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Supporting Information

Stabilization of planar heterojunction solar cells using a dimethyl sulfoxide-treated hole transport layer

Elaheh Habibzadeh, Joseph Palathinkal Thomas and Kam Tong Leung*

WATLab and Department of Chemistry, University of Waterloo, Waterloo, Ontario N2L3G1, Canada

E-mail: tong@uwaterloo.ca

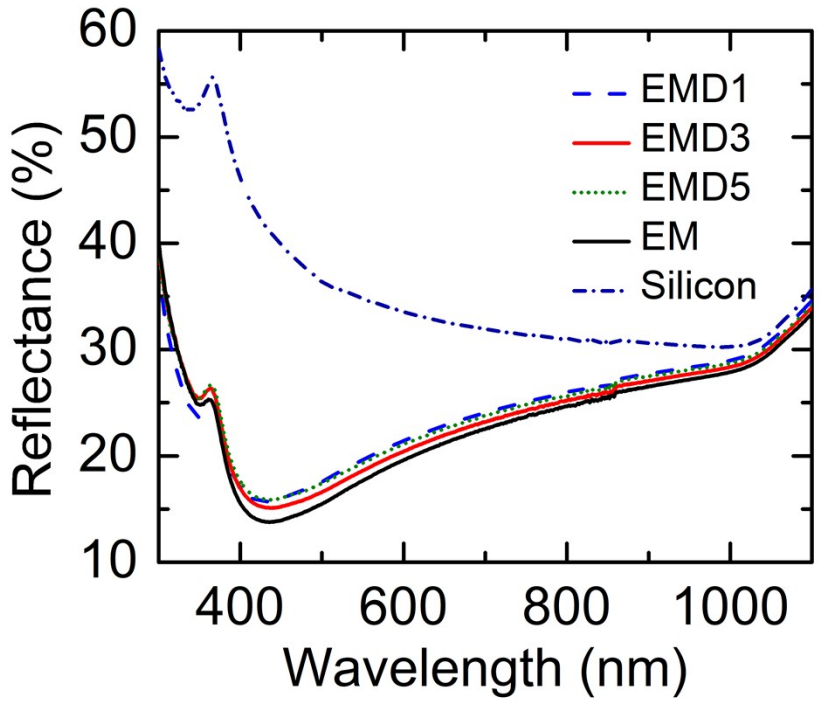

Fig. S1 Reflectance spectra of silicon, and EM, EMD1, EMD3 and EMD5 films deposited on silicon.

Table S1. Performance data of solar cells fabricated with cosolvent-added PEDOT:PSS EM (used as the control solution), and EM with added DMSO of selected concentrations: 1 wt% (EMD1), 3 wt% (EMD3), and 5 wt% (EMD5).

Solar cell based on as-deposited PEDOT:PSS film	J_{SC} (mA/cm^2)	V_{OC} (mV)	FF (%)	PCE (%)
EMD1	28.9	632.9	61.6	11.3
EMD3	30.1	642.4	69.4	13.4
EMD5	27.8	571.7	60.7	9.6
EM	28.1	645.1	62.6	11.4

Table S2. Performance data of as-fabricated solar cells with cosolvent-added PEDOT:PSS EMD3 and EM films and after ambient storage of selected hours.

Solar cell sample	J_{SC} (mA/cm^2)	V_{OC} (mV)	FF (%)	PCE (%)
EMD3 – 0 h	30.1	642.4	69.4	13.4
EMD3 – 48 h	29.9	631.3	66.4	12.5
EMD3 – 72 h	29.6	630.6	64.1	12.0
EMD3 – 144 h	29.6	624.4	61.0	11.3
EMD3 – 168 h	29.4	617.9	58.7	10.7
EMD3 – 216 h	29.2	613.0	53.9	9.7
EM – 0 h	28.1	645.1	62.6	11.4
EM – 24 h	28.0	579.7	45.8	7.4
EM – 72 h	27.7	526.8	38.9	5.7

Table S3. Performance data of solar cells fabricated with cosolvent-added PEDOT:PSS EMD3 and EM films after 72 h of ambient storage. Data for as-fabricated solar cells (without any ambient storage) are given in parentheses. The corresponding reductions (Red.) for the data after 72 h of ambient storage are also given in percentage of the respective as-fabricated values. The three EMD3 cells separately prepared are labelled as #1, #2, and #3.

Solar cell sample after 72 h ambient storage	J_{SC} (mA/cm^2)	Red. (%)	V_{OC} (mV)	Red. (%)	FF (%)	Red. (%)	PCE (%)	Red. (%)
EMD3 #1	29.6 (30.1)	1.5	630.6 (642.4)	1.8	64.1 (69.4)	7.5	12.0 (13.4)	10.6
EMD3 #2	30.1 (30.3)	0.5	639.5 (648.6)	1.4	53.2 (63.1)	15.7	10.3 (12.4)	17.3
EMD3 #3	30.0 (30.0)	0.3	639.2 (646.1)	1.1	56.6 (64.8)	12.7	10.8 (12.6)	13.9
Average	29.9 ± 0.3 (30.1 ± 0.2)	0.8	636.4 ± 5.1 (645.7 ± 3.1)	1.4	58.0 ± 5.6 (65.8 ± 3.3)	12.0	11.0 ± 0.9 (12.8 ± 0.5)	13.9
EM	27.7 (28.1)	1.4	526.8 (645.1)	18.3	38.9 (62.6)	37.9	5.7 (11.4)	50.1

Table S4. Performance data of six solar cells fabricated with cosolvent-added PEDOT:PSS EMD3 films.

Solar cell as-fabricated with EMD3	J_{SC} (mA/cm^2)	V_{OC} (mV)	FF (%)	PCE (%)
#1	30.1	642.4	69.4	13.4
#2	30.3	648.6	63.1	12.4
#3	30.0	646.1	64.8	12.6
#4	29.9	619.9	64.7	12.0
#5	28.6	644.9	65.0	12.0
#6	28.8	645.1	63.7	11.8
Average	29.6 ± 0.7	641.2 ± 10.6	65.1 ± 2.2	12.4 ± 0.6

Table S5. Repeated measurement test of performance data for solar cells fabricated with cosolvent-added PEDOT:PSS EMD3 and EM films.

Solar cell as-fabricated with cosolvent-added PEDOT:PSS	J_{SC} (mA/cm^2)	V_{OC} (mV)	FF (%)	PCE (%)
EMD3 – first measurement	29.9	642.2	69.3	13.3
EMD3 – second measurement	30.1	642.4	69.4	13.4
Average	30.0 ± 0.1	642.3 ± 0.1	69.4 ± 0.1	13.4± 0.1
EM – first measurement	28.03	643.8	62.6	11.3
EM – second measurement	28.1	645.1	62.6	11.4
Average	28.1 ± 0.1	644.5 ± 0.9	62.6 ± 0.0	11.4 ± 0.1