

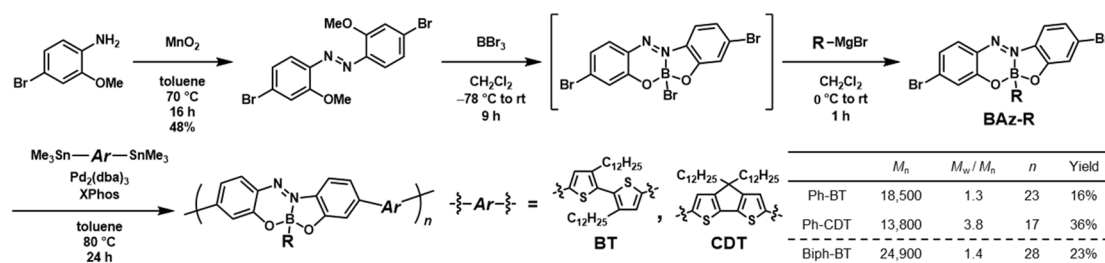
## Development of Novel Azobenzene-Boron Complexes for Solid-State NIR Emissive $\pi$ -Conjugated Polymers

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**Keywords:** Solid-state Emission; Near-infrared Emission; Boron Complex; Azobenzene; Conjugated Polymer

Fluorescence conjugated polymers (CPs) are expected to be applied in various fields such as optical devices because of excellent processability. In addition, there are more and more reports of near-infrared (NIR) CPs which are in high demand in the fields of bioimaging and telecommunications. However, very few NIR CPs with high-efficiency fluorescence properties even in solid state reported due to concentration quenching and thermal deactivation. Recently, we reported four-coordinate boron complexes called **BAz-F** by coordinating boron to the tridentate ligands based on azobenzene. By using **BAz-F** as an acceptor unit, we obtained the CPs which showed NIR fluorescence in solution.<sup>1</sup> We also found that CPs composed of **BAz-Ph** which have a phenyl group at boron maintained a high quantum yield even in solid.<sup>2</sup> This result should imply that the substituent at boron protruded perpendicularly from the  $\pi$ -conjugated plane suppressed concentration quenching. In this research, we aimed to introduce more steric substituents at boron, obtain donor–acceptor type copolymers and evaluate their optical properties in the solid state.



Scheme 1. Synthesis of **BAz-R** and CPs.

We synthesized **BAz-Ph** and **BAz-Biph**, and copolymers with donor units according to Scheme 1. Compared to **Ph-BT**, **Biph-BT** showed superior emission property in solid. Furthermore, we obtained **Ph-CDT** which exhibited high-efficiency luminescence above 900 nm (Fig. 1). We will report the details of the optical properties in the presentation.

1) Gon, M.; Tanaka, K.; Chujo, Y. *Angew. Chem. Int. Ed.* **2018**, 57, 6546–6551.

2) Gon, M.; Wakabayashi, J.; Nakamura, M.; Tanaka, K.; Chujo, Y. *Macromol. Rapid Commun.* **2020**, 2000566.

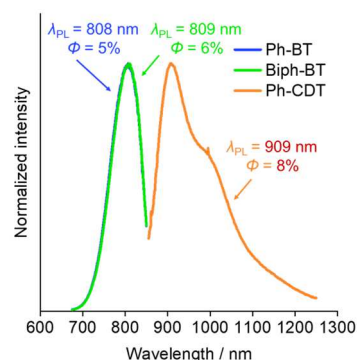


Figure 1. PL spectra of **Ph-BT**, **Biph-BT** and **Ph-CDT** in film.