Oriented Floating Film of *n*-type Polymeric Semiconductor by Unidirectional Floating Film Transfer Method

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Organic electronic devices using conjugated polymers have gained a lot of attention in the past three decades for their application in futuristic devices such as wearable electronics, flexible displays and sensors [1]. Conjugated polymers are a potential candidate for the active layer of organic field-effect transistor (OFETs) due to inherent flexibility, high solubility in organic solvents, and ease of film processing. Furthermore, mobility in OFET enhances when conjugated polymers are aligned along the current direction [2]. Several methods have been reported to orient conjugated polymers in one direction using solution processing. However, most of them are neither suitable for large-area film fabrication nor compatible with multilayer film fabrication for hetero-structured devices. Nonetheless, there are very few reports about the fabrication of oriented *n*-type CPs [2].

Our previous reports show that the unidirectional floating film transfer method (UFTM) is suitable for preparing the large-area film with oriented polymer chains. This method offers various advantages in solving most existing issues with other conventional techniques [2]. In this presentation, Fabrication of oriented films of *n*-type CP, Poly{[N,N′-bis(2-octyldodecyl)-naphthalene-1,4,5,8-bis(dicarboximide)-2,6-diyl]-alt-5,5′-(2,2′-bithiophene)}(N2200), using UFTM will be presented. The chemical structure of N2200, schematic of UFTM procedure, and polarized absorption spectra of oriented N2200 are shown in Fig. 1. These films prepared by UFTM can be transferred on either rigid or flexible substrates just by their adhesive force. The dichroic ratio (DR) of the UFTM films of N2200 was highly dependent on casting parameters. Films were oriented along the width of the ribbon-shaped films with DR >4 under optimized casting conditions. In addition, Charge transport anisotropy of thus oriented films in OFETs will also be discussed in detail.

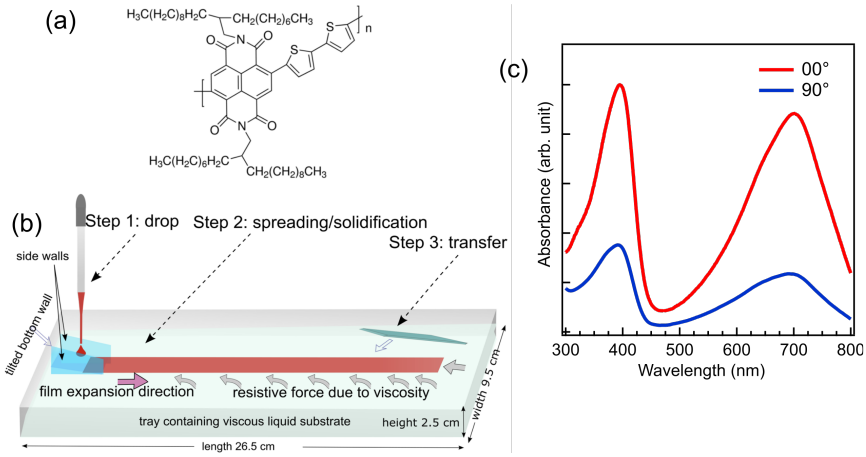

Fig.1. (a) Chemical structure of N2200. (b) Schematic illustration of UFTM. (c) Polarized UV-vis-NIR absorbance spectra of N2200.

References:

[1] M. Pandey et al., *J. Mater. Chem. C* **2019**, *7*, 13323.
[2] M. Pandey et al., ACS Appl. Mater. Interfaces **2021**, *13*, 38534.