## **Supplementary Information for**

## Utilization of "thiol-ene" photo cross-linkable hole-transporting polymer for solution-processed multilayer organic light-emitting diode

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Fig. S4. <sup>1</sup>H-NMR spectrum of compound 5.







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**Fig. S6**. <sup>13</sup>C-NMR spectrum of compound **4**.



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**Fig. S7**. <sup>13</sup>C-NMR spectrum of compound **6**.



Fig. S8. TGA thermogram of Allyl-TFB.



Fig. S9. DSC thermogram of Allyl-TFB.



**Fig. S10**. UV-Vis. absorption spectra of photo cross-linked Allyl-TFB films before and after solvent rinsing with different UV irradiation times.

(a) UV irradiation for 5 sec.



(c) UV irradiation for 60 sec.



(e) UV irradiation for 240 sec.



(b) UV irradiation for 10 sec.



(d) UV irradiation for 120 sec.



**Fig. S11**. Atomic force microscopic images of photo cross-linked HTL films with different UV irradiation times.

(a) UV irradiation for 30 sec.



(b) UV irradiation for 180 sec.



**Fig. S12**. Atmospheric photoelectron spectroscopy (Riken AC-2) measurement results of photo cross-linked HTL films with different UV irradiation times.

(a) UV irradiation for 30 sec.

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ſ	100.0		Data Disp	
I			Sample Name	UV exp-30sec
L			Measure Date	8/1/2013 3 19:35 PM
L	90.0		UV Intensity [nW]	49.8
I			Target of UV Intensity Adju:	50.0
L			Name of Quantity of light cc	KRICT
I	80.0		Counting Time [sec]	10
I			Anode Voltage [V]	2980
L			Dead Time	0.00547
I	70.0		Start Energy [eV]	4.50
L			Finish Energy [eV]	6.20
I			Step [eV]	0.05
L	60.0		Work Function [eV]	5.39
I	00.0		Gradient of Regression Lin	42.22
L		1	Power Number	0.50
I	50.0		Ground Level	1.49
L	30.0		Quantity of light correction	×
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(b) UV irradiation for 180 sec.



**Fig. S13**. Current density(J)-electric field(F) characteristics of hole-only devices of photo crosslinked HTL films with different UV irradiation times. [ITO / PEDOT:PSS / <u>cross-linked Allyl-TFB</u> / Au].

