Photophysical and Self-assembling Properties of Mechanofluorochromic C3 Symmetrical Difluoroboron-β-Diketonate

([1]*Graduate School of Science and Technology, Nara institute of science and technology*, [2] *Université Paris-Saclay, Ecole normale superieure Paris-Saclay*) ○ Shiho Katsumi[1,2], Marine Louis[1], Remi Metivier[2], Clemence Allain[2], Keitaro Nakatani[2], Tsuyoshi Kawai[1]

Keywords: Mechanofluorochromism, Aggregation-induced emission, Difluoroboron β-diketonate derivatives, Benzene-1,3,5-tricarboxamide derivatives

Photochemical properties and luminescent nature of self-assembled supramolecular architectures have been extensively studied as one of the central topics of organic photochemistry. In this study, we built a new molecular system and investigated methods to induce its self-assembly in order to construct a highly amplifiable supramolecular chiral induction system. Derivatives of benzene-1,3,5-tricarboxamide (BTA) are promising C3 symmetric planar supramolecular building blocks known for their ability to form long helical nanofibers.[1] We have studied various difluoro-boron diketonate (DFB) dyes, which display unique optical properties such as mechanofluorochromism (MFC) and aggregation-induced emission (AIE).[2-4] In this study, we connected three DFB units to the BTA core as side arms (BTA-DFB) and the fluorescence properties of the resulting compound are compared with the non-boronated precursor (BTA-D). We found that these molecules have several properties such as MFC, AIE, and helical fiber formation. These results suggest that they exhibit different supramolecular organizations that can be tuned through the application of external stimuli.

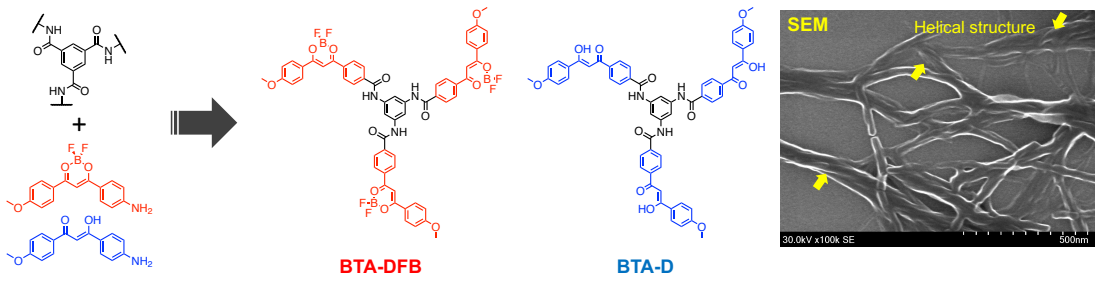

Figure 1. Molecular structures of BTA-D and BTA-DFB and SEM image of helical nano fibers obtained for BTA-D

1) Cantekin, S.; de Greef, T. F. A.; Palmans, A. R. A. *Chem. Soc. Rev*. **2012**, 41 (18), 6125–6137. 2) M. Louis, C. Piñero García, A. Brosseau, C. Allain, R. Métivier, *J. Phys. Chem. Lett.* **2019**, *10*, 4758. 3) Panis, J. A.; Louis, M.; Brosseau, A.; Katao, S.; de Los Reyes, F.; Nakashima, T.; Métivier, R.; Allain, C.; Kawai, T. *Chem. Eur. J.* **2022**, *28* (44). 4) Katsumi, S.; Saigusa, M.; Ito, F. *J. Phys. Chem. B* **2022**, *126* (4), 976–984.