

## Electronic Supplementary Information

### **Fabrication of planarly-oriented polycrystalline thin films of smectic liquid crystalline organic semiconductors**

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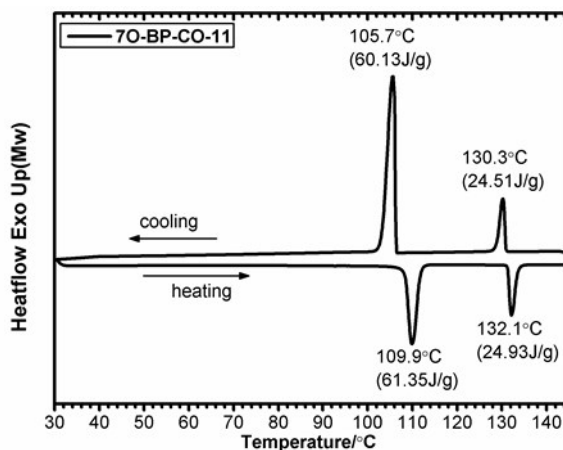
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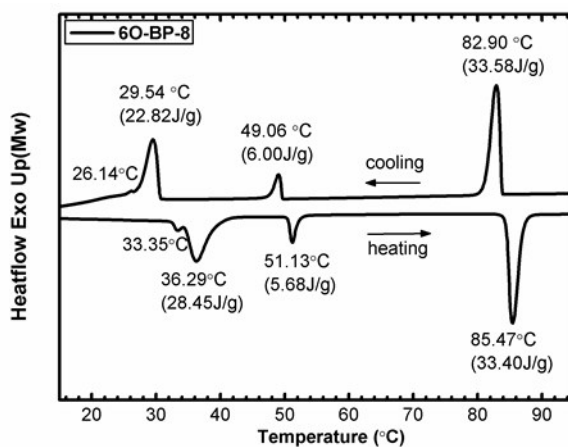
#### **Table of Contents**

1. DSC traces of liquid crystalline materials (p. 2-4)
2. Out- of- plane XRD patterns of 7O-BP-CO11, 8-TTP-8, 8-PNP-O4 (p.4)
3. POM textures of re-orientation process of 8-PNP-012, 8-TTP-8, 6O-BP-8, 6-TTP-12, and 8-PNP-O3 thin films (p. 5-6)
4. Original Data for 1 D XRD (p.6-8)

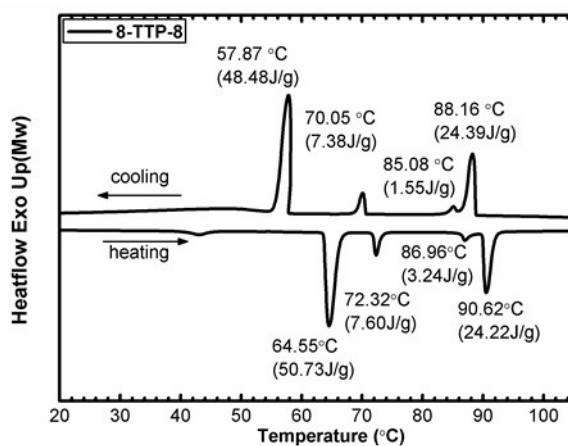
## 1. DSC traces of liquid crystalline materials



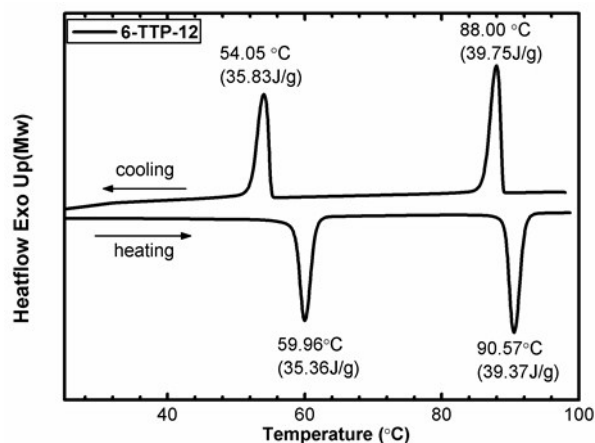
ESI Fig. 1 DSC traces of compound **7O-BP-CO-11** on 2nd heating run and 1st cooling run at 5 °C/min under N<sub>2</sub>.



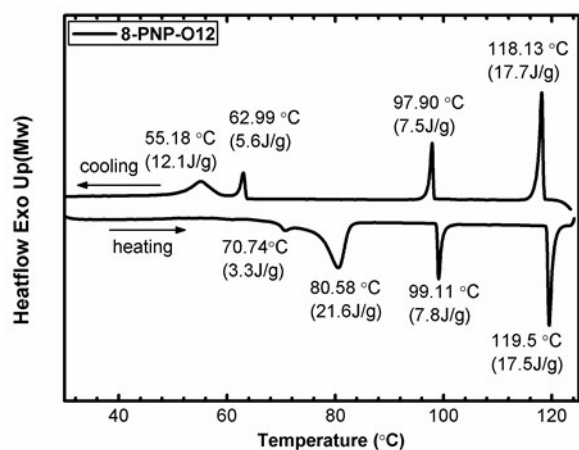
ESI Fig. 2 DSC traces of compound **6O-BP-8** on 2nd heating run and 1st cooling run at 5 °C/min under N<sub>2</sub>.



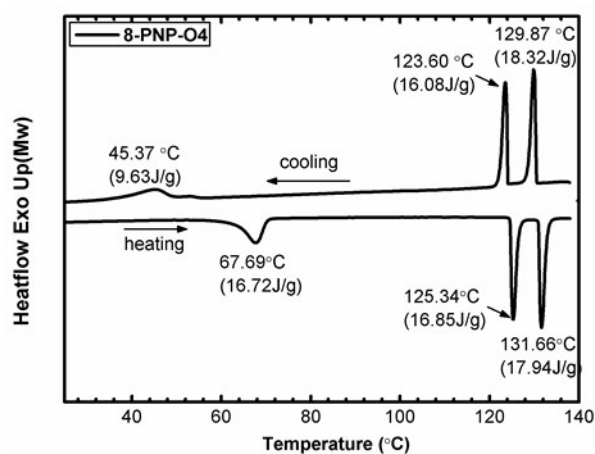
ESI Fig. 3 DSC traces of compound **8-TTP-8** on 2nd heating run and 1st cooling run at 5 °C/min under N<sub>2</sub>.



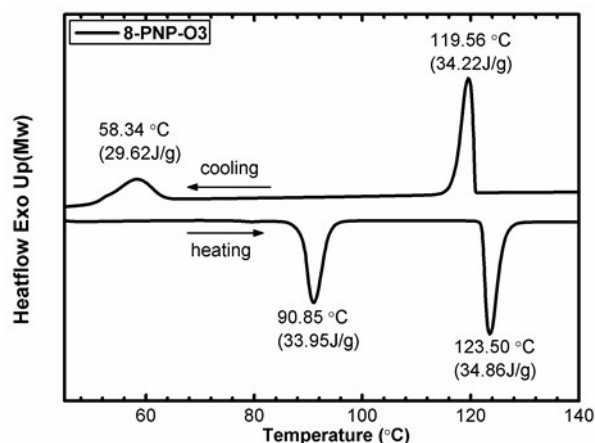
ESI Fig. 4 DSC traces of compound **6-TTP-12** on 2nd heating run and 1st cooling run at 5 °C/min under N<sup>2</sup>.



ESI Fig. 5 DSC traces of compound **8-PNP-O12** on 2nd heating run and 1st cooling run at 5 °C/min under N<sup>2</sup>.

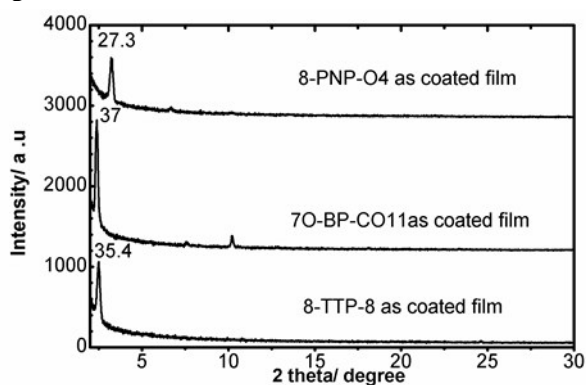


ESI Fig. 6 DSC traces of compound **8-PNP-O4** on 2nd heating run and 1st cooling run at 5 °C/min under N<sup>2</sup>.

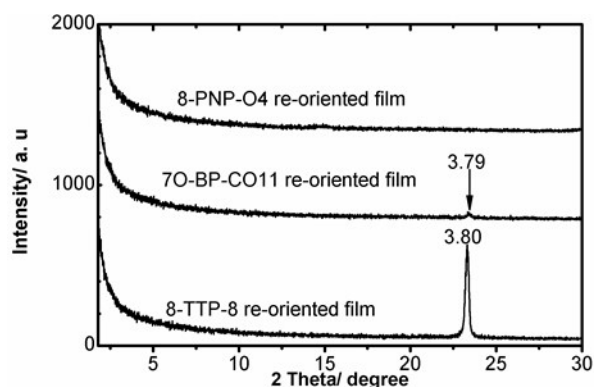


ESI Fig. 7 DSC traces of compound **8-PNP-O3** on 2nd heating run and 1st cooling run at 5 °C/min under N<sup>2</sup>.

## 2. Out- of- plane XRD patterns of 7O-BP-CO11, 8-TTP-8, 8-PNP-O4



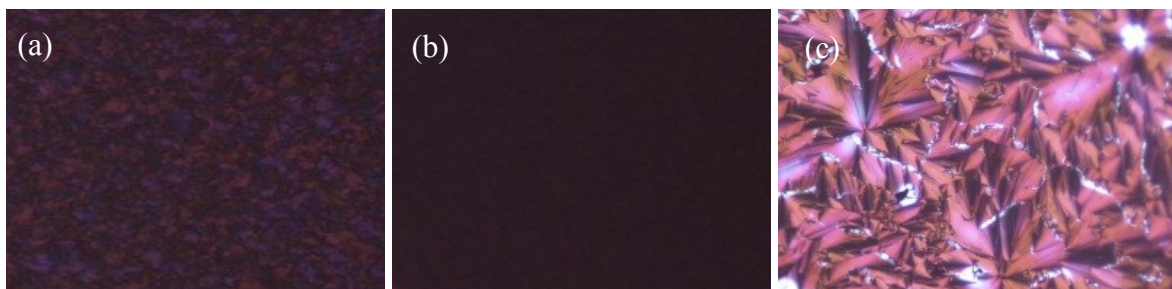
ESI Fig. 8 Out- of- plane XRD patterns of as spin-coated films of 7O-BP-CO11, 8-TTP-8, 8-PNP-O4



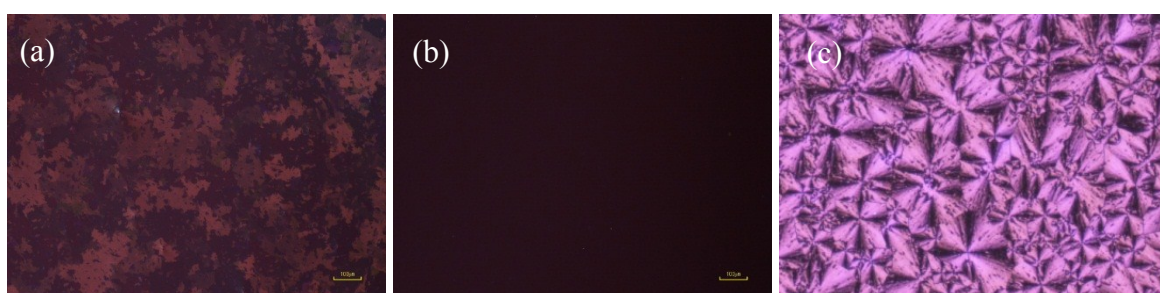
ESI Fig. 9 Out- of- plane XRD patterns of re-oriented films of 7O-BP-CO11, 8-TTP-8, 8-PNP-O4

Re-oriented polycrystalline thin film of **8-PNP-O4** was failed to show any peaks in the wide angle region of its XRD pattern, this may due to the large amount of grain boundaries induced when cooling into its crystal phase. However, the disappearance of peaks at the small angle region and the resulting typical fan-shaped texture still strongly support a planar orientation of the film.)

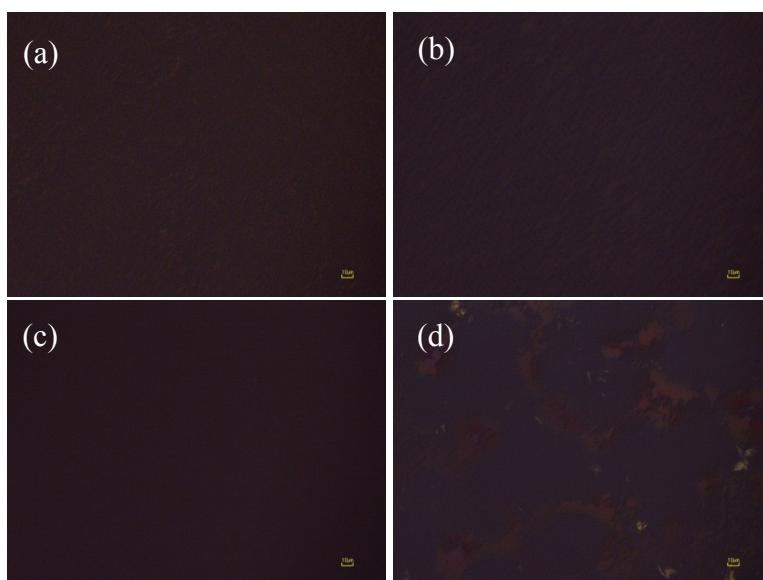
### 3. POM textures of re-orientation process of 8-PNP-012, 8-TTP-8, 6O-BP-8, 6-TTP-12, and 8-PNP-O3 thin films



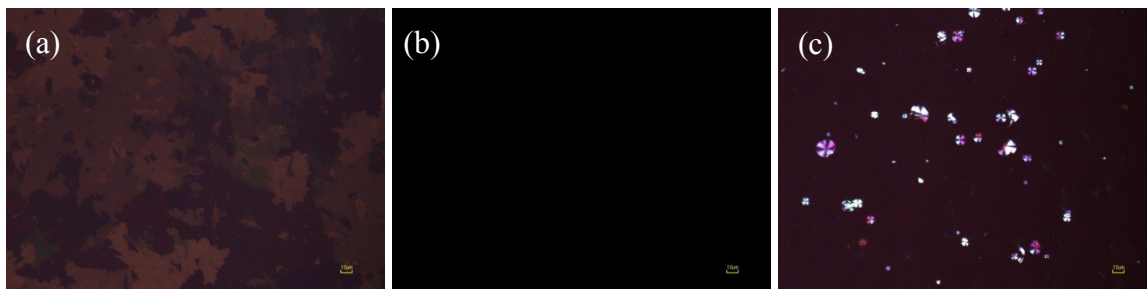
**ESI Fig. 10** POM textures of 8-PNP-O12 film (a) as spin-coated, (b) annealing with PVA layer at 85 °C of SmB phase and (c) annealing with PVA layer at 110 °C of SmA phase.



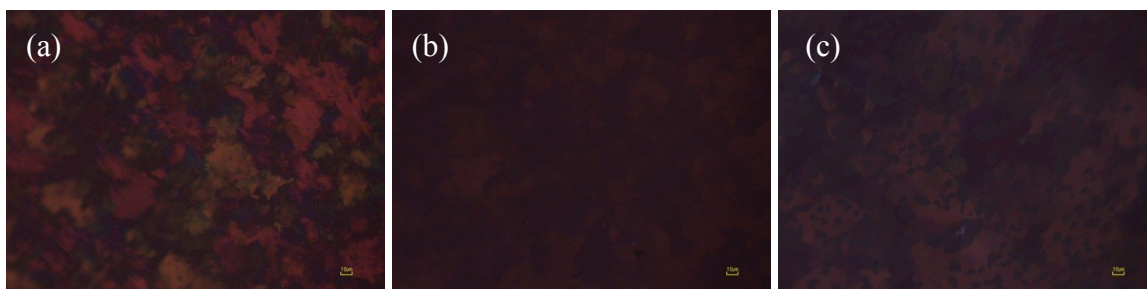
**ESI Fig. 11** POM textures of 8-TTP-8 film (a) as spin-coated, (b) annealing with PVA layer at 80 °C of SmF phase and (c) annealing with PVA layer at 88 °C of SmC phase.



**ESI Fig. 12** POM textures of 6O-BP-8 film (a) as spin-coated, (b) annealing with PVA layer at 45 °C of SmB phase, (c) annealing with PVA layer at 80 °C of SmE phase and (d) after annealing to isotropic phase with PVA layer and cooling to room temperature.



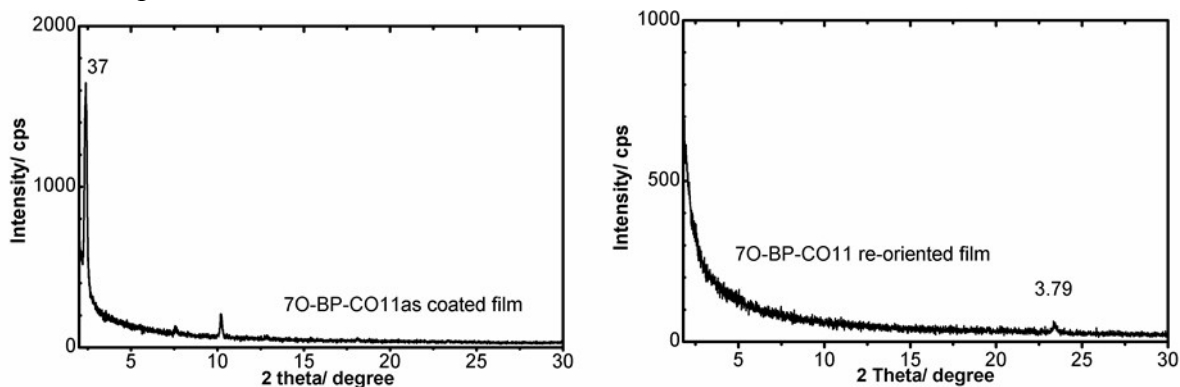
**ESI Fig. 13** POM textures of 6-TTP-12 film (a) as spin-coated, (b) annealing with PVA layer at 80 °C of SmF phase and (c) after annealing to isotropic phase with PVA layer and cooling to room temperature.



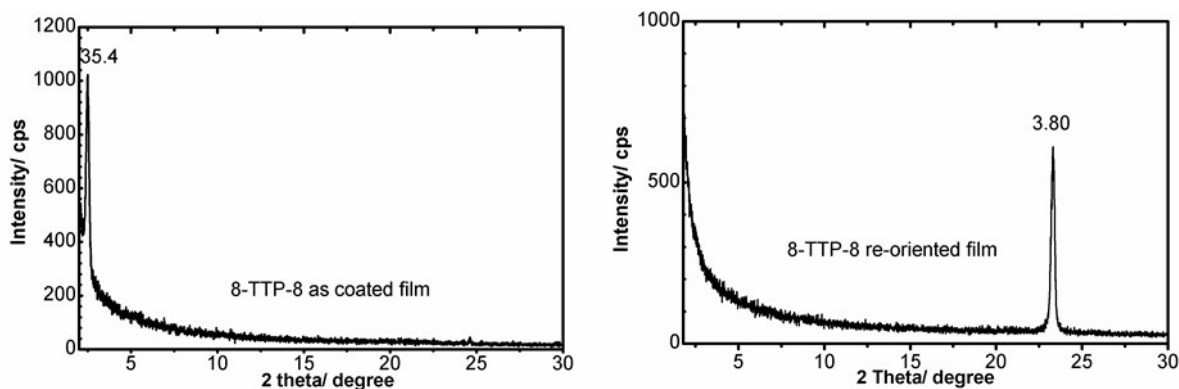
**ESI Fig. 14** POM textures of 8-PNP-O3 film (a) as spin-coated, (b) annealing with PVA layer at 110 °C of SmE phase and (c) after annealing to isotropic phase with PVA layer and cooling to room temperature.

#### 4. Original Data for 1 D XRD

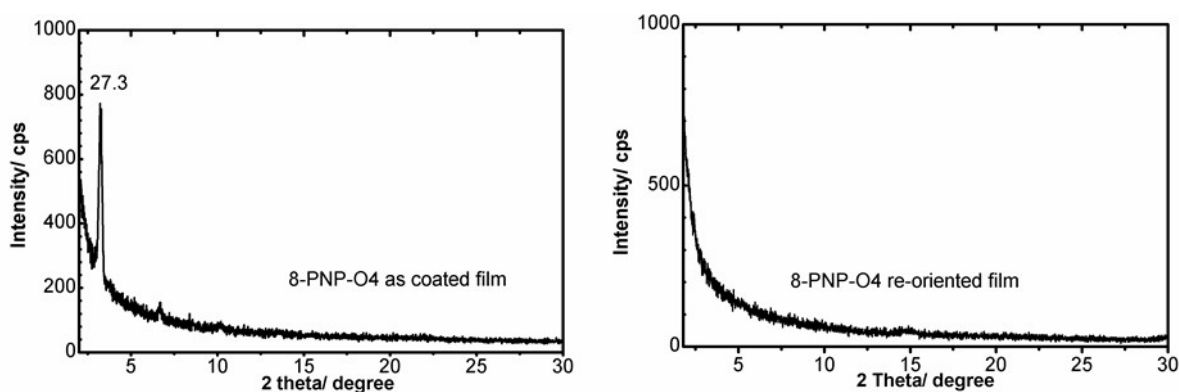
##### 1) Out- of- plane XRD



**ESI Fig. 15** Out- of- plane XRD patterns of as coated film of 7O-BP-CO11 (left) and re-oriented films of 7O-BP-CO11 (right)

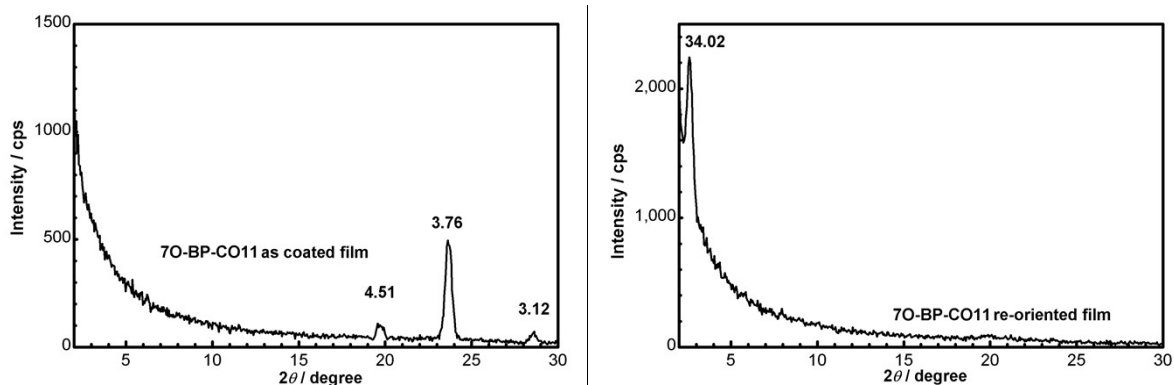


**ESI Fig. 16** Out- of- plane XRD patterns of as coated film of 8-TTP-8 (left) and re-oriented films of 8-TTP-8 (right)

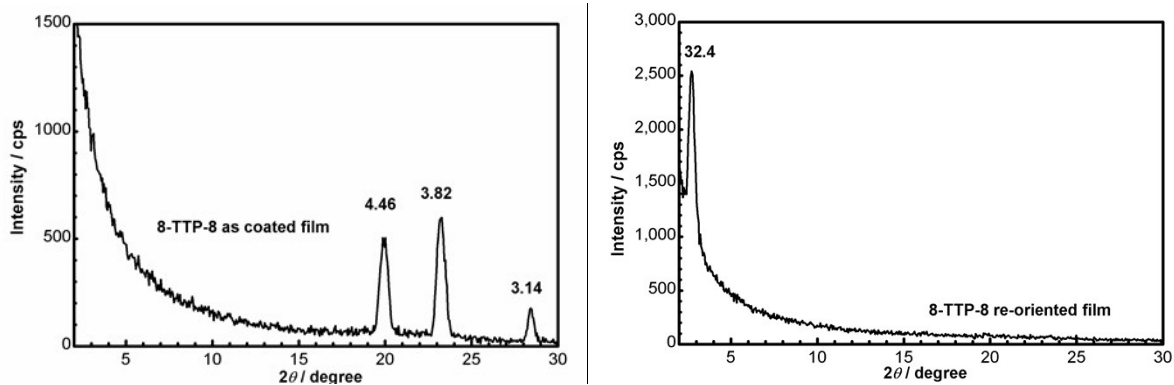


**ESI Fig. 17** Out- of- plane XRD patterns of as coated film of 8-PNP-O4 (left) and re-oriented films of 8-PNP-O4 (right)

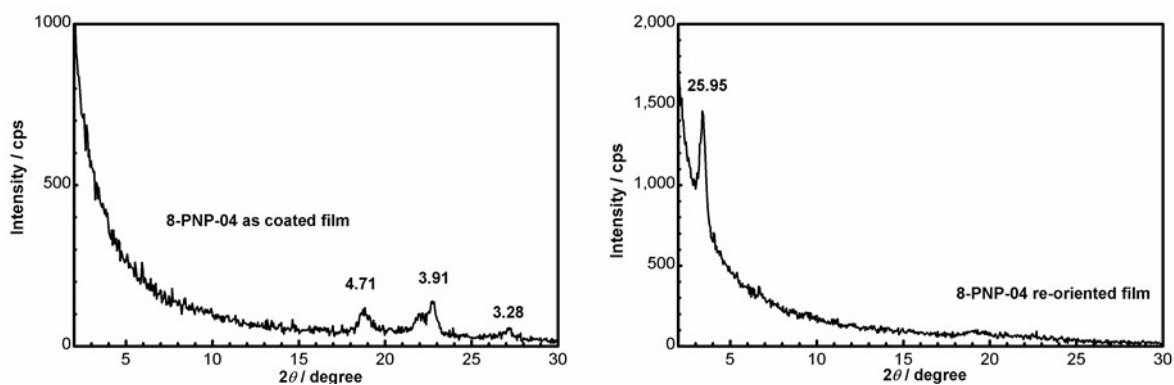
2) In- plane XRD



**ESI Fig. 18** In- plane XRD patterns of as coated film of 7O-BP-CO11 (left) and re-oriented films of 7O-BP-CO11 (right)



**ESI Fig. 19** In-plane XRD patterns of as coated film of 8-TTP-8 (left) and re-oriented films of 8-TTP-8 (right)



**ESI Fig. 20** Out- of- plane XRD patterns of as coated film of 8-PNP-O4 (left) and re-oriented films of 8-PNP-O4 (right)