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A Spectrophotometric Method of Studying Hemoglobin and Other Colored Substances in Solution

George E. Davis
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A theoretical expression is derived for the thermo-electric power of polycrystalline zinc in terms of the principal thermo-electric powers of the component crystals.

STATE UNIVERSITY OF IOWA,
IOWA CITY, IOWA.

A MICROPHOTOMETER FOR THE STUDY OF SPECTOGRAMS

I. J. GWINN

A modification of Harrison's microphotometer has been developed, following his suggestion, which is used for accurate measurements of line widths on spectrograms. A vertical optical system using microscope lenses focuses the light on a bismuth-silver thermocouple. Accurate readings of length are obtained with a finely constructed micrometer screw.

Studies have also been made on the relative intensities of lines on both optical and X-ray spectrograms. The instrument is also of use in testing the uniformity of thin films of metal.

STATE UNIVERSITY OF IOWA,
IOWA CITY, IOWA.

A SPECTROPHOTOMETRIC METHOD OF STUDYING HEMOGLOBIN AND OTHER COLORED SUBSTANCES IN SOLUTION

GEORGE E. DAVIS

An investigation was carried out to determine the possibilities of applying spectrophotometric methods to the problem of estimating the cencentration of hemoglobin in blood. The concentration of a substance in solution can easily be determined from its transmission of some particular wave length, providing the absorption ratio for that wave length is known. A late model direct reading spectrophotometer was used. The method was found to be fairly accurate and simple and should prove valuable in other physical investigations involving the study of spectral transmission curves of various colored substances.

Some interesting irregularities in the shape of the spectral transmission curve in one of the absorption bands of oxyhemoglobin were observed.

These investigations were carried out under the direction of

Professor Charles Sheard in the Section of Physics at the Mayo Clinic, Rochester, Minnesota.

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MOLECULAR SPACE ARRAY IN X-RAY DIFFRACTION HALOS IN A LIQUID: THE CASE OF LIQUID NORMAL PRIMARY ALCOHOLS: THE CYBOTATIC STATE

G. W. STEWART AND ROGER M. MORROW

For more than a decade (Debye and Scherrer, Nachr. Gesell. Göttingen (1916), p. 6) the X-ray circular diffraction halo in liquids has been known. Doubtless numerous times the suggestion has been made (vide Hewlett, Phys. Rev. 20 (1922), p. 688, and others) that there is in the liquid a spacial arrangement of molecules, probably as fragmentary crystals. But definite evidence of such a structure has been lacking. The authors have investigated by means of $M_oK\alpha$ x-radiation the liquid normal primary alcohols from ethyl to lauryl and have obtained the following:

1. There are two significant distances determined by diffraction intensity peaks.

2. One of these distances remains fairly constant, varying from 4.6 Å with lauryl, $C_{11}H_{23}(OH)$, to 4.4 Å with butyl, $C_4H_9(OH)$, and then decreasing more rapidly to methyl, $CH_3(OH)$, 3.8 Å.

3. The other distance varies linearly with the content of CH_2 in the molecule, the variation for each such addition being approximately 1.54 Å. The distance for lauryl is about 22 Å.

4. The evidence leads to the conclusion that the latter distance is occasioned by the length of the chain molecule and the former by the distance of separation of molecules perpendicular to the chain.

5. From computation of density and from the polarity of the compound, one finds that two CH polar groups appear to unite, making a chain two molecules in length, and that the planes containing these groups are not perpendicular to the chains.

6. The addition of each CH_2 lengthens the molecule by approximately 1.3 Å, which is of the same order as crystalline C distances, and is in agreement with the similar experiments of Müller and Saville (Journal Chem. Soc., Vol. 127 (1925), p. 599) and earlier observers on solid long chain hydrocarbons. The above interpretation of distance of separation of chains and relative