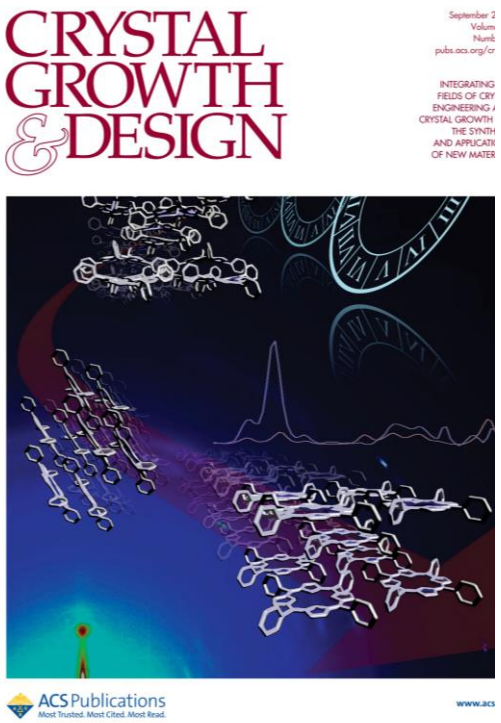

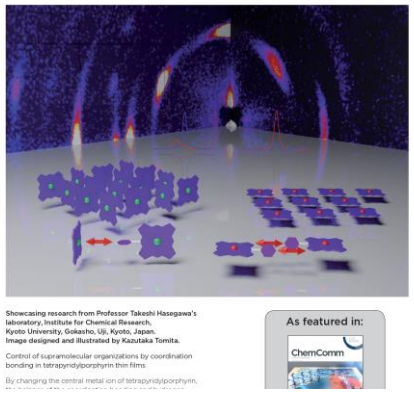

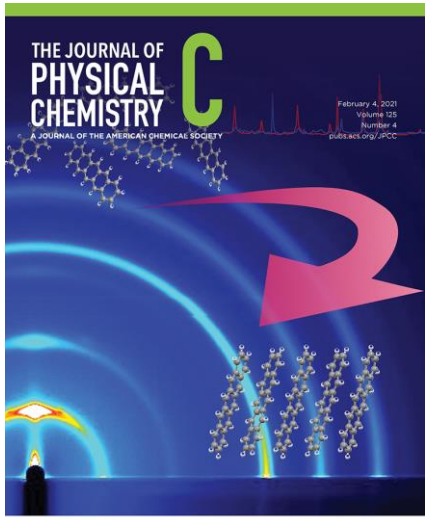

[Organic Semiconductor Group] 2022 Research Introduction

Projects

1 Selective control of molecular orientation

- ✓ *Sci. Rep.* **2019**, *9* (1), 579.

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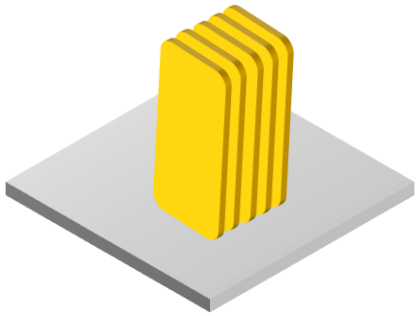
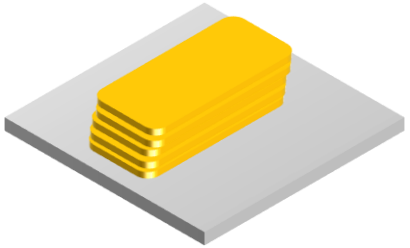
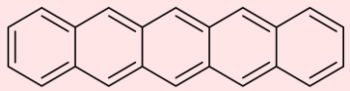
Molecular orientation of organic semiconductors

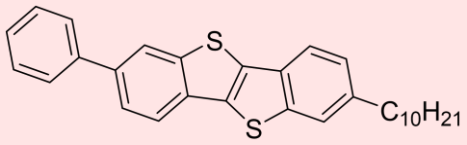


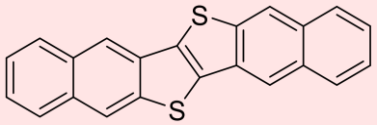
Selective control of molecular orientation

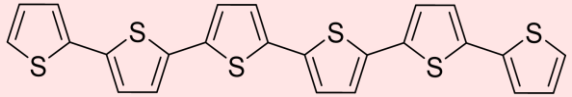


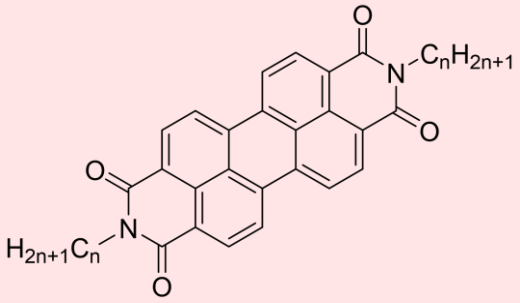
End-on

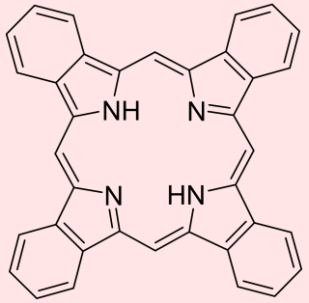


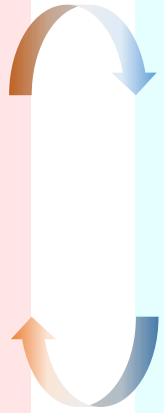




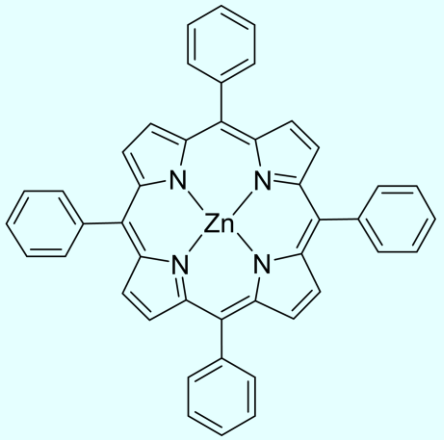


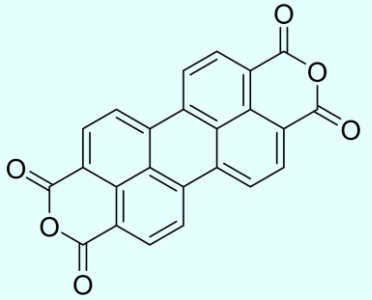


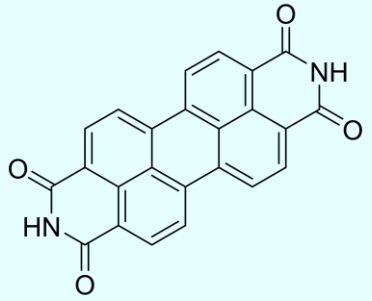




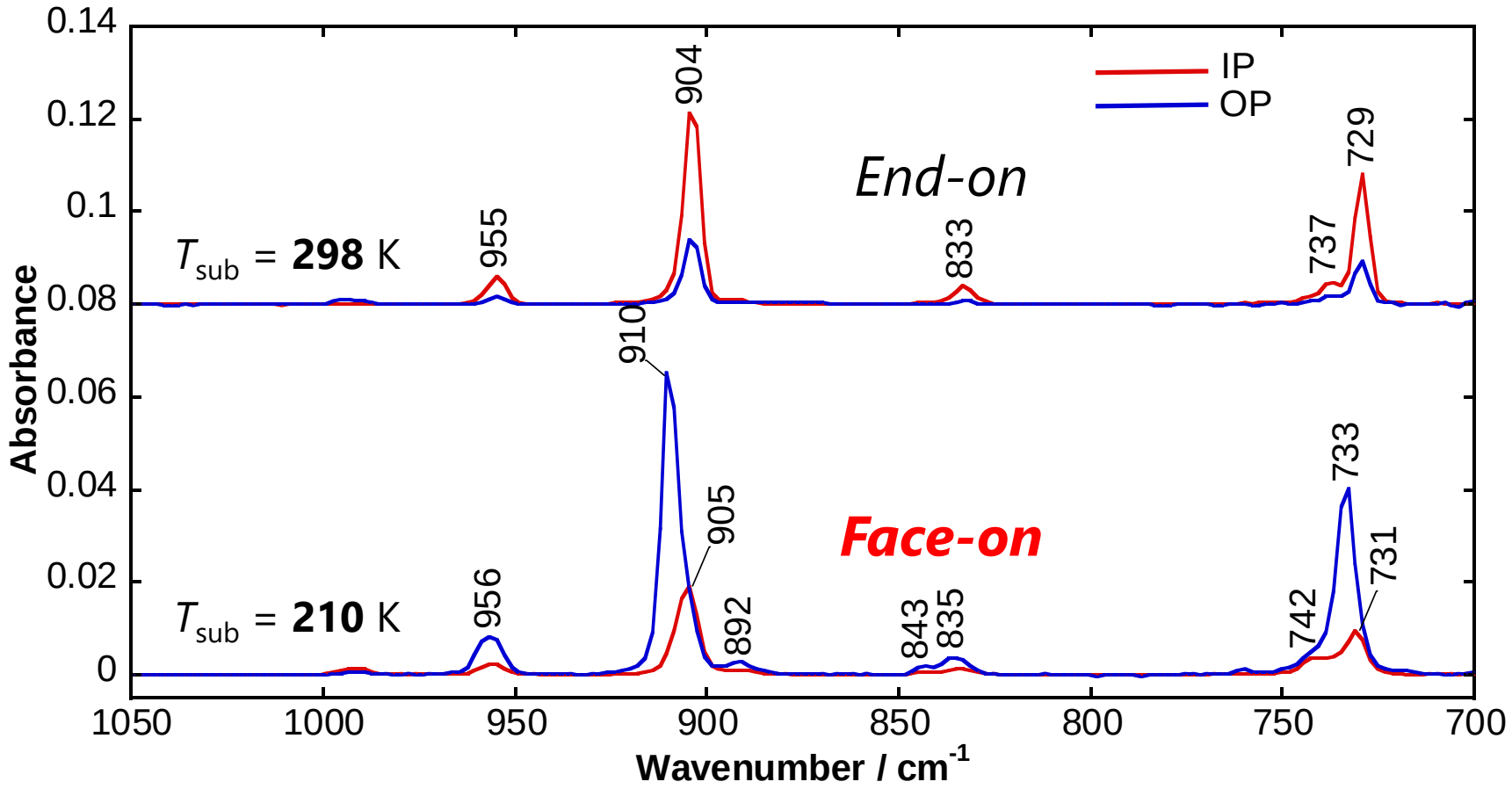
Face-on

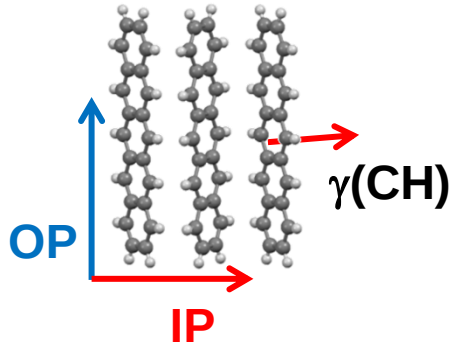


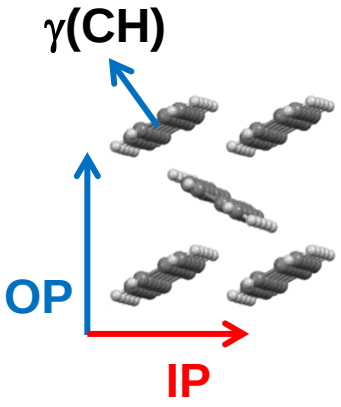




Alternative face-on thin film structure of pentacene







*Achievement of **face-on orientation** of pentacene on silicon*

Sci. Rep. **2019**, *9*, 579.

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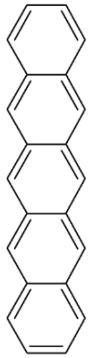
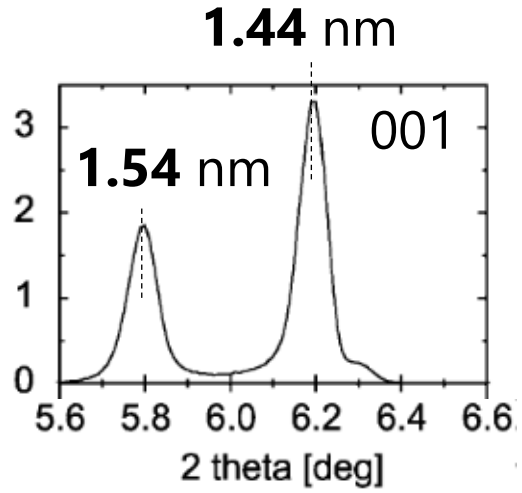
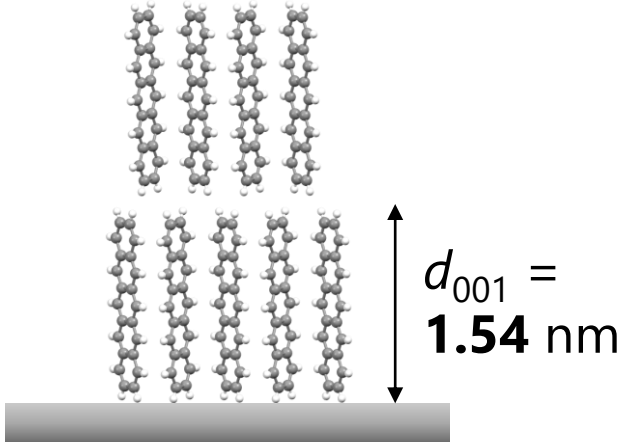
Thin-film phases of organic semiconductors



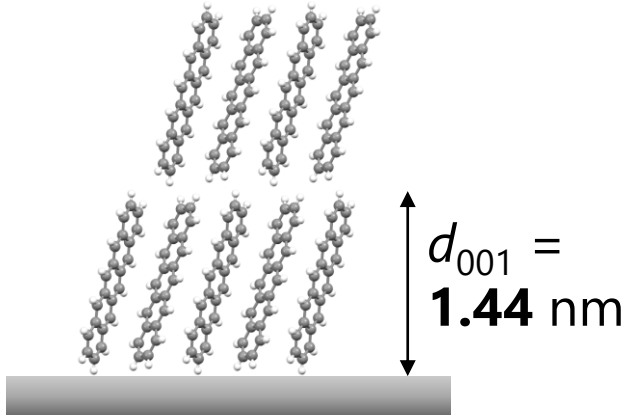


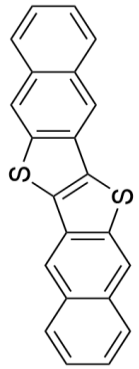
Mattheus et al., *Synth. Met.* **2003**, 138, 475.

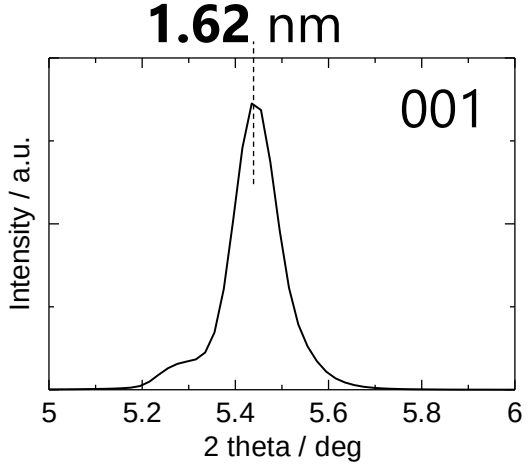
Thin-film phase

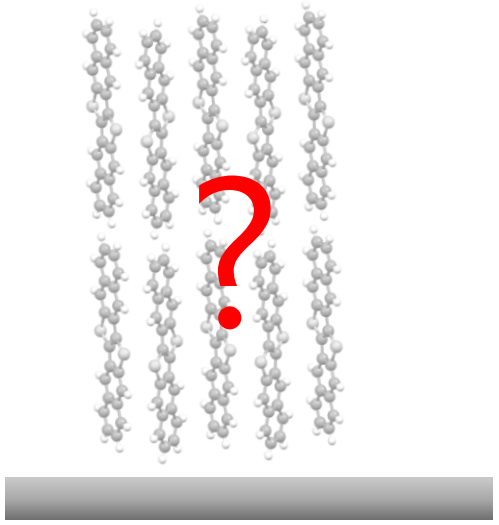


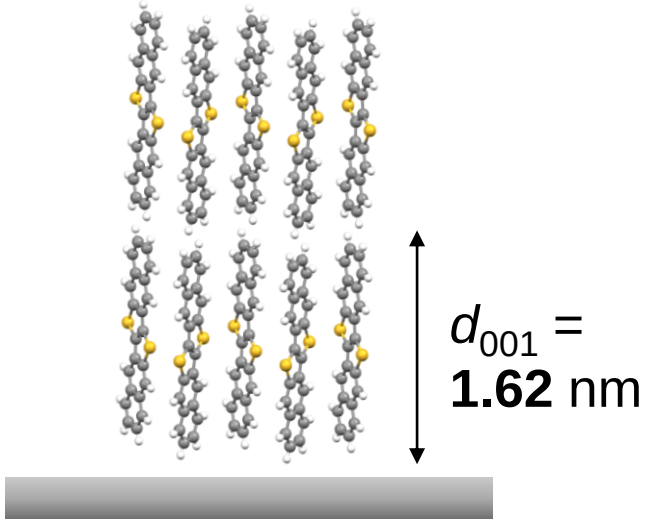
Bulk phase





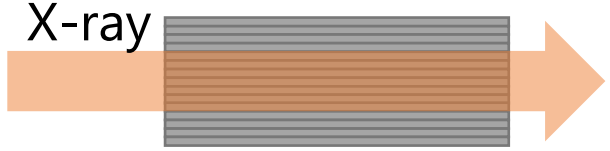




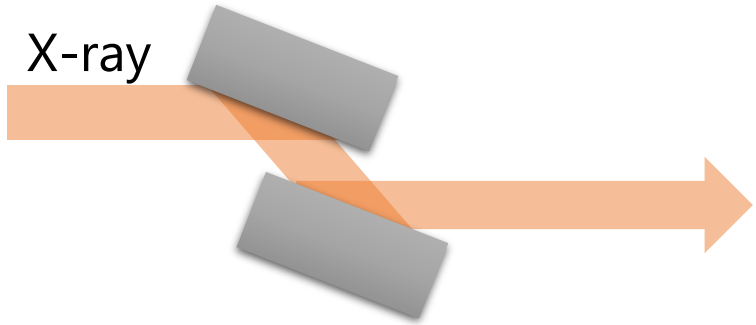


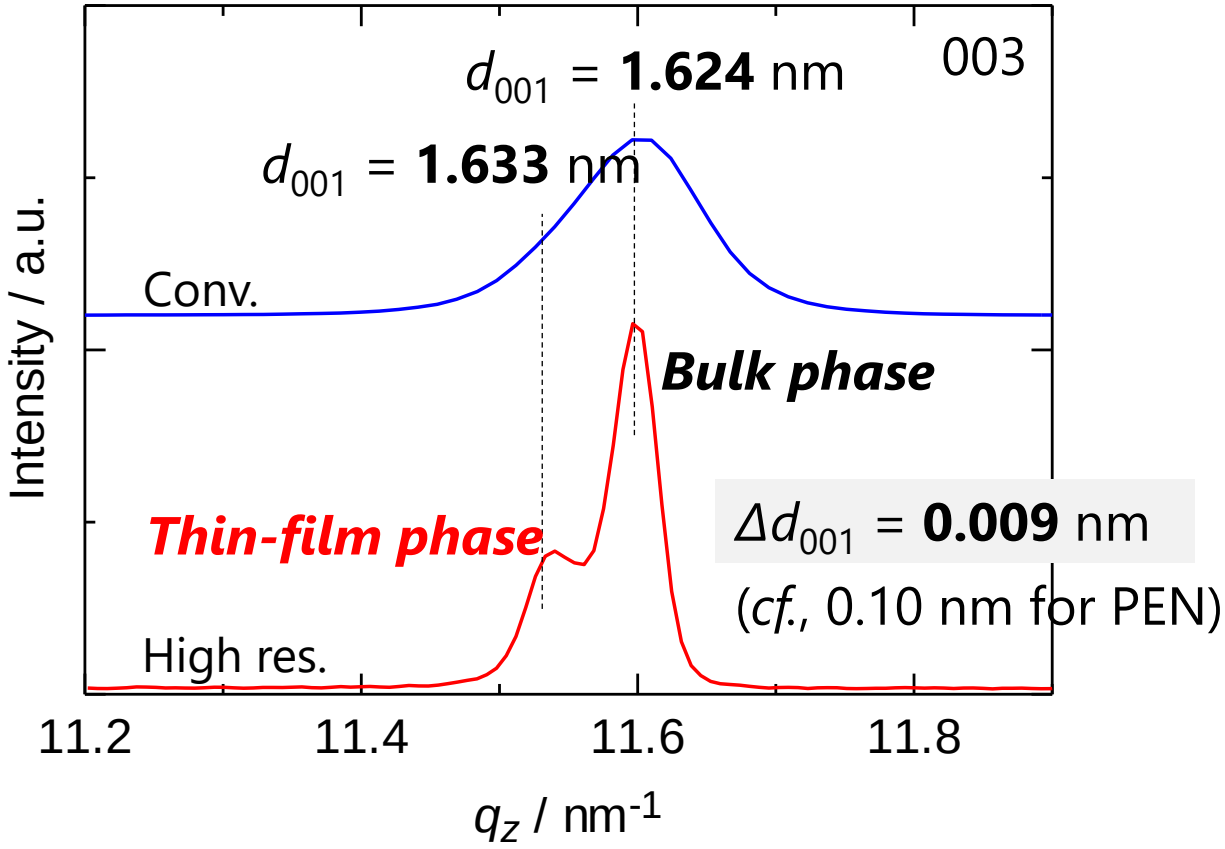
Hidden thin-film phase of DNTT

Soller slit (Conventional)



Ge monochromator (High resolution)





*Identification of **thin-film phase** of DNTT on silicon*

Appl. Phys. Express **2020**, *13*, 095505.

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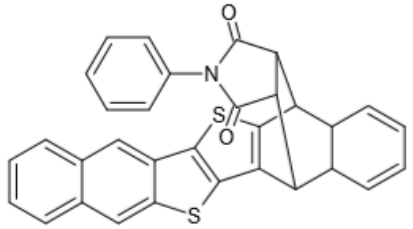
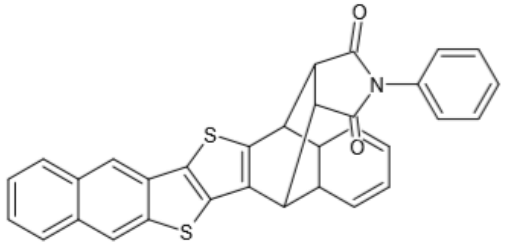
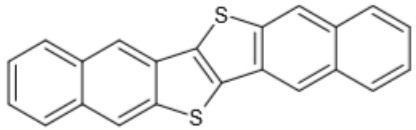
Thermal conversion of DNTT precursors



Endo-isomer

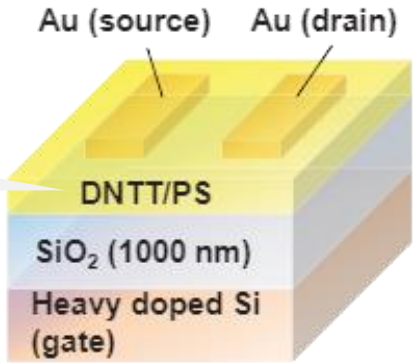


Exo-isomer



DNTT

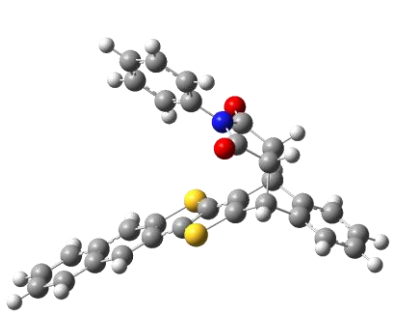
3.35 $cm^2 V^{-1} s^{-1}$ OFET mobility **0.94** $cm^2 V^{-1} s^{-1}$



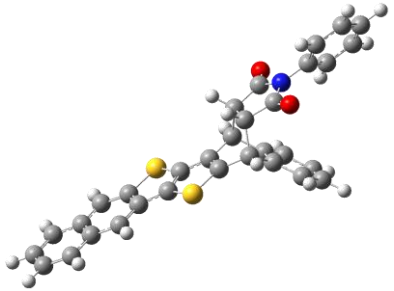
[1] Hamaguchi, A. et al. *Adv. Mater.* **2015**. *27*, 6606.
[2] Kimura, Y. et al. *Adv. Mater.* **2015**. *27*, 727.

The structure-property relationship remains unresolved.

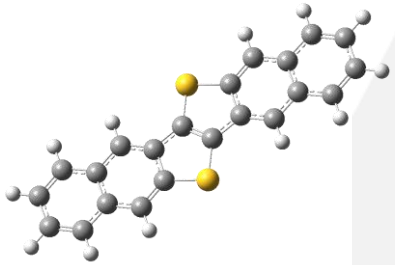
Stereoisomer-dependent conversion



Endo-isomer
(**High** mobility)



Exo-isomer
(**Low** mobility)



DNTT

*Control of **on-surface reactions** of DNTT precursors*

Sci. Rep. **2022**, *12*, 44448.

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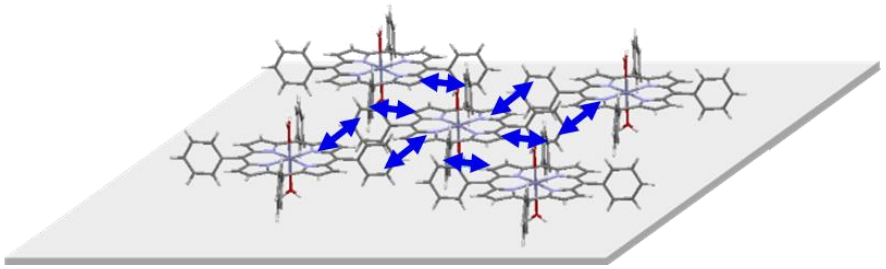
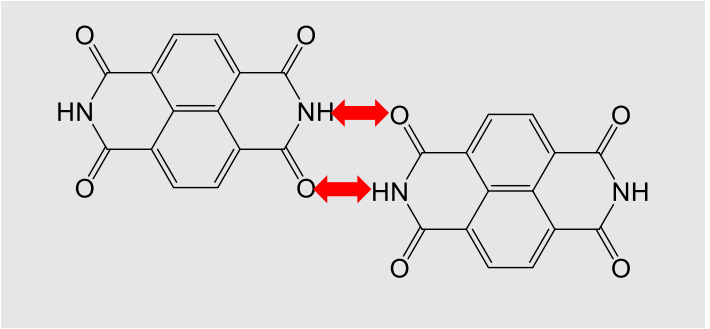
Supramolecular organizations in thin films

✓ Molecular design strategy for **face-on** orientation

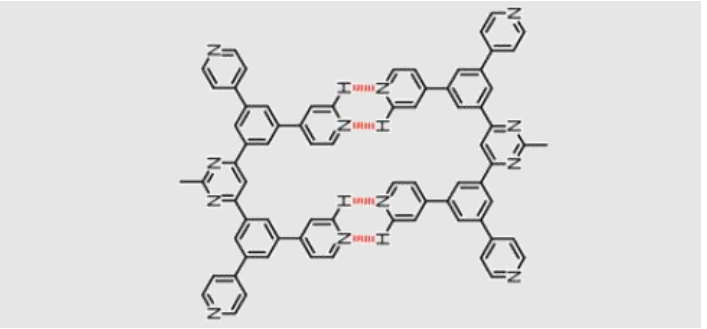
C-H/π interaction



Hydrogen bonding



C-H/N interaction



Yokoyama. D. et al. *Adv. Funct. Mater.* **2011**, *21*, 1375.

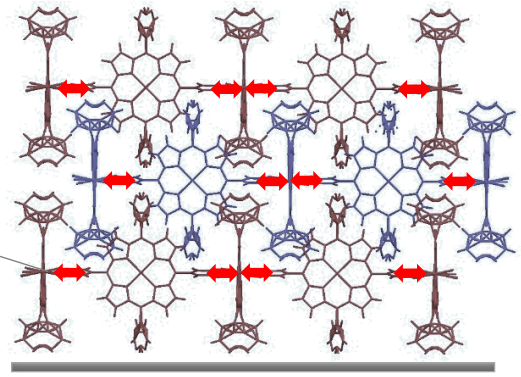
✓ Molecular design strategy for **edge-on** orientation

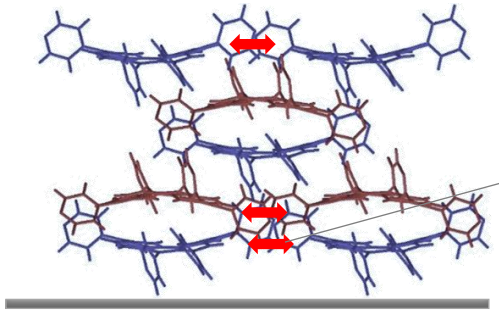
No report!

Control of supramolecular organizations

M^{2+}	Fe^{2+}	Co^{2+}	Ni^{2+}	Cu^{2+}
$d_{x^2-y^2}$	—	—	—	↑
d_{z^2}	—	↑	↑↓	↑↓
Molecular orientation	**Edge-on**	**Random**	**Face-on**	**Face-on**

Metal/N coordination





C–H/N interaction

*Achievement of **edge-on orientation** of porphyrins*

Chem. Commun. **2022**, *58*, 2116.