This article was downloaded by: [Tomsk State University of Control Systems and Radio]

On: 17 February 2013, At: 06:16

Publisher: Taylor & Francis

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House,

37-41 Mortimer Street, London W1T 3JH, UK



Molecular Crystals

Publication details, including instructions for authors and subscription information: http://www.tandfonline.com/loi/qmcl15

On the Fluorescence of 9-Cyanoanthracene

P. Sarti-fantoni ^a & R. Teroni ^a

^a Gruppo di Lavoro di Strutturistica e Spettroscopia Molecolare del Consiglio Nazionale delle Ricerche Istituto di Chimica Organica della Università di Firenze Version of record first published: 21 Mar 2007.

To cite this article: P. Sarti-fantoni & R. Teroni (1969): On the Fluorescence of 9-Cyanoanthracene, Molecular Crystals, 6:3-4, 431-433

To link to this article: http://dx.doi.org/10.1080/15421407008083480

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: http://www.tandfonline.com/page/terms-and-conditions

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

Molecular Crystals and Liquid Crystals. 1970. Vol. 6, 431-433 Copyright © 1970 Gordon and Breach Science Publishers Printed in Great Britain

On the Fluorescence of 9-Cyanoanthracene

P. SARTI-FANTONI and R. TERONI

Gruppo di Lavoro di Strutturistica e Spettroscopia Molecolare del Consiglio Nazionale delle Ricerche Istituto di Chimica Organica della Università di Firenze

Received in revised form August 8, 1969

Abstract—The polarized green fluorescence of 9-cyanoanthracene crystals is reanalysed and found to be structured.

The green emission is progressively weakened by irradiation, and becomes replaced by a blue fluorescence.

Introduction

Solid state photoreactions have received a great deal of attention in the last years.¹ The irradiation of anthracene^{2,3} and anthracene derivatives³ was studied either for spectroscopic purpose² or to have more information on the products formed in the solid state.³

During the photochemical dimerization of 9-cyanoanthracene³ under irradiation with the light of mercury lamp (filtered with an 0×1 Change Pilkington filter) a progressive change in the fluorescence was observed, in agreement with earlier work under different conditions.⁴ The fluorescence spectrum is now remeasured and compared with that reported in the literature.⁴ Important points of difference have stimulated us to reanalyse the fluorescence emission of 9-CNA in order to have additional information on the nature and properties of the solid state photoreaction involved.

Fluorescence emission of 9-CNA

Thin crystals ($\cong 10\mu$) of 9-CNA prepared by sublimation were mounted on a pinhole drilled in a brass disk. This method of

mounting was found important to isolate a central portion of the crystal away from the edges which acted as emission sites, if irradiated, even at the very beginning of the exposure. In fact, under the microscope the major part of the green fluorescence from a free sample could be seen to be reemitted from edges or surface imperfection on the crystal.

From a masked crystal the green fluorescence was very weak at the beginning of the exposure to the mercury light and at first increased in intensity as new emitting centres appeared in the irradiated area. The green fluorescence recorded was different in detail from that reported in the literature. The main feature was the presence of vibrational structure as shown in Fig. 1. After increasing in intensity to a maximum this green fluorescence emission decreased. At the same time, after 20-30 minutes exposure under our conditions, a blue emission appeared, and eventually (after $\cong 100$ minutes) completely replaced the green. Figure 2 shows the two spectra together.

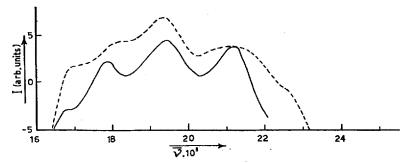


Figure 1. Fluorescence of 9-cyanoanthracene crystal at beginning of exposure to the mercury light.

---- emission parallel to the (a) axis
----- emission parallel to the (c) axis

The fluorescence was found to be polarized with the (a) polarization more intense for the green band but less intense for the blue. By irradiating a powder of 9-CNA (microcrystals) an intense green structured fluorescence is obtained from the beginning. This seems to be due to the large number of preformed traps

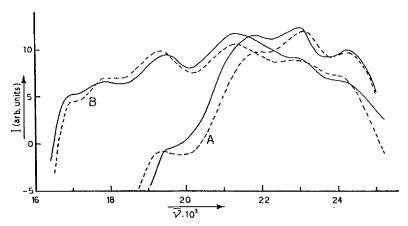


Figure 2. Fluorescence of 9-cyanoanthracene crystal: (A) after 100 minutes of exposure; (B) after 24 minutes of exposure.

--- emission parallel to the (a) axis

---- emission parallel to the (c) axis

(edges...) which act as reemitting sites whereas in well-formed crystals the emitting centres appear only in the course of irradiation.

Experimental

9-cyanoanthracene samples were prepared by sublimation in a metal crucible. The light of a mercury lamp (Mazda 250W) filtered with a Change Pilkington 0×1 filter was focused on the sample. The fluorescence light, passed through a Wollaston prism, was analysed with a E 742 Hilger-Watts spectrograph. The spectra were recorded on photographic plates and measured on a Hilger microphotometer. Iron are spectrum was used for calibration.

REFERENCES

- Schmidt, G. M. J., in Reactivity of the Photoexcited Organic Molecules, Interscience Publishers (1967).
- 2. Craig, D. P. and Akon, C. D., Trans. Faraday Soc. 62, 1673 (1966).
- 3. Craig, D. P. and Sarti-Fantoni, P., Chem. Comm. 742 (1966).
- 4. Stevens, B. and Dickinson, T., Spectrochim. Acta 19, 1685 (1963).