

界面の振動分光学

Vibrational Spectroscopic Study of Surface Chemistry

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研究成果概要

Pentacene (PEN; Figure 1b) is a semiconductor material used as an active layer for organic field-effect transistors (OFETs). To develop solution-processed OFETs, Yamada and co-workers developed 6,13-dihydro-6,13-ethanopentacene-15,16-dione (PDK; Figure 1a), which is a solvent-soluble precursor compound of PEN to PEN (b).

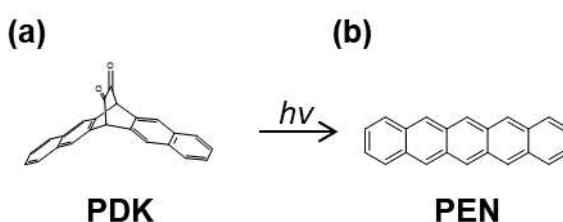


Figure 1. Photochemical reaction from PDK (a) to PEN (b).

[1]. This compound can be photochemically converted to the target material in thin films, and the photoconversion reaction can be accelerated by adding 1,2,4-trichlorobenzene (TCB) to the precursor film [2]. Nevertheless, the presence of residual TCB in the precursor film has not been confirmed so far, suggesting that a more detailed analysis of the precursor method is needed. In this study, the effect of additives on the conversion ratio of PDK to PEN is analyzed by infrared p-polarized multiple-angle incidence resolution spectrometry in combination with density functional theory calculations. The spectroscopic analysis reveals that the additive solvent remains in the spincoated film and promotes the photoconversion reaction to PEN.

参考文献

- [1] Yamada, H. et al. *Chem. Eur. J.* **2005**, *11*, 6212.
[2] Nakayama, K. et al. *J. Mater. Chem. C* **2013**, *39*, 6244.

発表論文(謝辞なし)

Shioya, N.; Fang, T.; Fujii, M.; Fujiwara, R.; Hayashi, H.; Yamada, H.; Hasegawa, T. Quantitative Analysis of Photochemical Reactions in Pentacene Precursor Films. *Langmuir* **2024**, *40* (1), 1137–1142. <https://doi.org/10.1021/acs.langmuir.3c03594>.