Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.
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Supporting Information

In situ patterning microgrooves via inkjet etching for solution-processed OLED display

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1. PVK and CYtop's resistance to solvent erosion

To study the PVK layer's erosion resistance to CYtop solvent, we examined the film thickness of the PVK layer (HTL) before and after CYtop solvent treatment using a Veeco Dektak 150 surface profilometer. To treat the PVK surface with solvent, 60 μL of the CYtop solvent was spin-coated on top of the PVK layer with the spinning speed of 2000 rpm for 1 min inside a nitrogen filled glove box. The results are shown in Figure S1 (a). After CYtop solvent treatment, the film thickness of PVK layer remains unchanged.

To study the CYtop layer's erosion resistance to *o*-DCB solvent, we examined the film thickness of CYtop layer before and after *o*-DCB solvent treatment using a Veeco Dektak 150 surface profilometer. To treat the CYtop surface with solvent, 60 μL of *o*-DCB was spin-coated on top of the CYtop layer with the spinning speed of 2000 rpm for 1 min inside a nitrogen filled glove box. The results are shown Figure S1 (b). After *o*-DCB solvent treatment, the film thickness of CYtop layer remains unchanged. The orthogonal solubility between CYtop polymer and organic layer avoids any solvent erosion.

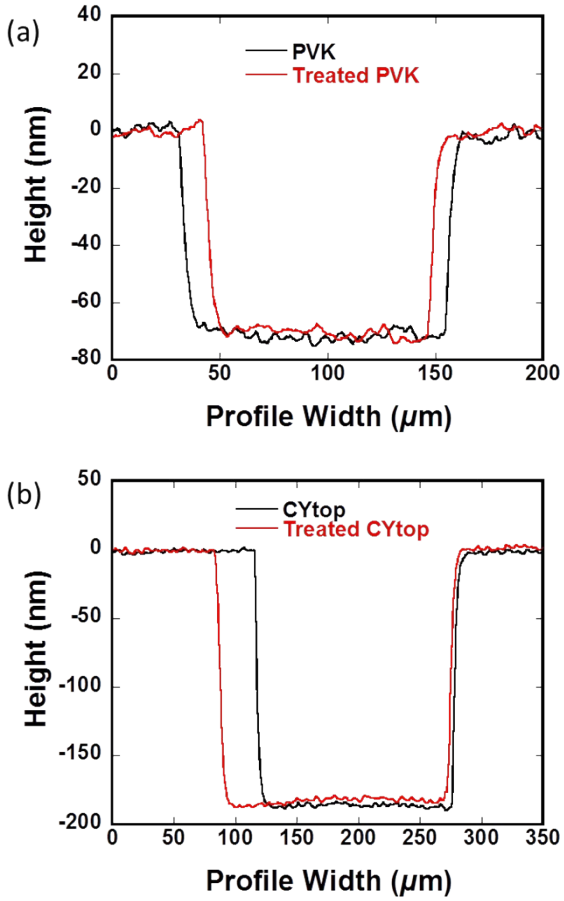

Figure. S1 (a) The film thickness of PVK layer (HTL) before and after CYtop solvent treatment. **(b)** The film thickness of CYtop layer before and after *o*-DCB solvent treatment.

2. The wettability of the red and the green materials

The contact angles of the red and the green emitting materials on PVK and CYtop substrates have been studied. The red and the green emitting materials are PPF-SO-DHTBT, and PPF-SO-BT, respectively (Adv. Funct. Mater. 2013, 23, 4366−4376). Both of them are dissolved in o-dichlorobenzene at 12 mg/mL. The contact angle of PPF-SO-DHTBT is 59.4° on PVK, and 10.0°on CYtop. The contact angle of PPF-SO-BT is 64.3° on PVK, and 10.5° on CYtop, as shown in the following figure. The lyophobic CYtop banks on the lyophilic PVK act as combined physical barriers and surface energy barriers to receive and confine the inkjet-printed droplets

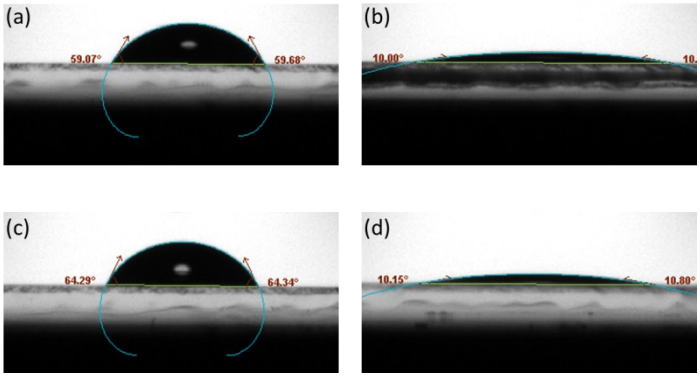

Figure. S2 The contact angle of the PPF-SO-DHTBT on **(a)** the CYtop substrate, and **(b)** the PVK substrate. The contact angle of the PPF-SO-BT on **(c)** the CYtop substrate, and **(d)** the PVK substrate.