

*Supporting Information for:*

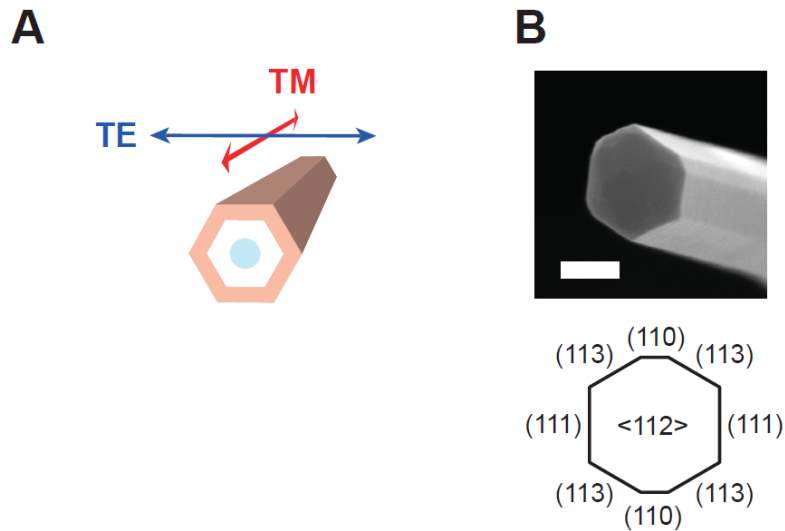
## **Tuning Light Absorption in Core/Shell Silicon Nanowire Photovoltaic Devices through Morphological Design**

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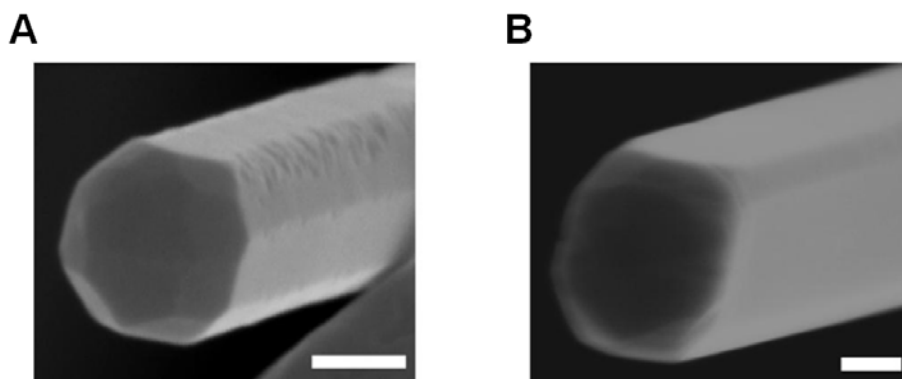
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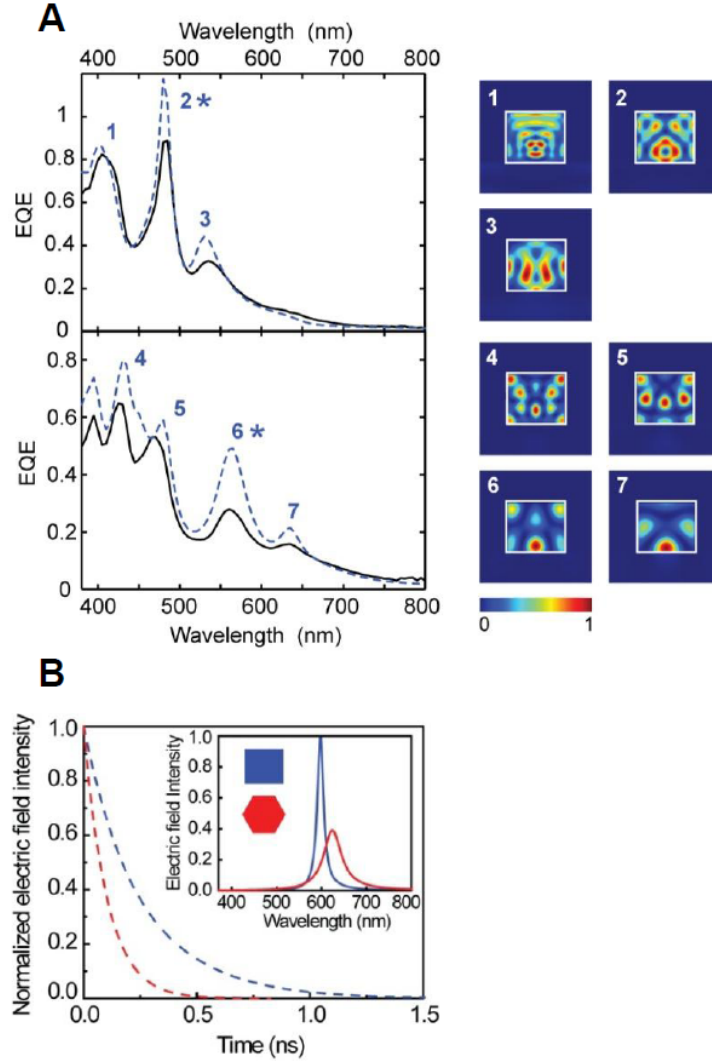
Supplementary Figures S1 – S3



**Figure S1. Characterization of hexagonal p/i/n Si NWs.** (A) Schematic illustration of the electric field vector for TE and TM polarizations. (B) SEM image (top) of a p/i/n NW showing the approximately hexagonal cross-sectional morphology of the NW. Scale bar, 200 nm. Schematic illustration (bottom) of the NW cross-sectional morphology assigning faceted surfaces to {110}, {113}, and {111} crystal planes.



**Figure S2. Characterization of p/i/n Si NWs grown with phosphine during shell growth.** (A) SEM image of a p/i/n NW with n-shell grown for 25 minutes at 860 °C. (B) SEM image of an approximately rectangular p/i/in NW with n-shell grown for 40 minutes at 860 °C. Scale bar, 100 nm.



**Figure S3. Polarization-resolved EQE spectra of a small rectangular NW and comparison of peak widths in hexagonal and rectangular NWs.** (A) Left, experimental (solid black) and simulated (dashed blue) EQE spectra collected with TE (top) and TM (bottom) polarization for a rectangular p/i/n NW with a diameter of  $\sim 200$  nm. Absorption modes with high symmetry are marked by \*. Right, absorption mode profiles corresponding to the peaks labeled on left. (B) Time-dependent decay of electric field intensity for the resonant mode centered at  $\sim 600$  nm in Si NW cavities with hexagonal (dashed red) and rectangular (dashed blue) morphology and diameter of 280 nm. Inset, Fourier transforms of the time-dependent signals, showing the narrow, high amplitude mode from the rectangular NW (solid blue) contrasting with the broadened and low one from the hexagonal NW (solid red).