

ナノチューブを形成するアントラセン二量体へのエチニレン部位の導入

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Introduction of Ethynylene Moieties into Nanotube-Forming of Anthracene Dyad(¹*Faculty of Engineering, Chiba University*, ²*Graduate School of Science and Engineering, Chiba University*, ³*Institute for Advanced Academic Research, Chiba University*) ○Arisa Ino¹, Takumi Aizawa², Shiki Yagai³

We previously found that scissor-shaped diphenyl anthracene dyad **1** possessing amide groups self-assembles into highly blue-emissive ($\lambda_{\text{em-max}} = 432 \text{ nm}$) organic nanotubes (Figure 1a). Herein, a new dyad **2**, in which an ethynylene unit was incorporated into the π -conjugated moieties, was synthesized based on the molecular backbone of **2** to explore the effect of π -conjugated units on the self-assembly behavior and emission properties. Cooling a hot monomeric solution of dyad **2** in *n*-octane solution led to the formation of uniform cylindrical structures (Figure 1b). The dimensions of the cylinders of **2** are similar to those formed by **1**, suggesting the formation of nanotubes. The nanotubes of dyad **2** showed bluish-emission with an emission maximum at $\lambda_{\text{em-max}} = 481 \text{ nm}$ (Figure 1c). The effect of the introduction of ethynylene unit on photophysical properties and the self-assembled nanostructures will be discussed.

Keywords: Self-assembly; Anthracene; Organic Nanotube; Nanostructure; π - π stacking

当研究室は最近、アミド基を有するアントラセン二量体 **1** が、青色に発光するナノチューブ¹⁾へと自己集合することを見出した²⁾。本研究では、 π 共役部位が自己集合および発光特性へ与える影響を調査するために、分子 **1** の骨格にエチニレン部位を導入した新規アントラセン二量体 **2** を新規に合成した。(Figure 1a)。低極性溶媒中において分子 **2** は、一次元状に伸長したナノチューブを形成した (Figure 1b)。蛍光スペクトル測定から、分子 **2** は極大発光波長を 481 nm に有し、青緑色の発光を示した (Figure 1c)。エチニレン部位の導入が集合体構造や光物性に及ぼす影響について考察する。

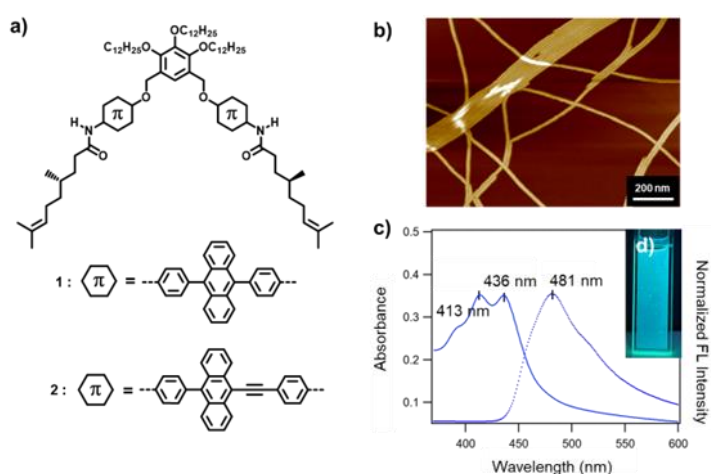


Figure 1. a) Molecular structures of **1** and **2**. b) AFM image of nanotubes of **2**. c) UV/Vis and FL spectra of **2** in *n*-octane. Inset shows a photograph of *n*-octane of **2** under 365-nm light irradiation.

- 1) a) K.Tashiro, S. Yagai et al., *Chem. Rec.* **2022**, DOI:10.1002/tcr.202100252.
- 2) b) T. Aizawa, H. Arima, S. Yagai et al., *manuscript in preparation*.