Supporting Information for:

A Comparison of the Behavior of Single Crystalline and Nanowire Array ZnO Photoanodes

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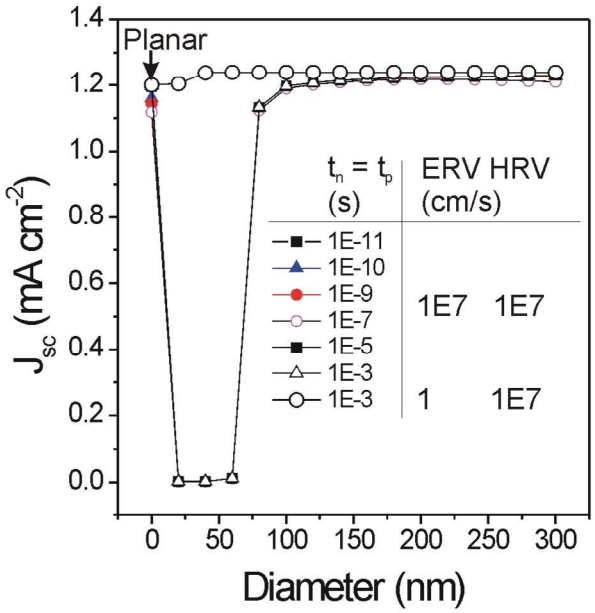

Figure S1. Simulated short circuit current densities under 1-sun illumination for ZnO nanowires with varying diameter, electron and hole lifetime, and interfacial electron and hole recombination velocities. Despite long carrier lifetimes of 1 ms large J_{SC} values are not observed in wires with d<75 nm. However, when the electron recombination velocity is reduced, simulating a 'hole-selective' contact characteristic of dye-sensitized solar cells, large J_{SC} values are obtained even at small wire diameters where very little electric field is present (See **Figure S2**).

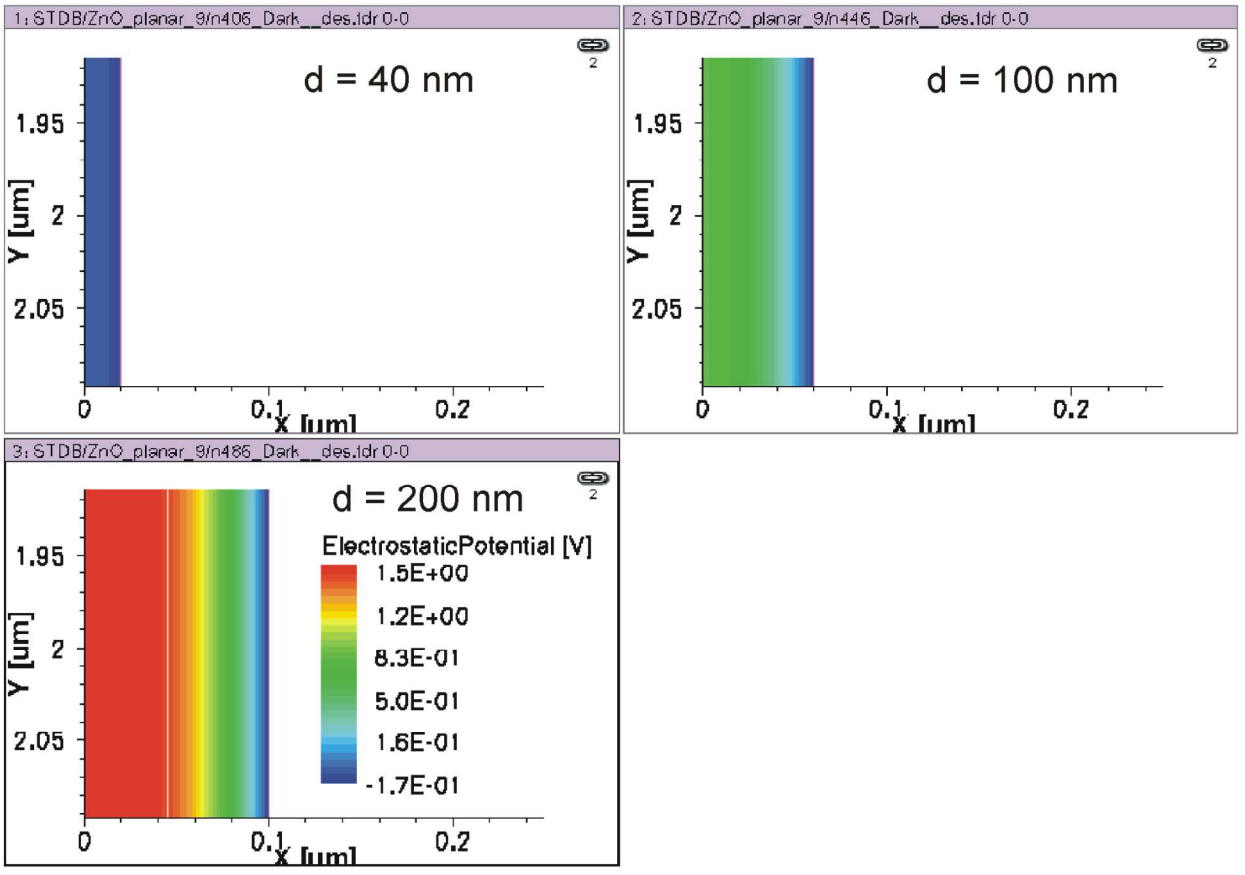

Figure S2. Simulatedelectrostatic potential in the dark, plotted vs. spatial coordinates of cross-sections of one half of ZnO nanowires with diameters of 40 nm, 100 nm, and 200 nm.

Table S1. Parameters for the device physics simulation

Parameter	**Value**
Band Gap	3.3 (eV)
Electron Affinity	3.7 (eV)
Electron DOS	4.0E18 (cm^{-3})
Hole DOS	1.8E19 (cm^{-3})
Electron Mobility	50 ($cm^2 V^{-1} s^{-1}$)
Hole Mobility	10 ($cm^2 V^{-1} s^{-1}$)
Electron lifetime	1E-9 (s)
Hole lifetime	1E-9 (s)
Electron Recombination Velocity	1E7 ($cm\ s^{-1}$)
Hole Recombination Velocity	1E7 ($cm\ s^{-1}$)

Index of refraction data and absorption coefficient data were taken from Ref 1.

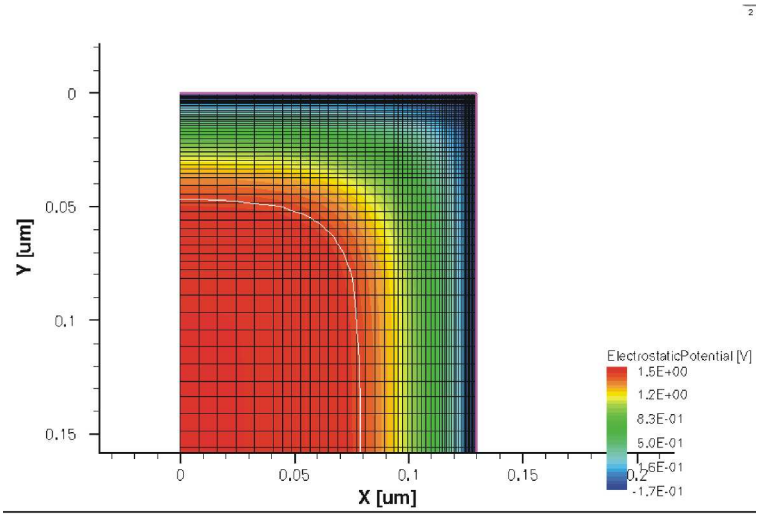

Figure S4. Example of the simulation mesh used in device physics simulations.

References:

(1) Yoshikawa, H.; Adachi, S. *Japanese Journal of Applied Physics***1997**, *36*, 6237.

Complete Reference 2:

2. Boettcher, S. W.; Warren, E. L.; Putnam, M. C.; Santori, E. A.; Turner-Evans, D.; Kelzenberg, M. D.; Walter, M. G.; McKone, J. R.; Brunschwig, B. S.; Atwater, H. A.; Lewis, N.S., *J. Am. Chem. Soc.***2011,***133*, 1216-1219.