ARTICLE

Supplementary Materials of Dilute Anion Alloyed III-Nitride Nanowires for Photoelectrochemical Water Splitting

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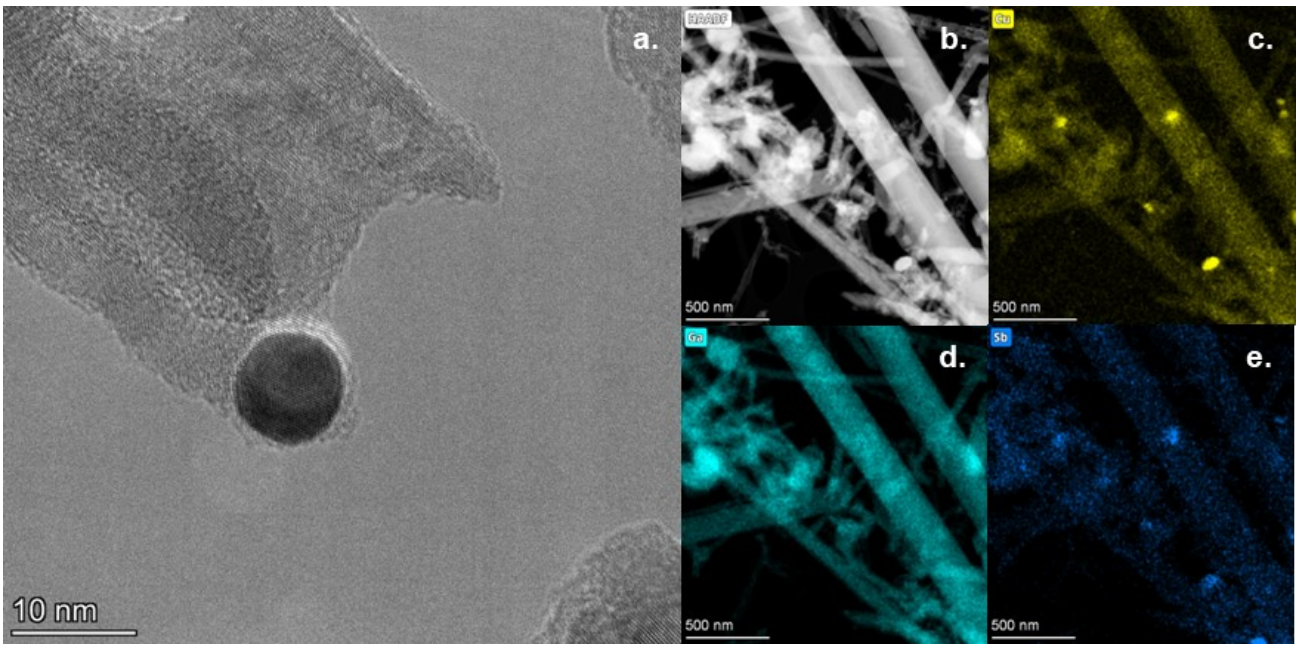

Figure S 1 High resolution Transmission Electron Micrograph of a. $GaSb_xN_{1-x}$ wires grown at 850 ºC, b. the corresponding High-angle annular dark-field image, and the elemental mapping of c. copper, d. gallium and e. antimony.

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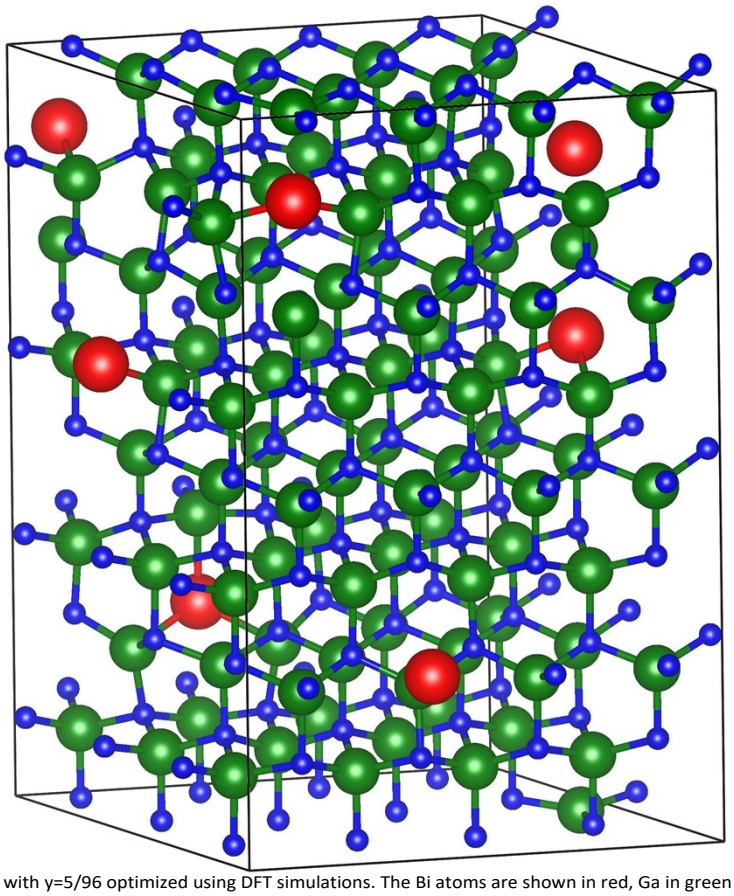


Figure S 2 GaBiyN1-y supercell with y=5/96 optimized using DFT simulations. The Bi atoms are shown in red, Ga in green and N in blue.

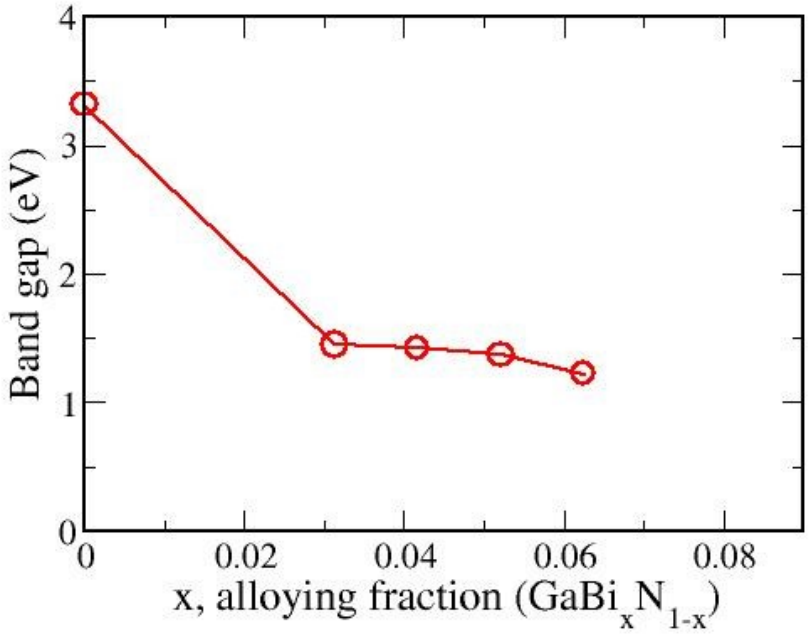
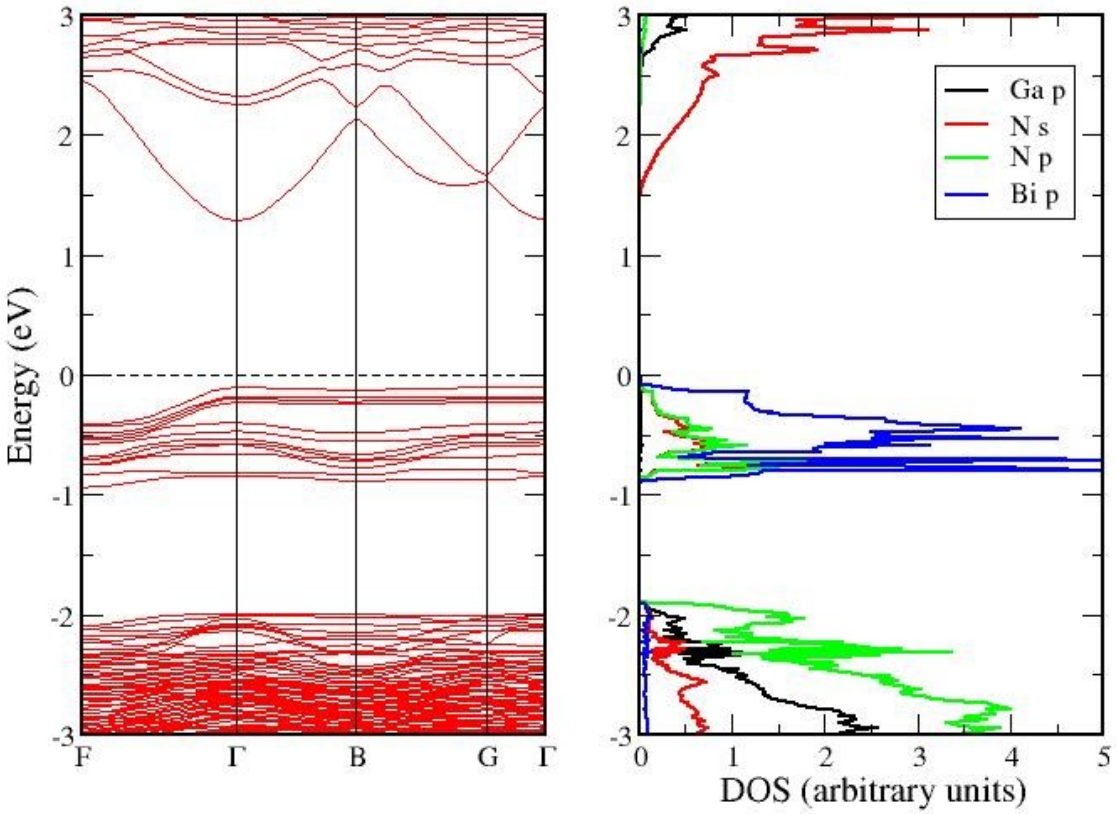


Figure S 3 Plot showing band gap dependence on Bi concentration. A sharp initial drop in the gap value is followed by a more gradual decline for larger concentration.



The gap is within visible region for Bi concentration up to 3%.

Figure S 4Calculated band structure and PDOS for the $GaBi_yN_{1-y}$ alloy with y=4/96.

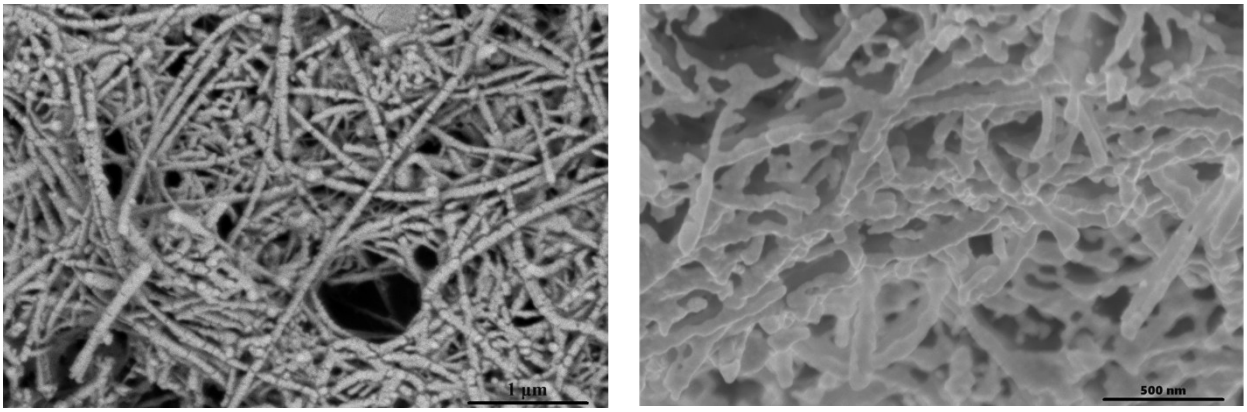


Figure S5. SEM images of two different $Ga_{1-x}Sb_xN$ nanowire samples after they were used in photoelectrochemical testing. Both samples were sensitized with OER electrocatalyst, $W_{0.98}Ir_{0.02}O_{3-\delta}$.

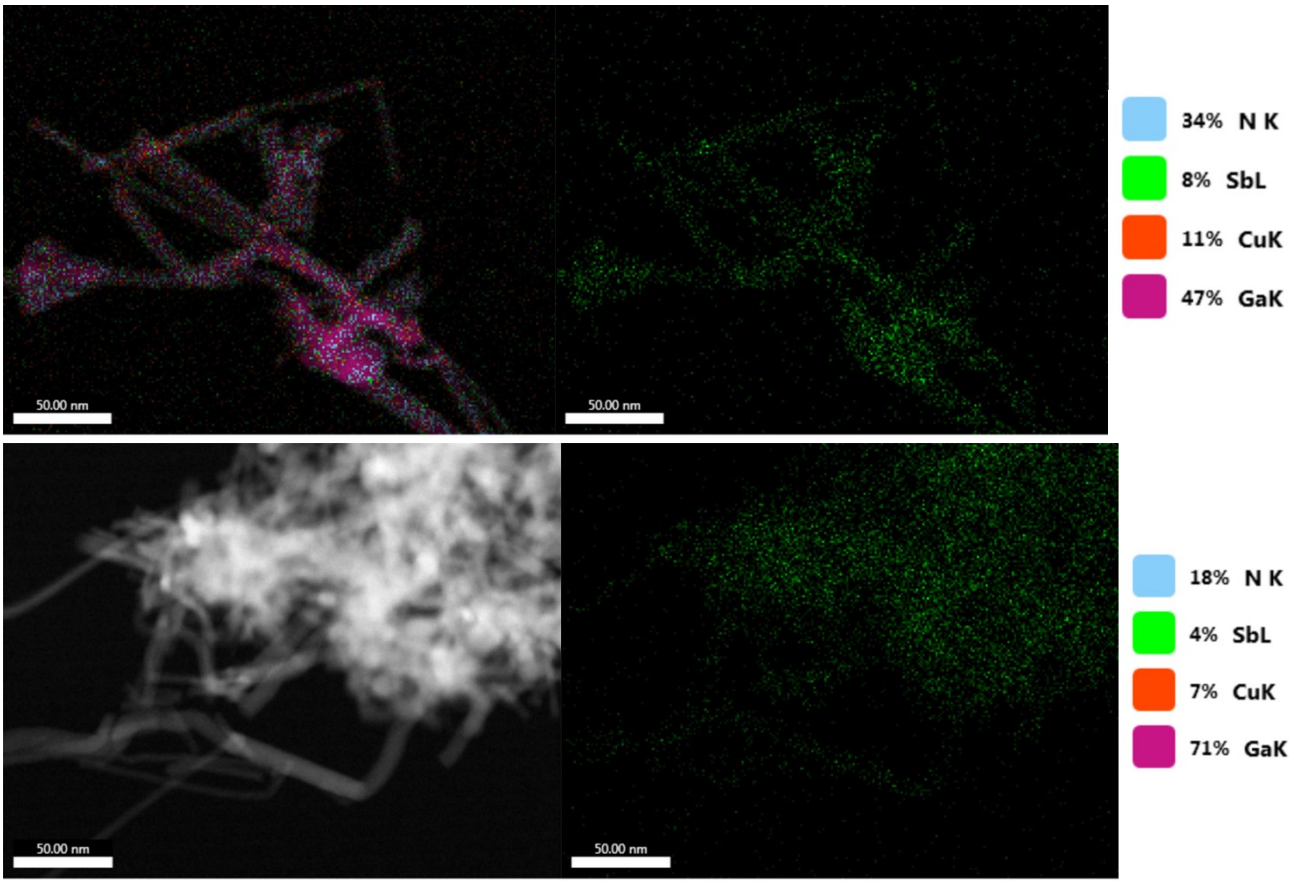


Figure S6. TEM-EDS data for $GaSb_xN_{1-x}$ nanowires for two samples indicating quantification of Sb presence and uniformity of distribution throughout wires.

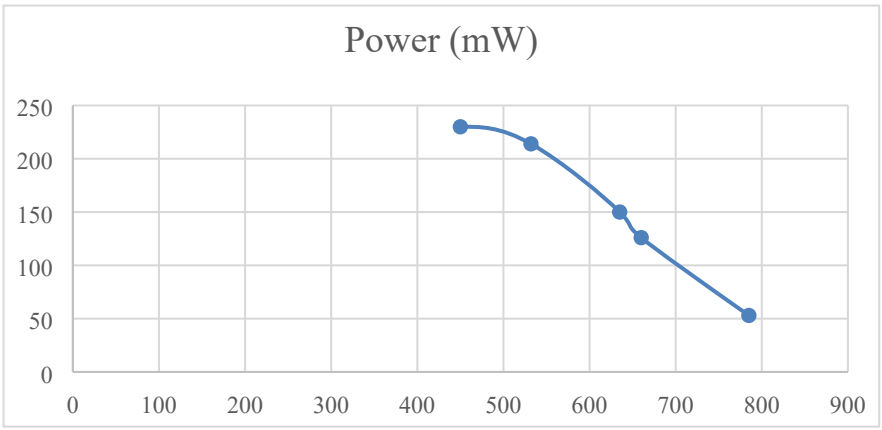


Figure S7. Intensity as function of wavelength measured using a Si photo-diode.