

*Measurement of Infrared Dichroism for
the Crystal of Lauric Acid
in the CsBr Region*

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For the measurement of infrared dichroism the silver chloride transmission polarizer is ordinarily used. However, in the region below 20μ its performance is not satisfactory owing to its poor transmittance. For the purpose of measuring dichroism for saturated long chain monocarboxylic acids in the range from 600 to 350 cm^{-1} we tested a transmitting polarizer in which six polyethylene films are used instead of silver chloride plates.

The result is very satisfactory and the spectra for lauric acid are shown in Fig. 1. This polarizer is also used in the NaCl region except those about the 2900, 1475, 1375 and 720 cm^{-1} absorptions of polyethylene. In Fig. 2 the dichroism for the oriented crystals of lauric acid in the region from 1300 to 900 cm^{-1} measured by the polyethylene polarizer is given. For the purpose of comparison the same dichroism measured by a Perkin-Elmer AgCl polarizer is shown in Fig. 3. The result indicates that the performance of the present polarizer is as satisfactory as that of the AgCl polarizer.

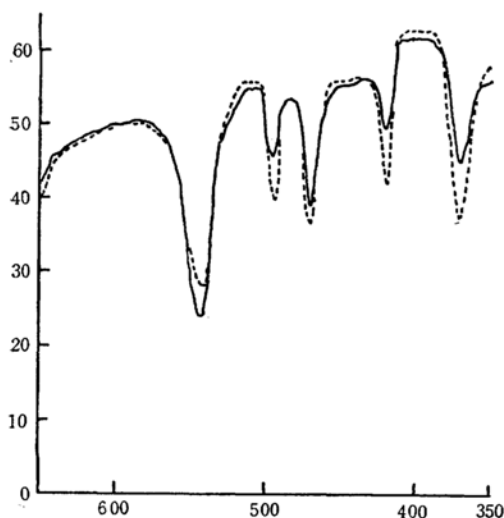


Fig. 1. The infrared dichroism of the oriented crystals of lauric acid (C form) in the CsBr region measured by a polyethylene polarizer.

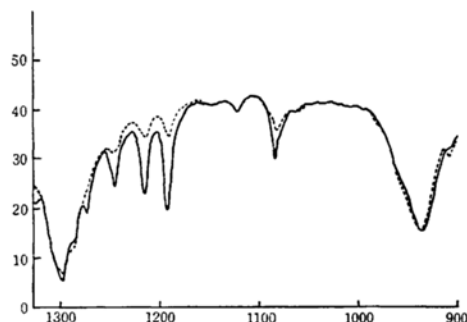


Fig. 2. The infrared dichroism of the oriented crystals of lauric acid (C form) in the NaCl region measured by a polyethylene polarizer.

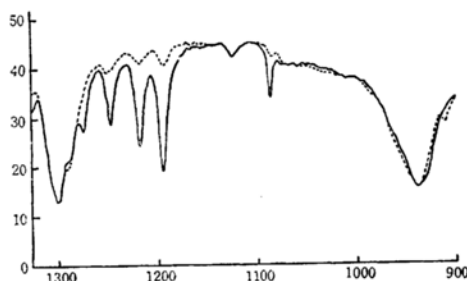


Fig. 3. The infrared dichroism of the oriented crystals of lauric acid (C form) in the NaCl region measured by an AgCl polarizer.

The thickness of the polyethylene film used was 0.02 mm. and an incline of approximately 60 degrees of the films gave the best performance. The measurement was made by a Perkin-Elmer Model 21 spectrometer equipped with NaCl or CsBr prism.

In Figs. 1, 2 and 3 the dotted and the full lines give the spectra for the incident light polarized along the a - and b -axes of the crystal, respectively. It is interesting to note that the four lines in the range from 350 to 500 cm^{-1} given in Fig. 1 have the opposite dichroism to that of the equally spaced progression of bands found in the region from 1180 to 1350 cm^{-1} . The interpretation of the result will be reported afterwards.

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Added in Proof:

Recently H. Yoshinaga, S. Fujita, Y. Yamada and A. Mitsuishi have made a polyethylene film polarizer and used this for the region measured by the far-infrared grating spectrometer (Symposium on Molecular Structure and Spectroscopy at Columbus, June, 1959).