

Zeitschrift: Schweizerische mineralogische und petrographische Mitteilungen = Bulletin suisse de minéralogie et pétrographie
Band: 40 (1960)
Heft: 2

Artikel: Optical and crystallographical properties of 1-(-anisoyl)-4-methoxynaphthalene
Autor: Rittmann, A. / El-Hinnawi, E.E.
DOI: <https://doi.org/10.5169/seals-31158>

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 19.07.2025

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>

Optical and Crystallographical Properties of 1-(*p*-anisoyl)-4-methoxynaphthalene

By *A. Rittmann* and *E. E. El-Hinnawi*¹⁾
(Istituto di vulcanologia dell'Università di Catania)

With 2 figures in the text

Abstract

Crystals of 1-(*p*-anisoyl)-4-methoxynaphthalene are monoclinic holohedral.

$$\beta = 94^\circ 56' \quad a/b = 1.398$$

The Crystals are colourless, biaxial with average $n = 1.650$. Parallel extinction with negative elongation. $2V = +86^\circ 30'$; $\Delta = 0.045$. These crystal-optical data are an indispensable means of identifying the compound.

Introduction

1-(*p*-Anisoyl-4-)methoxynaphthalene $C_{19}H_{16}O_3$ was prepared by ELKASHEF and SAID-AHMED²⁾ by the reaction between anisoyl chloride and α -methoxynaphthalene in the presence of anhydrous aluminium chloride in carbon disulphide medium.

For its identification only two tests are available, namely the melting point determination and the red colour it yields with concentrated sulphuric acid. However, these two tests can not be considered to be specific for the identification of the compound, as many other compounds will yield the same results. On the other hand, the crystal-optical properties give rise to several characteristics by means of which the compound can be identified at once with certainty.

In the present investigation the authors give the directly observed optical properties of this crystalline compound and its standard values.

¹⁾ Present Address: National Research Centre, Dokki, Cairo, Egypt.

²⁾ M. Sc. Thesis, Cairo University, 1959.

Behaviour of the crystals on the heating stage

Before starting in the preparation of crystals for goniometric and optical measurements, it was necessary to establish that the compound does not exist in more than one crystallographical modification at different temperatures, for if this were so, each one would have to be crystallized out separately within the temperature range of its stability. A few crystals of the substance under investigation were heated on the heating stage and no change of phase was observed till the crystals melt at 108° C.

Crystallographical Properties

Measurements on the theodolite goniometer were carried out on five crystals grown from a hot ethyl alcohol solution. Their average length was four millimeters, their width 1.5 millimeters and their thickness about two millimeters.

The following table gives the observed forms, their corresponding average φ and ρ values and the character of their signals.

Table 1.

Miller face symbols	φ	ρ	Type of signal
(001)	90° 00'	4° 56' ($\pm 1'$)	Very sharp
(100)	90° 00'	90° 00'	Very sharp
(110)	35° 41' ($\pm 3'$)	90° 00'	Sharp

The calculated crystallographical constants (using the above φ and ρ values) are found to be:

$$\beta = 94^\circ 56'$$

$$a/b = 1.398$$

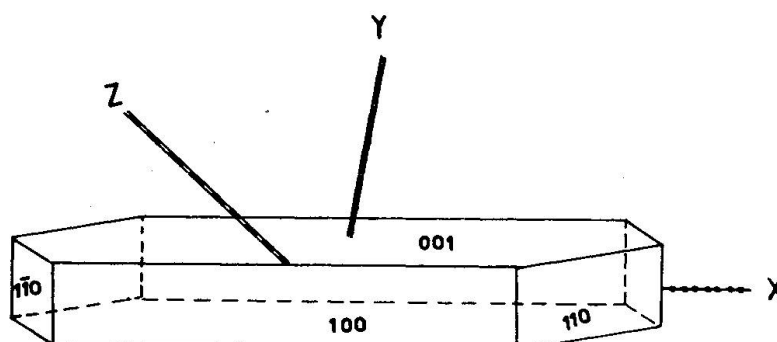


Fig. 1. An idealized crystal of 1-(ρ -Anisoyl)-4-methoxynaphthalene. Z, X and Y are optical directions.

c/b cannot be calculated because of the absence of domal or pyramidal faces.

From the previous crystallographical data, it appears that crystals of 1-(*p*-anisoyl)-4-methoxynaphthalene belong to the holosymmetrical class of the monoclinic system.

An idealized crystal drawn from the stereographic projection using RITTMANN's³⁾ nomogram for crystal drawing is shown in Fig. 1.

Optical Properties

The following optical properties were determined on flat-lying microcrystals grown on a glass carrier. Fig. 2 is a photomicrograph of these crystals.

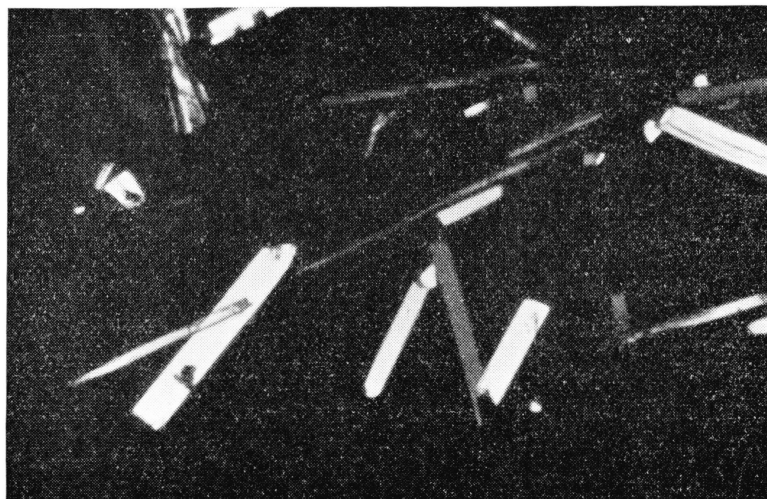


Fig. 2. Photomicrograph of crystals of 1-(*p*-Anisoyl)-4-methoxynaphthalene. Crossed Nicols, 94 \times .

Observations in polarized light

The crystals are colourless. Two types of faces are distinct: the first (100) is rectangular, while the second (001) is six-sided. Profile angles measured on (001), i. e. the angles between the edges [(010)/(110)], [(110)/(1 $\bar{1}$ 0)], and [(1 $\bar{1}$ 0)/(010)] are 126°; 108° and 126° respectively.

The indices of refraction could not be determined with sufficient accuracy, as the crystals are soluble in the immersion media. However,

³⁾ Schweiz. Min. Petrogr. Mitt., IX, p. 190, 1929.

the average index of refraction n was found to be slightly lower than that of α -monobromonaphthalene (1.658) and may be estimated to be about 1.650.

Observations between crossed nicols

The crystals are anisotropic. Both (100) and (001) show straight extinction and negative elongation, indicating that the crystals are prismatic parallel to the b -axis.

The relative birefringences Δ_0 measured on both (100) and (001) have been found to be 0.031 and 0.038 respectively.

Observations in the conoscope

On (100) the interference figure is monosymmetric S_{13} (according to the classification of the interference figures by the senior writer) with a positive character. The quotient of the extreme retardations (Q value) = 0.53 while $1/Q'$, which is the quotient of the intermediate retardation and the maximum one = 0.59 (using a numerical aperture of 0.85).

Having an average index of refraction of 1.650, the optic axial angle $2V$ has been found to be $+87^\circ$, while the maximum birefringence Δ was found to be 0.045.

On (001), the interference figure is monosymmetric, S_{13} , with a positive character.

Q value = 0.63, while $1/Q' = 0.76$, $2V = +86^\circ$ and $\Delta = 0.044$.

From the above conoscopical observations, it is evident that the average optic axial angle is $+86^\circ 30'$ while the average maximum birefringence $\Delta = 0.045$. The optical orientation is shown in Fig. 1.

Acknowledgements. One of us (*E. E. El-Hinnawi*) wishes to express his deep appreciation to the National Research Centre and the Mission Bureau, Cairo for granting him a study leave at the Vulcanological Institute of Catania University, Italy.

February 1960.