## **Supporting Information**

# Single-step fabrication of 3D hierarchical ZnO/ZnS heterojunction branched nanowires by MOCVD for enhanced photoelectrochemical water splitting

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**Figure. S1.** High magnification TEM of ZnO branched NWs with the corresponding energy dispersive X-ray spectroscopy (EDS) mapping. The scale represents 1 μm.



**Figure. S2.** Line scan profile of ZnO branched NWs along STEM image with the corresponding EDS analysis and elemental distribution.



Figure. S3. The dark currents of all photoanodes.



**Figure. S4.** SEM images with different magnifications for s-h-b-ZnO NWs photoanode after photoelectrochemical water splitting reaction.



Figure S5. XRD pattern of s-h-b-ZnO NWs photoanode after photoelectrochemical water splitting reaction.