

## Supplementary Information

### Electrophoretic Deposited Oxide Thin Films as Charge Transporting Interlayers for Solution-Processed Optoelectronic Devices: the Case of ZnO Nanocrystals

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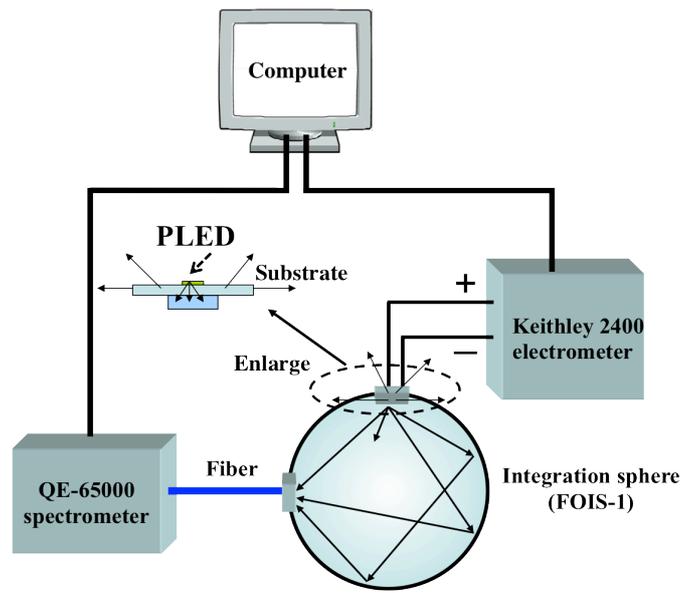
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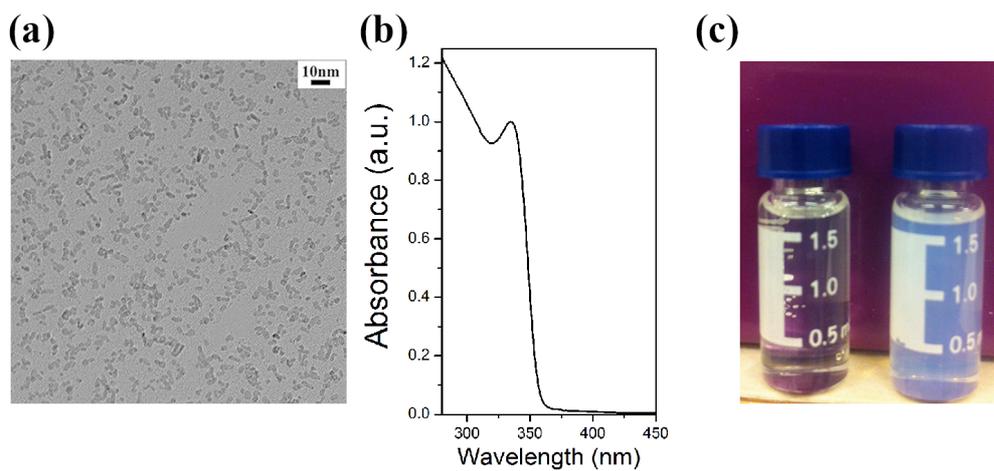
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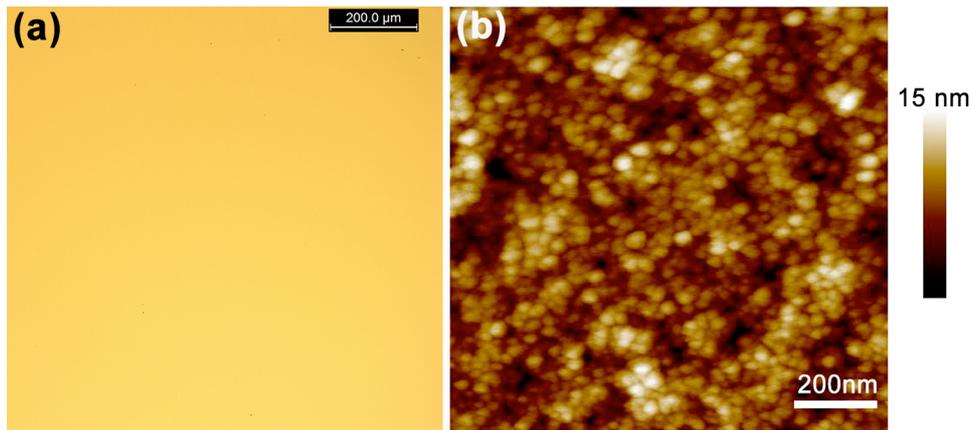
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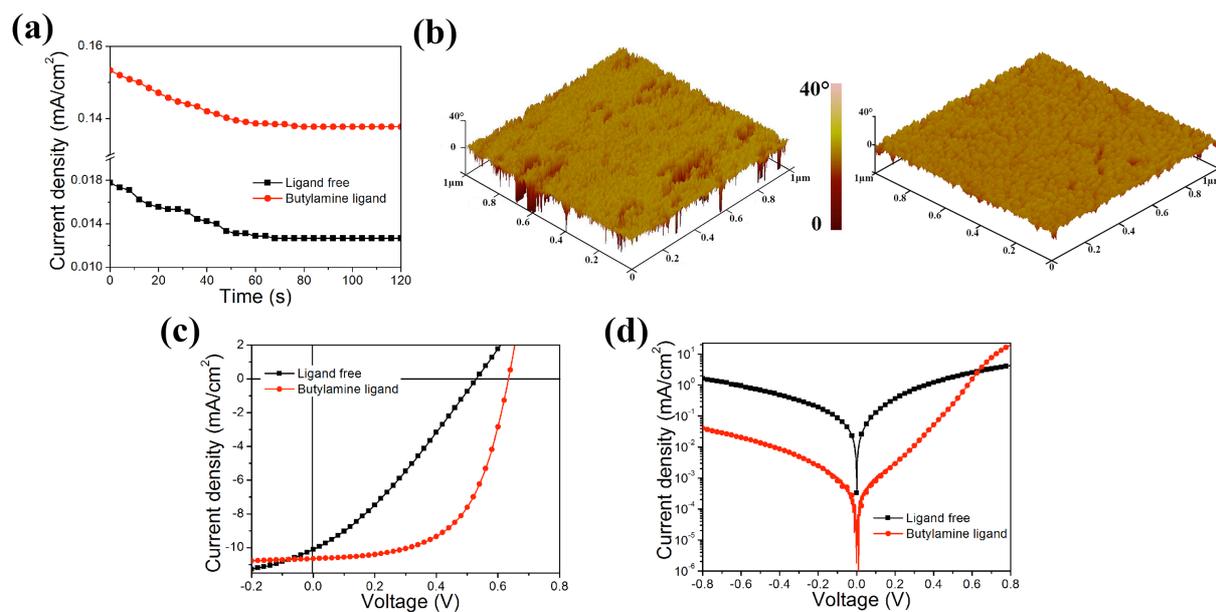
**Scheme S1.** PLED measurement system.



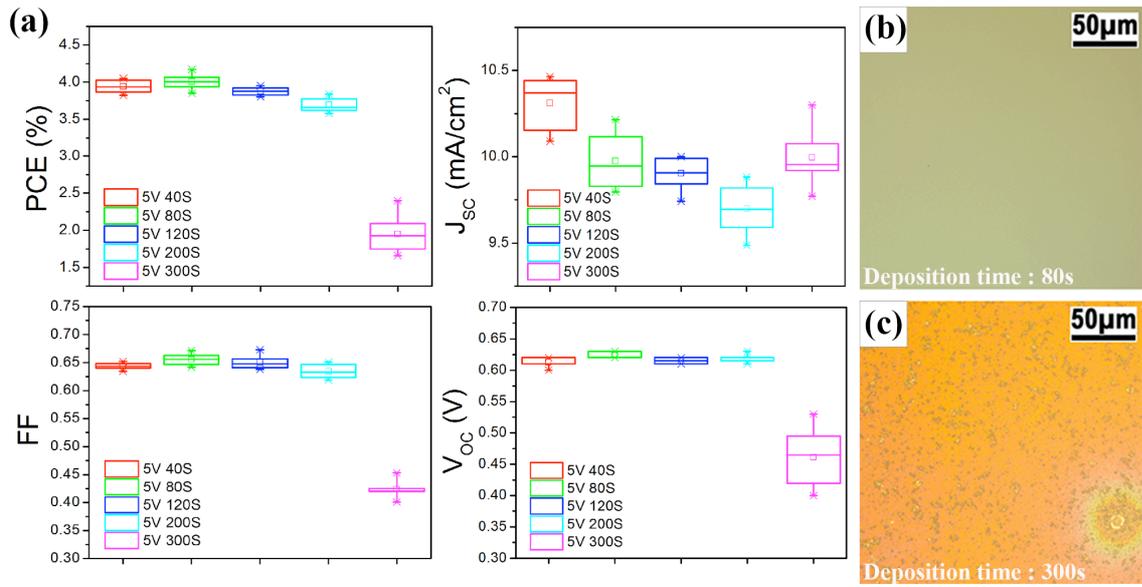
**Fig. S1** a) A typical TEM image of colloidal ZnO nanocrystals. b) Absorption spectrum of the ZnO nanocrystal solution. c) Digital pictures of the nanocrystal solution with (left) and without butylamine ligand (right) stored under ambient conditions for 60 and 10 days, respectively.



**Fig. S2** a) Optical image of 1 mm<sup>2</sup> area EPD ZnO film obtained at 5V for 120 s. b) Typical ZnO thin films obtained by spin-coating at 4000 rpm using a nanocrystal solution with chloroform and methanol as the solvent.



**Fig. S3** a) Current density versus time during the EPD experiments of ZnO nanocrystal solution. b) 3D AFM phase images of EPD processed ZnO nanocrystal films obtained from the solution without ligand (left) and with butylamine as capping ligand (right) under the same applied voltage, respectively. c) and d) J-V curves of inverted P3HT: PC<sub>61</sub>BM solar cells fabricated on EPD ZnO films (both with and without butylamine ligands) under illumination and dark, respectively.



**Fig. S4** a) Standard deviation profiles for all device parameters of the inverted organic solar cells based on the analysis of ten devices with EPD processed ZnO interlayers deposited from different deposition time. b) and c) Optical images of EPD processed ZnO interlayers obtained from different deposition time under 5 V applied voltage.

**Tab. S1** Summary of processing parameters and the performance of inverted P3HT: PC<sub>61</sub>BM solar cells based on the EPD processed ZnO interlayers.

<b>Experiment No.</b>	<b>EPD parameters</b>	<b>Butylamine Ligands</b>	<b>Average <i>PCE</i> (%)</b>	<b>Best <i>PCE</i> (%)</b>
1	5 V, 120 s	Yes	4.04	4.24
2	5 V, 120 s	No	1.53	1.65
3	5 V, 40 s	Yes	3.90	4.05
4	5 V, 80 s	Yes	4.02	4.19
5	5 V, 200 s	Yes	3.64	3.84
6	5 V, 300 s	Yes	1.83	2.15