

corporation in the sulphate group of the chondroitin sulphuric acid obtained, when labelled sodium sulphate is added to slices of cartilage in about equivalent concentrations and under otherwise identical conditions. It was found that in the latter case the content of isotope was many times higher, as has been shown elsewhere<sup>2</sup>. At present, it is impossible to state whether these findings reflect a real difference in the speed of exchange of the acetyl groups and of the sulphate groups or whether the difference in the content of isotope found is merely due to different sizes of the sulphate and acetyl pools.

In addition, the course of the curves reproduced in the figure, indicating a considerably higher rate of uptake at the end of the experiment, differs from that of the curves representing the exchange of sulphate in the chondroitin sulphuric acid, which is almost linear during the first 20 hours. The cause of this discrepancy has not been investigated. The possibility that the increase in the C<sup>14</sup> incorporation found in the later part of the former curve may be due to bacterial influence cannot be completely ruled out.

The authors wish to express their thanks to Professor Erik Jorpes for valuable discussions and stimulating advice during the work.

This investigation has been aided by grants from the *Rockefeller Foundation*, the *Swedish Medical Research Council*, the *Knut and Alice Wallenberg Foundation*, and the *Vitrum Company*, Stockholm.

1. Boström, H., and Månsson, B. *J. Biol. Chem.* **196** (1952) 483.
2. Boström, H., and Månsson, B. *Arkiv Kemi, in press.*
3. Krebs, H. A., and Henseleit, K. *Z. physiol. Chem.* **210** (1932) 33.
4. Phares, E. F. *Arch. Biochem. and Biophys.* **33** (1951) 173.

Received November 5, 1952.

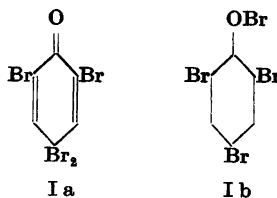
## Studies on Quinones and Hydroquinones. IV\*. A Note on the Structure of Tribromophenol Bromide

KARL ERIK ALMIN and BENGT LINDBERG

*Papperstekniska Avdelningen, Svenska Träforskningsinstitutet*  
and

*Organisk-kemiska Institutionen, Kungl. Tekniska Högskolan, Stockholm, Sweden*

It is possible to propose alternative structures, containing either a carbonyl group or with the hypobromite configuration, for the substances obtained by the bromination of certain quinones, with bromine methanol<sup>1</sup>. A simple substance for comparison is tribromophenol bromide for which two structures, the one (I a) quinonoid and the other (I b) a phenyl hypobromite, have been suggested. Elston, Peters and Rowe<sup>2</sup> investigated analogous polyhalo derivatives and found that the



ultraviolet absorption spectra supported the quinonoid structure. Recently Yasnikov and Shilov<sup>3</sup> studied the reaction between tribromophenol and bromine water containing radioactive Br, and concluded that tribromophenol bromide should have the quinonoid structure (I a). We have now determined the infrared absorption spectrum of tribromophenol bromide (Fig. 1). The two bands at 5.97  $\mu$  and 6.31  $\mu$  are due to the C = O group and the C = C

\* Part III. *Acta Chem. Scand.* In the press.

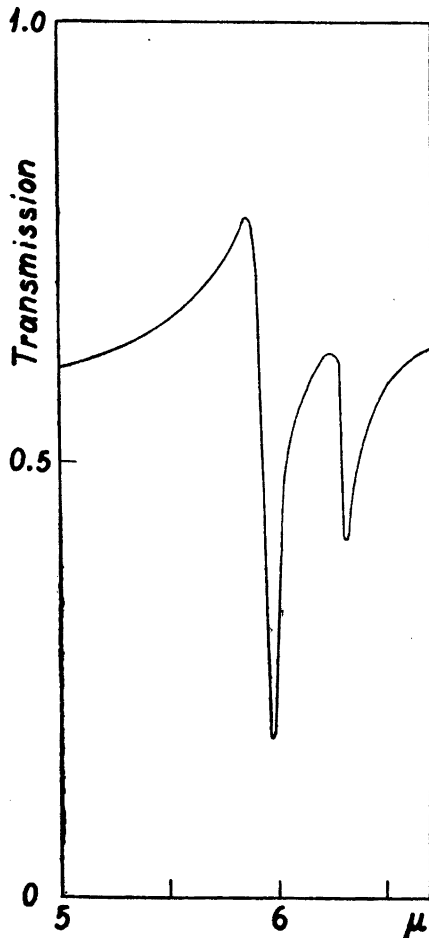


Fig. 1. Infrared spectrum of tribromophenol bromide.

bonds, respectively, and are very close to the corresponding bands in the spectra of quinone and 2,6-dimethylpyrone, in which the C = O bands are found at 6.01  $\mu$  and 5.99  $\mu$  and C = C bands at 6.28  $\mu$  and 6.21, 6.27  $\mu$ <sup>4</sup>. Thus the infrared spectrum of tribromophenol bromide furnishes conclusive evidence for the quinonoid structure (I a).

**Experimental.** The tribromophenol bromide was prepared in the usual manner and

purified by crystallization from chloroform. The infrared absorption spectrum was determined, using freshly crystallized material in paraffin oil paste, with a Perkin Elmer infrared spectrometer, Model 12 C, with 67° calcium fluoride prism.

One of us (B. L.) wishes to thank *Statens Naturvetenskapliga Forskningsråd* for financial support.

1. Lindberg, B. *Unpublished results*.
2. Elston, C. H. R., Peters, A. T., and Rowe, F. M. *J. Chem. Soc.* **1948**, 367.
3. Yasnikov, A. A., and Shilov, E. A. *Doklady Akad. Nauk. U.S.S.R.* **78** (1951) 925; *Chem. Abstracts* **46** (1952) 5009.
4. Randall, H. M., Fowler, R. G., Fuson, N., and Dangel, J. R. *Infrared determination of organic structures*, New York 1945.

Received December 4, 1952.

### An Observation on the Parameter $\alpha$ of the Debye-Hückel Formula

JARNE ELLILÄ

*Chemical Institute, University of Helsinki, Helsinki, Finland*

The writer has investigated the dissociation of acetic acid in water solutions of strong 1-1 electrolytes. In this report part of the results obtained is presented.

The investigation was carried out by a method developed by Kilpi<sup>1</sup>. The method is based on potentiometric titration of a weak acid with a strong hydroxide, and from the buffer capacity determined at one of the inflexion points of the titration curve the corresponding dissociation constant can be calculated. Eleven different salts were used as electrolytes. The concentrations used are expressed in moles of salt per liter of solution.

From the observations it was found that the negative logarithm of the dissociation constant, pK of acetic acid is an additive