{-1} to $\nu(\text{S-O})$ of S-O-C bond, at 617 cm^{-1} to $\delta(\text{SO})$, at 576 and 562 cm^{-1} to $\delta(\text{SO})_{\text{deg.}}$, and that at 440 cm^{-1} to $\delta(\text{OSO})$.

Further, infrared absorption spectra of monopotassium salts of ethyl, butyl, propyl, isopropyl, isoamyl, cyclohexyl, benzyl, *p*-cresyl, and *p*-nitrophenyl sulfates were compared with the absorption of corresponding alcohols and phenols, and it was confirmed that the characteristic absorption bands of organic sulfate monoesters appeared at $1240\sim 1260\text{ cm}^{-1}$ ($\nu_{\text{S-O}}_{\text{deg.}}$), $1200\sim 1220\text{ cm}^{-1}$ ($\nu_{\text{SO}}_{\text{deg.}}$), $1040\sim 1070\text{ cm}^{-1}$ (ν_{SO}), $750\sim 800\text{ cm}^{-1}$ (ν_{SOC}), $615\sim 650\text{ cm}^{-1}$ ($\delta_{\text{SO}}_{\text{sym.}}$), and at $550\sim 590\text{ cm}^{-1}$ ($\delta_{\text{SO}}_{\text{deg.}}$) (two bands).

Infrared absorption spectra in the region of $4000\sim 350\text{ cm}^{-1}$ were also measured of sulfate esters of polysaccharides such as those of glucose, cellulose, hydroxycellulose, starch, and of heparin, charoninsulfuric acid, and chondroitinsulfuric acid. The presence of an organic sulfate monoesters in the urine, as a result of detoxication, was also detected by spectral measurements. Detailed reports on this work will be published in the near future.

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1) A. Simon, H. Kriegsmann: Chem. Ber., **89**, 1718, *et seq.* (1956).