# Supporting Information for

## Black Nanostructured $Nb_2O_5$ with Improved Solar Absorption and Enhanced Photoelectrochemical Water Splitting

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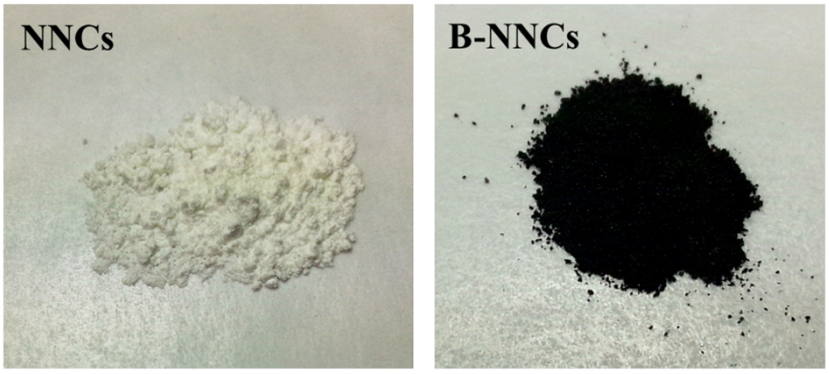


**Figure S1.** Photographs of NNCs and B-NNCs powder.

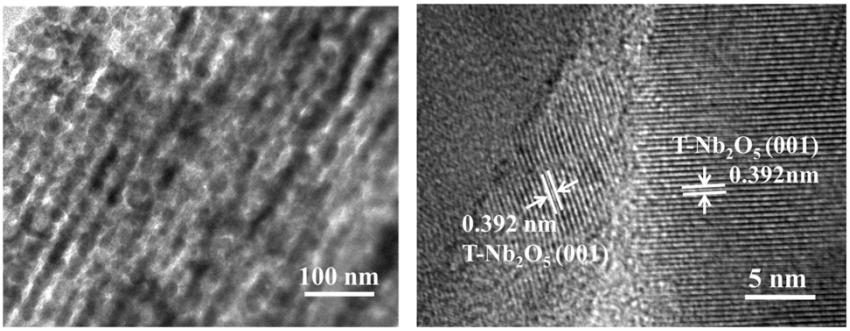


**Figure S2.** TEM and HR-TEM image of B-NNCs.

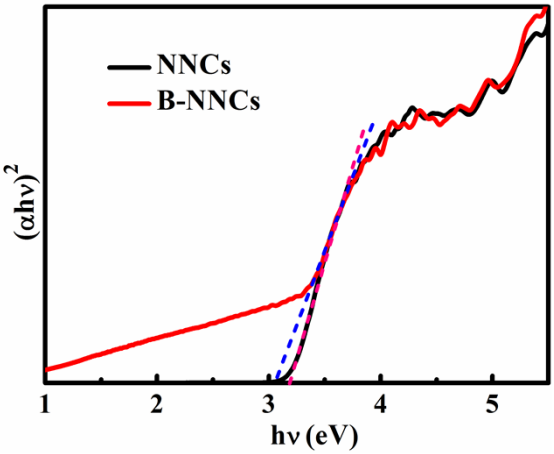


**Figure S3.** Tauc plots of two samples.

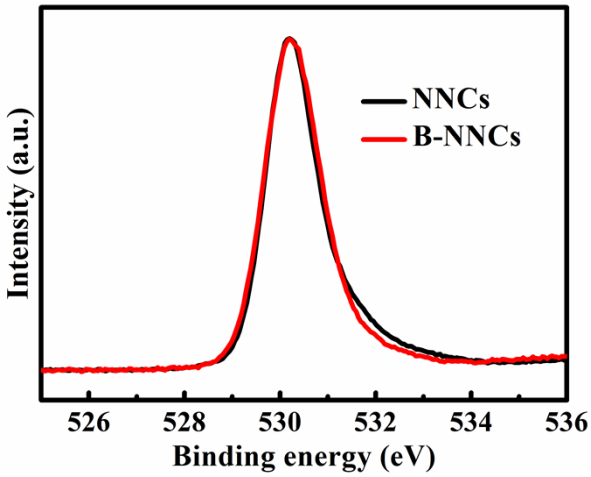


**Figure S4.** Normalized XPS O 1*s* spectra of NNCs and B-NNCs.

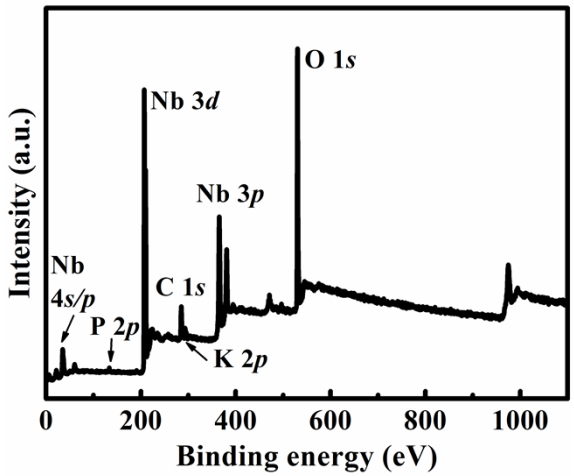


**Figure S5.** XPS survey spectrum of B-NNCs.

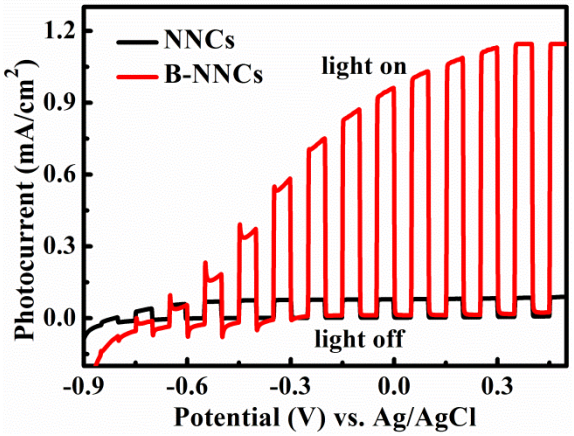


**Figure S6.** Chopped linear sweep voltammograms of NNCs and B-NNCs under simulated solar light illumination.

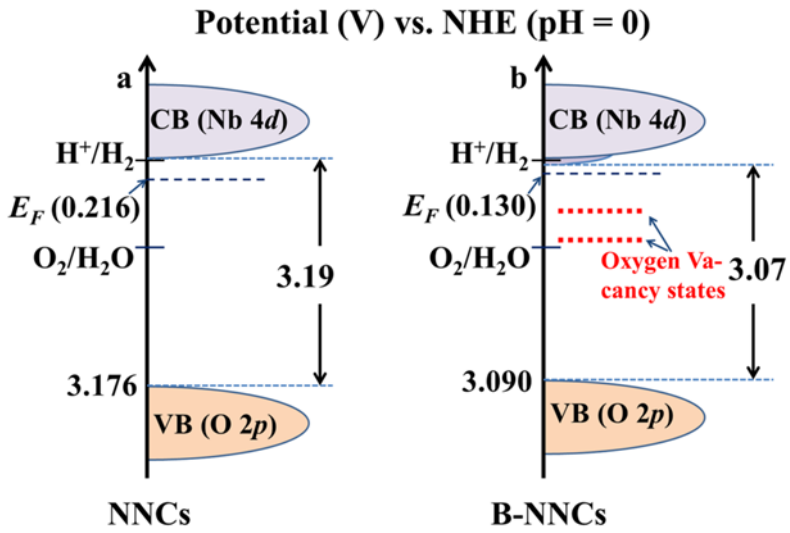


**Figure S7.** Schematic energy diagram of NNCs and B-NNCs.

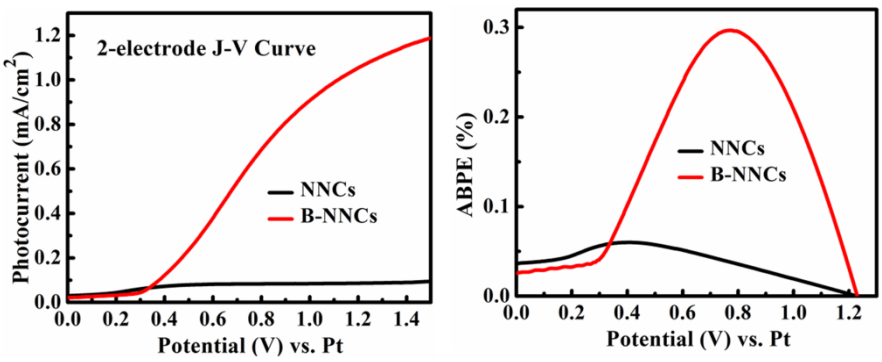


**Figure S8.** 2-electrode photocurrent-potential curves and the corresponding ABPE.

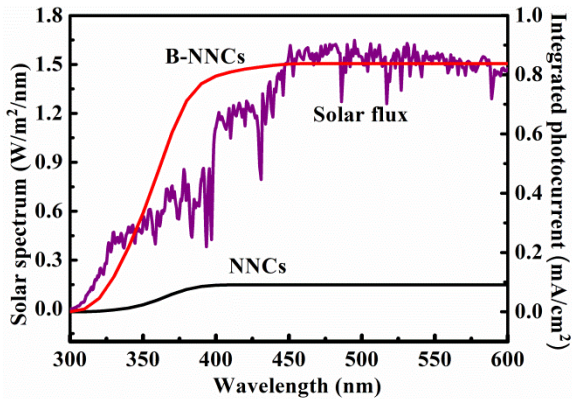


**Figure S9.** The integrated photocurrent based on the IPCE data (300 nm to 600nm). The photocurrent density was calculated by integrating the IPCE spectra with a standard AM 1.5 G solar spectrum (ASTMG-173-03), using the following equation:

$$I = \int_{300}^{600} \frac{1}{1240} \lambda IPCE(\lambda) E(\lambda) d\lambda$$

where E(λ) is the solar spectral irradiance at a specific wavelength (λ) and IPCE(λ) is the obtained IPCE profile as a function of wavelength (λ) at 0.23 V vs. Ag/AgCl (in 1

M NaOH). The calculated photocurrents (300~600 nm) are 0.838 mA $cm^{-2}$ and 0.091 mA $cm^{-2}$ for B-NNCs and NNCs, respectively.