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Supporting Information

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GaP/GaNP Heterojunctions for Efficient Solar-Driven Water Oxidation

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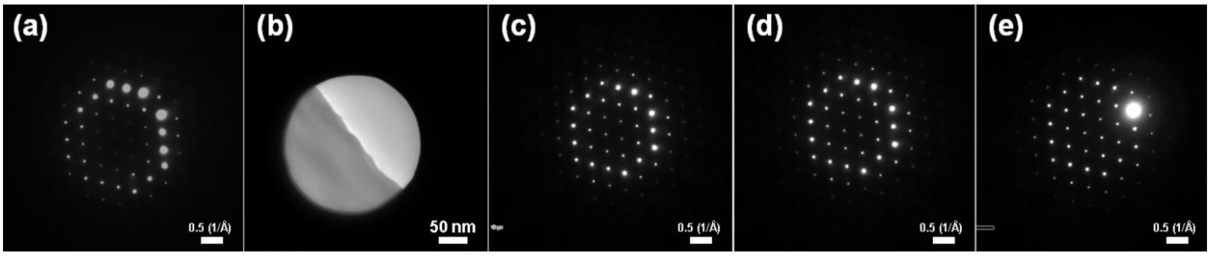

Figure S1. Selected area electron diffraction (SAED) pattern of (a) an area of n-GaP, (c) an area including both i-GaNP and p^+-GaP layers (TEM image of selected region is shown in (b)), and (d) i-GaNP and (e) p^+-GaP of selected areas in (b). The combined SAED pattern (Figure S1c) is very similar to the SAED pattern of i-GaNP (Figure S1d) and p^+-GaP (Figure S1e).

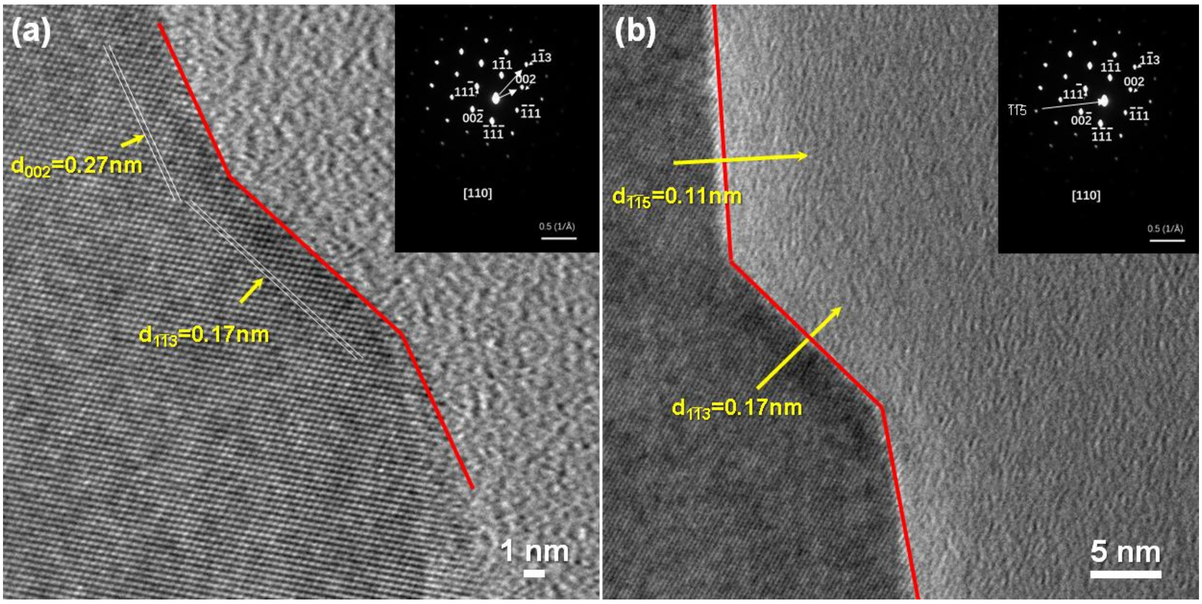

Figure S2. (a,b) HRTEM images of surface structure of n-GaP/i-GaNP/p$^+$-GaP thin film substrate with the identified facets.

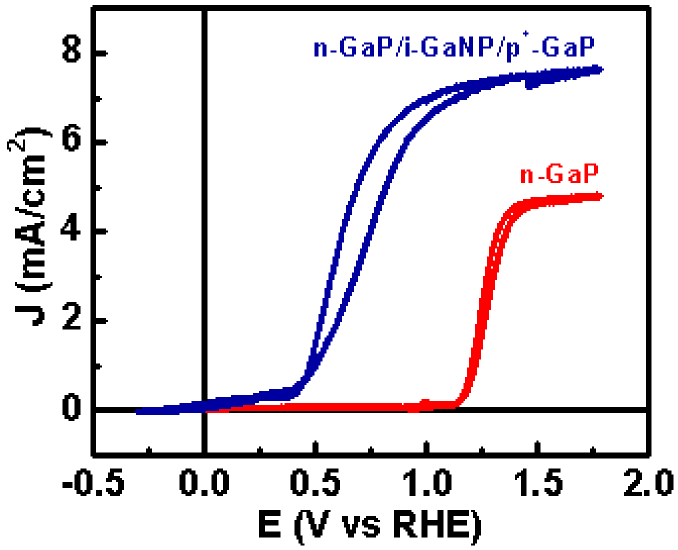

Figure S3. Cyclic voltammetry (CV) measurement under illumination of the TiO_2/Ni-coated n-GaP and n-GaP/i-GaNP/p^+-GaP thin film heterojunction substrates recorded at a scan rate of 10 mV/s in 1 M KOH electrolyte.

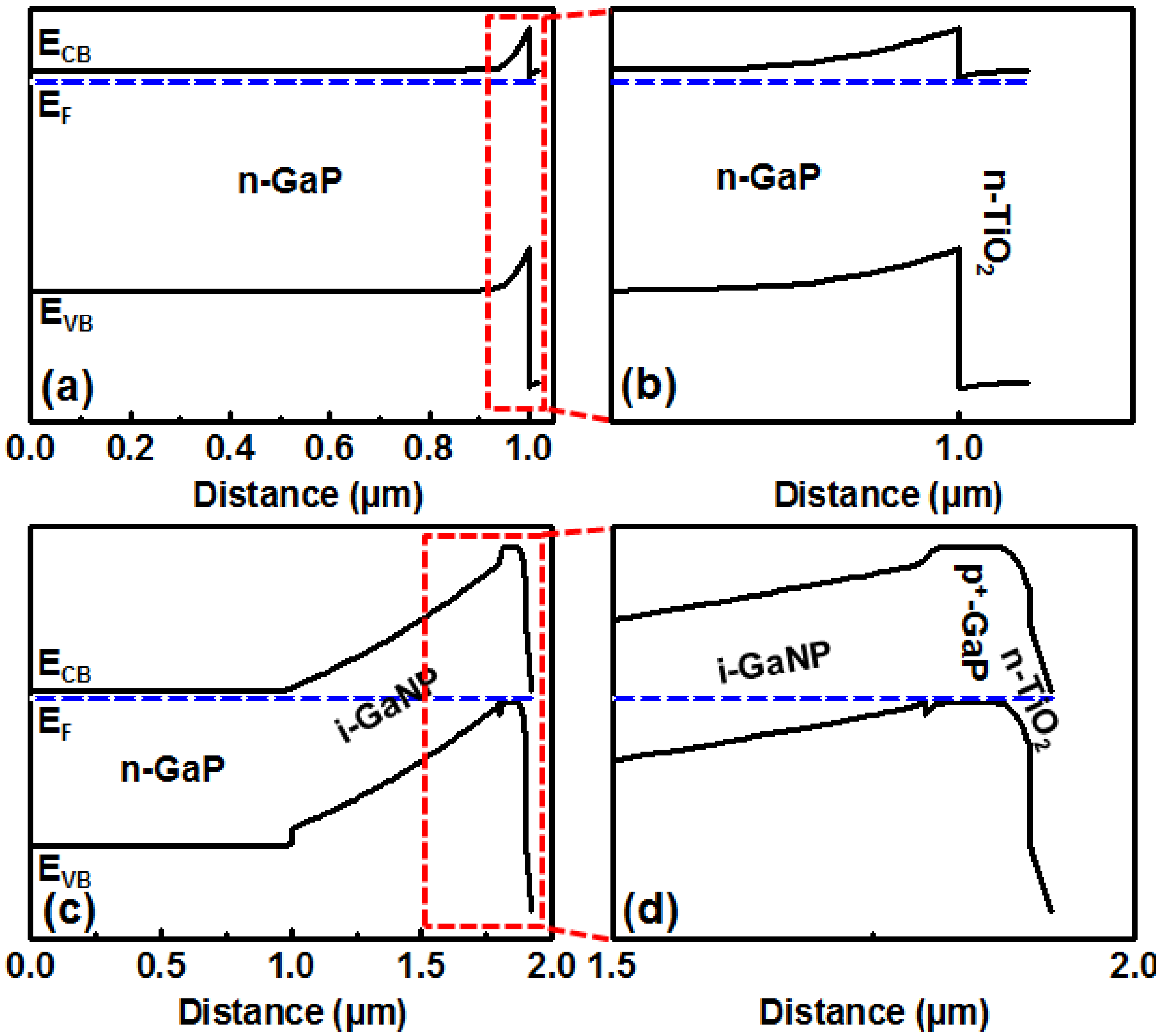

Figure S4. Approximate energy band diagram of the TiO_2-coated (a,b) n-GaP and (c,d) n-GaP/i-GaNP/p$^+$-GaP substrates at equilibrium condition and at dark, which was simulated using SCAPS (version 3.1.02) numerical simulation software. The band gap of anatase TiO_2 layer deposited by ALD was considered to be 3.2 eV.[1,2] The electron affinity of TiO_2 (anatase and ALD deposited) was considered as ~4.3 eV.[1,3] The doping concentration of the ALD-deposited anatase TiO_2 is in the range of 10^{17} cm^{-3} [4] (was considered 10^{17} in the simulation). The considered TiO_2 thickness was 20 nm based on its deposited thickness.

References

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