

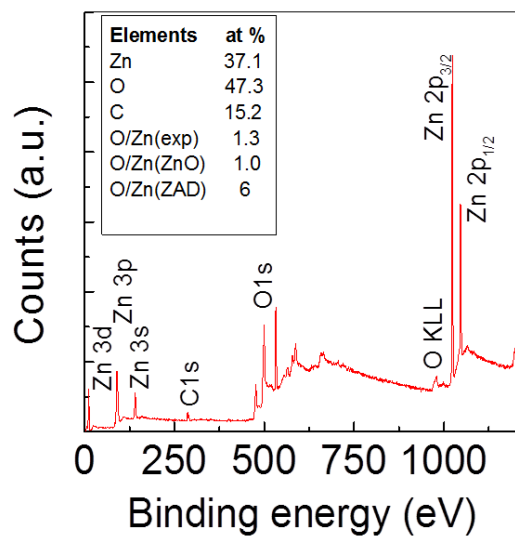
Efficient Inverted Bulk-Heterojunction Solar Cells from Low-Temperature Processing of Amorphous ZnO Buffer Layers

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(a)



(b)

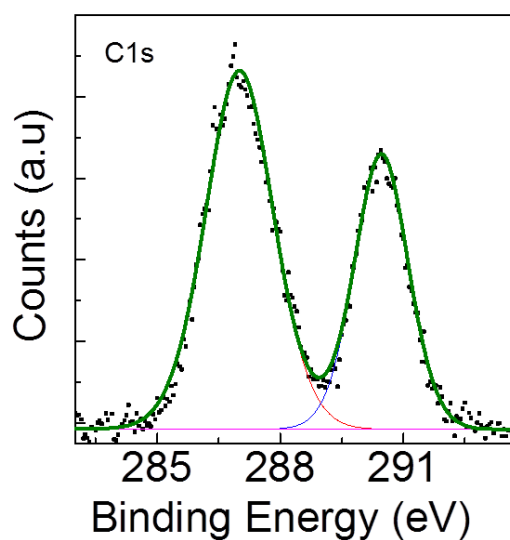


Figure S1(a) XPS survey scan of a low-temperature solution-processed a-ZnO film on gold foil. Inset of (a) shows the estimated atomic fraction of the elements in the film. (b) High resolution XPS spectra of C1s core levels combined with peak fits to the spectra

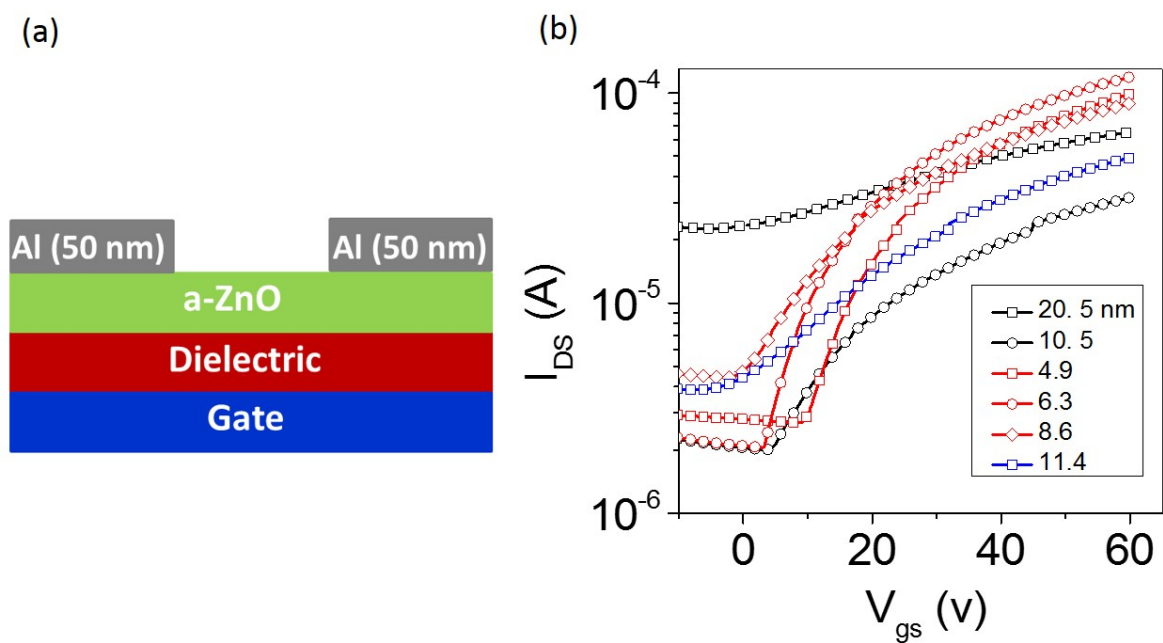


Figure S2. (a) a-ZnO thin film transistor device structure on Si/SiO₂ (300 nm) substrate (b) Transfer characteristics of a-ZnO-thin film FETs as a function of RMS surface roughness.

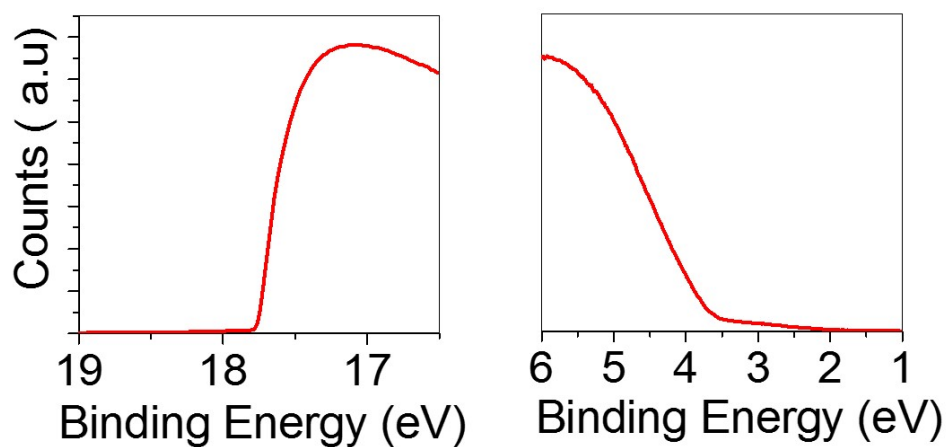


Figure S3. Typical UPS spectra of a-ZnO thin films prepared on Au foil.

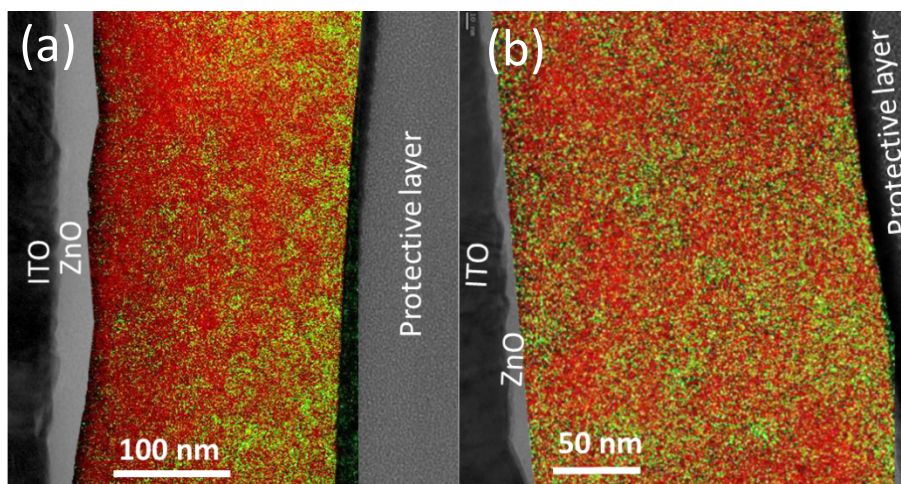


Figure S4. Cross-sectional TEM images of the ITO/ZnO/P3HT:PCBM layer structure with the respective elemental map (Red: C & Green: S) taken on the same location superimposed over the active layer region (a) ZnO layer prepared from a high precursor concentration (0.46 M) (b) ZnO layer prepared from a low precursor concentration of 0.07 M.

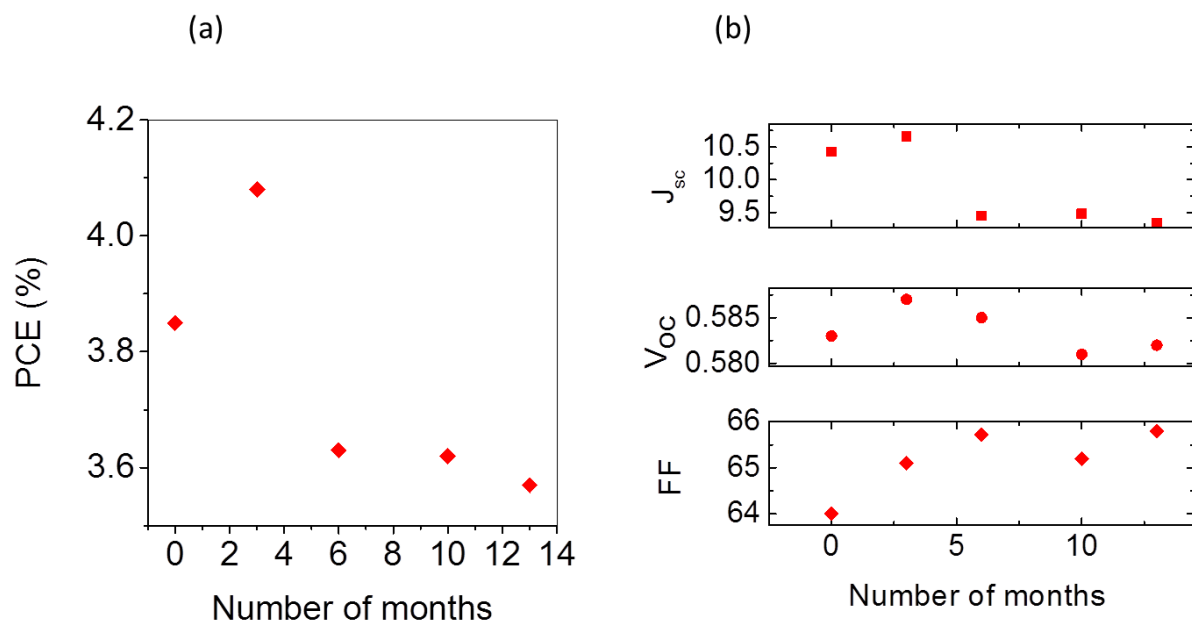


Figure S5 (a) Variation of PCE (of the best device based on P3HT:PCBM active layer) and (b) other device performance parameters such as FF (%), V_{oc} (V) and J_{sc} (mA/cm²) over 13 months duration.

SI-Table 1

Variation of PCE, and other performance parameters (V_{oc} , J_{sc} and FF) of PTB7:PC71BM OPVs after 3 months of aging.

| | | PCE (%) | V_{oc} (V) | FF (%) | J_{sc} (mA/cm ²) |
|----------------|-------|---------|--------------|--------|--------------------------------|
| Initial | glass | 6.54 | 0.735 | 63 | 14.2 |
| | PET | 5.6 | 0.724 | 70 | 11.0 |
| 3 months aging | glass | 5.82 | 0.745 | 67 | 11.6 |
| | PET | 5.1 | 0.735 | 72 | 9.6 |