

Supporting information

**ZnO@Ag<sub>2</sub>S core-shell nanowire arrays for environmental friendly solid-state quantum dot-sensitized solar cell with panchromatic light capture and enhanced electron collection**

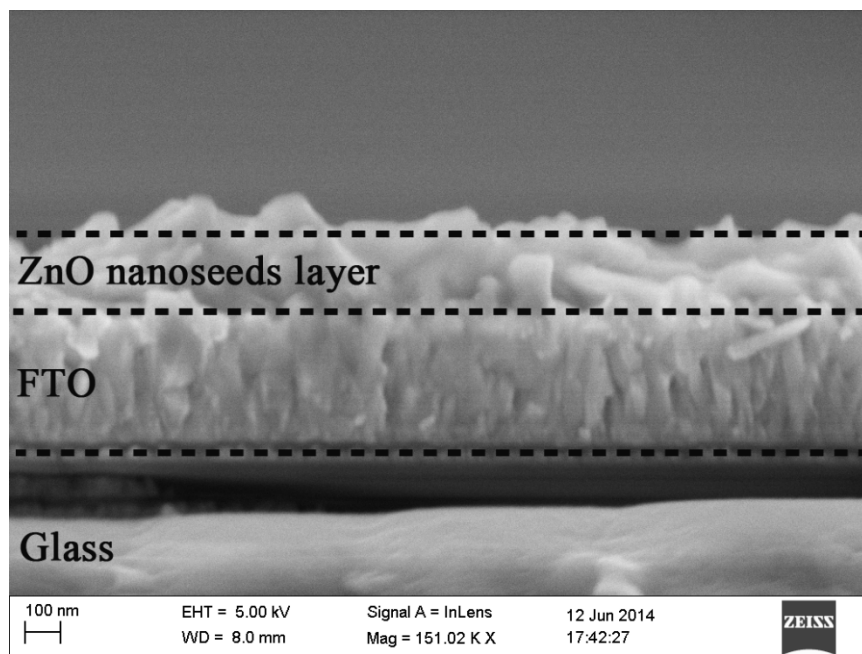
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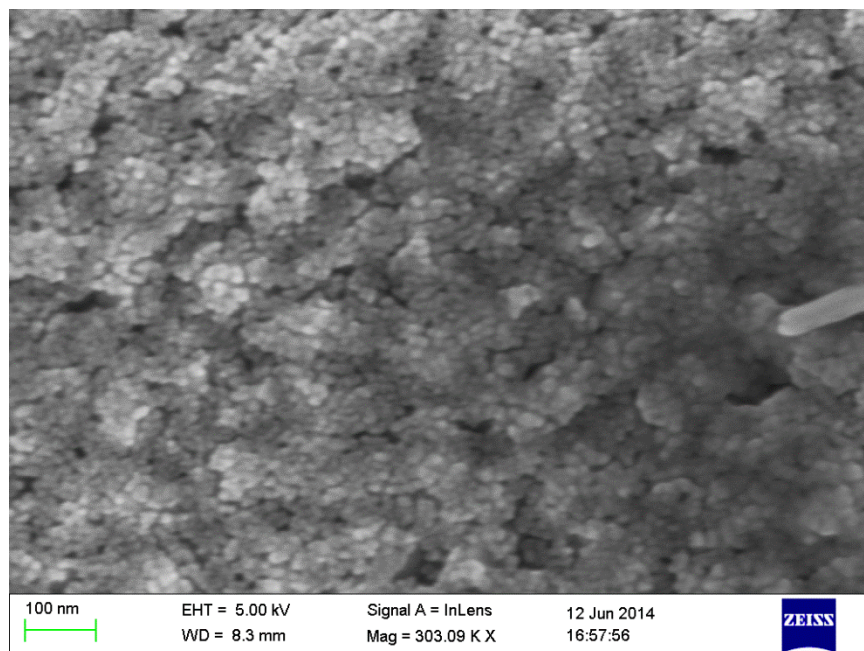
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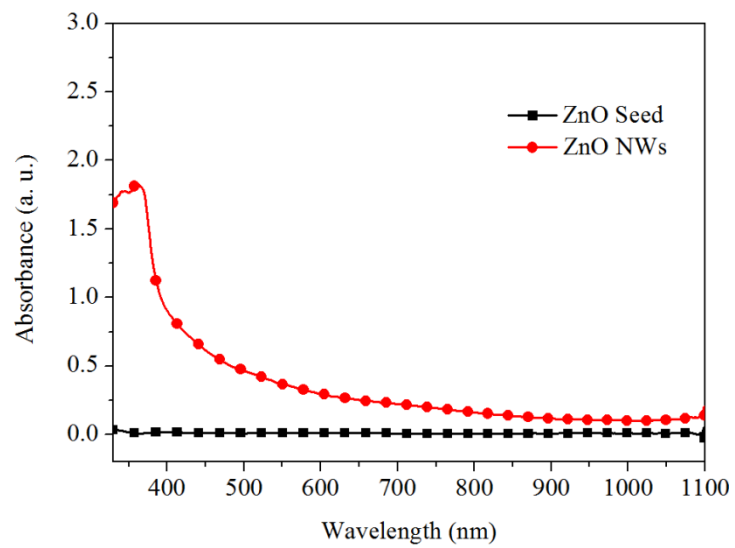
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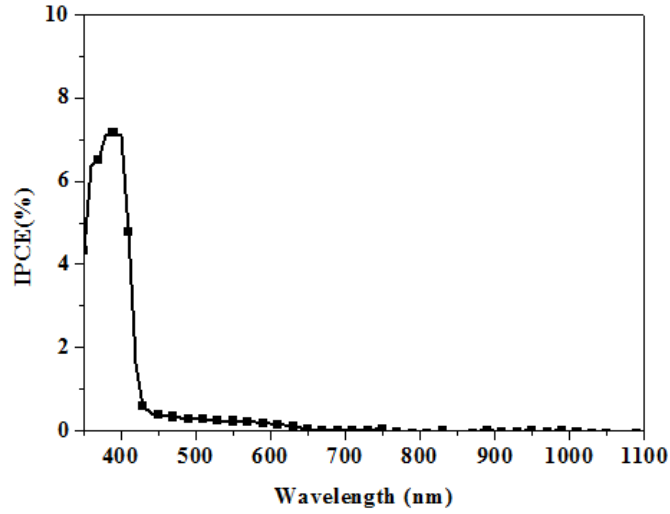
**Figure S1.** Cross-sectional SEM image of ZnO nano seeds layer covered FTO substrate. The layer thickness is around 100 nm.



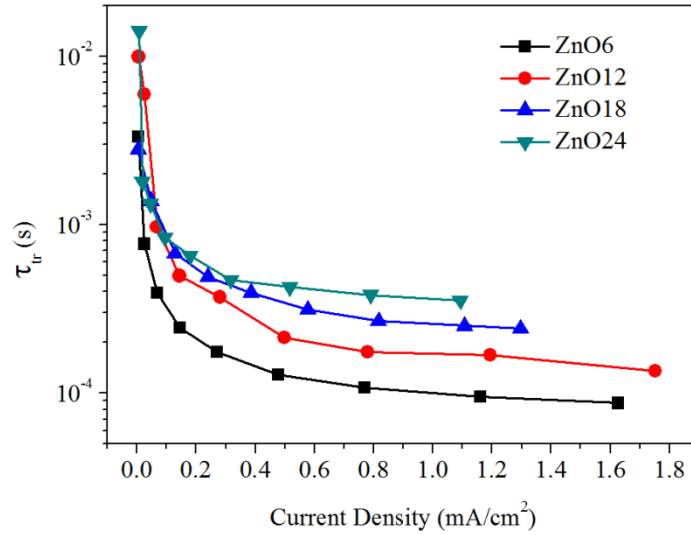
**Figure S2.** SEM image of top surface of ZnO NPs seeds covered FTO substrates.



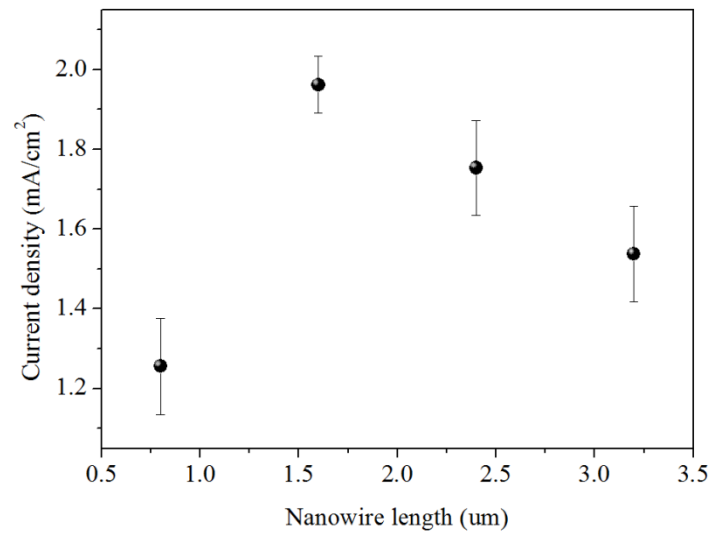
**Figure S3.** Light absorption spectra of ZnO NWAs film.



**Figure S4.** IPCE spectrum of the device without QDs than only contains NWAs and P3HT.



**Figure S5.** Electron transport time as function of short-circuit density for NWAs device with different NW length.



**Figure S6.** Photocurrent density as a function of NW length in core-shell NWAs photoanode.