Supporting Information:

Ni$_3$S$_2$-Decorated TiO$_2$ Nanotube Arrays as an Effective Photoanode for Photoelectrochemical Water Splitting

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Fig. S1 LSV for TiO$_2$ NTAs and Ni-TiO$_2$ NTAs in 1 M NaOH solution at a scan rate of 50 mV s$^{-1}$.

A linear sweep of the Ni/TiO$_2$ NTAs and pure TiO$_2$ NTAs were measured in the dark, as shown in Fig. S1. It is noted that an obvious oxidation peak was observed for the Ni/TiO$_2$ NTAs in the potential range from 0.4 to 0.5 V vs. Ag/AgCl reference electrode. According to the previous reports, the anodic oxidation peak at about 0.46 V vs. Ag/AgCl reference electrode corresponds to the oxidation reaction of Ni (II) $\rightarrow$ Ni (III).[1] This result proved that the metallic Ni has been successfully loaded on to the surface of TiO$_2$ NTAs photoanode.
In order to further prove the existence of Ni$_3$S$_2$, a large amount of nickel sulfide powder were synthesize using the same preparation route. The XRD patterns of nickel sulfide powder is described in Fig. 3. Clearly, except for a relatively week peaks centered at $\theta = 27.18^\circ$, which is consistent with NiS$_2$ (PDF no. 65-3325), additional diffraction peak were mainly assigned to the pure phase of Ni$_3$S$_2$ (JCPDS no. 44-1418) and metallic Ni (JCPDS no. 45-1027). Therefore, the presence form of nickel sulfide, which was synthesized by this method, on the surface of TiO$_2$ NTAs is mainly Ni$_3$S$_2$.

References