Electronic Supporting Information

One-step Chemical Vapor Deposition of MoS_2 Nanosheets on SiNWs as Photocathodes for Efficient and Stable Solar-driven Hydrogen Production

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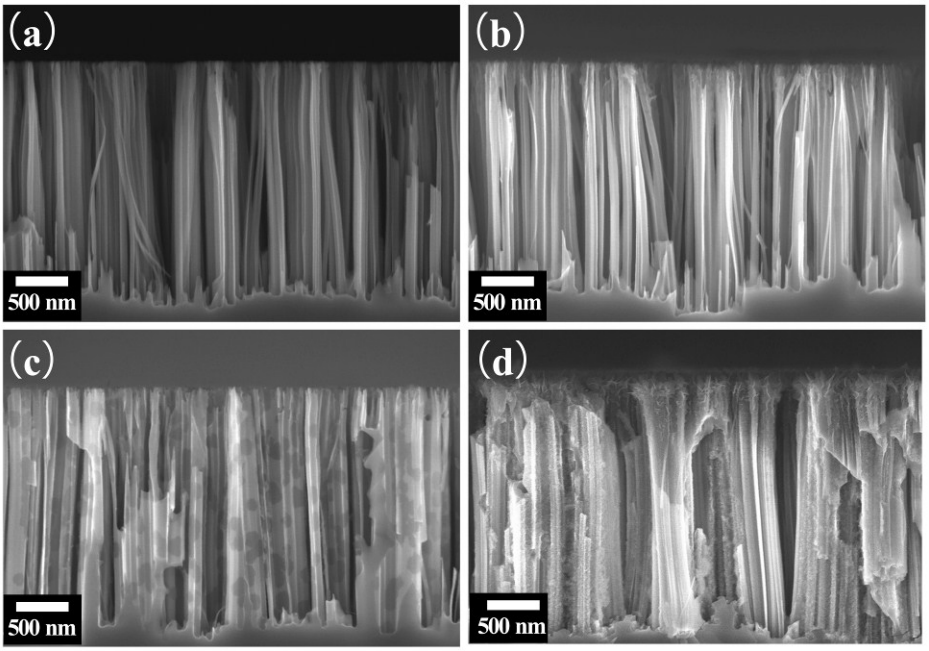

Fig. S1 Cross-sectional SEM images of SiNWs/MoS_2 with different deposited times during the CVD process. (a-d) represent 0 min, 10 min, 20 min and 30 min, respectively.

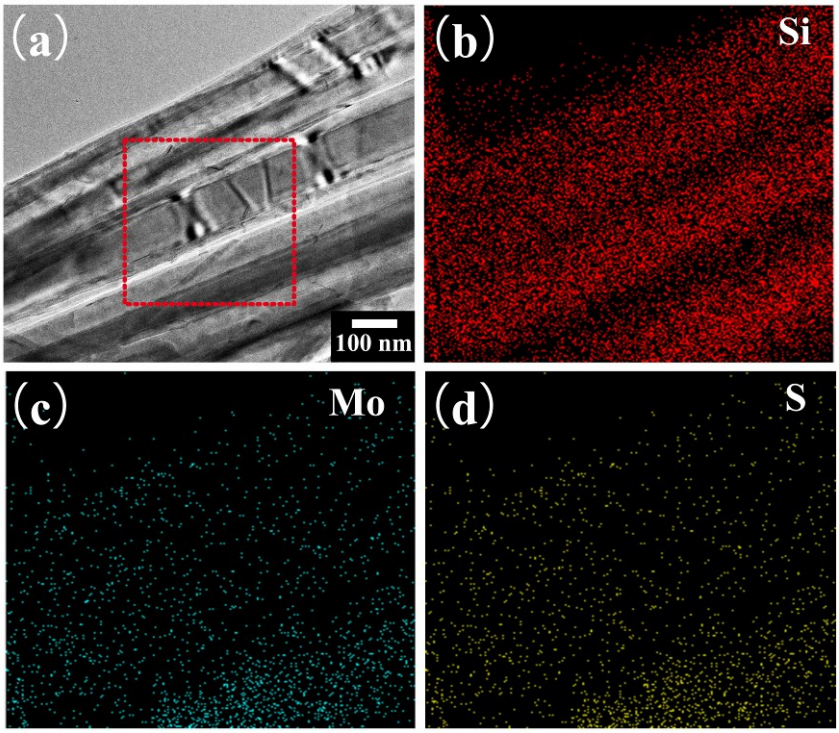

Fig. S2 (a) TEM image of SiNWs/MoS_2. (b) - (d) corresponding Si, Mo and S elemental mapping images in the selected area, respectively, indicating the evenly distribution of Mo and S on the surface of SiNWs.

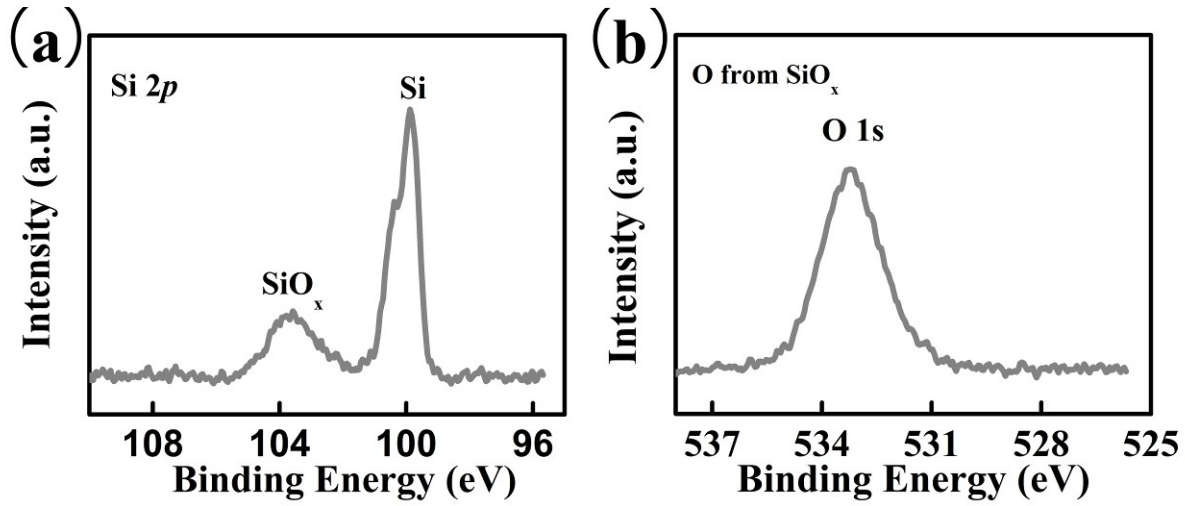

Fig. S3 XPS spectrum of SiNWs/MoS_2. (a) Si 2p and (b) O 1s.

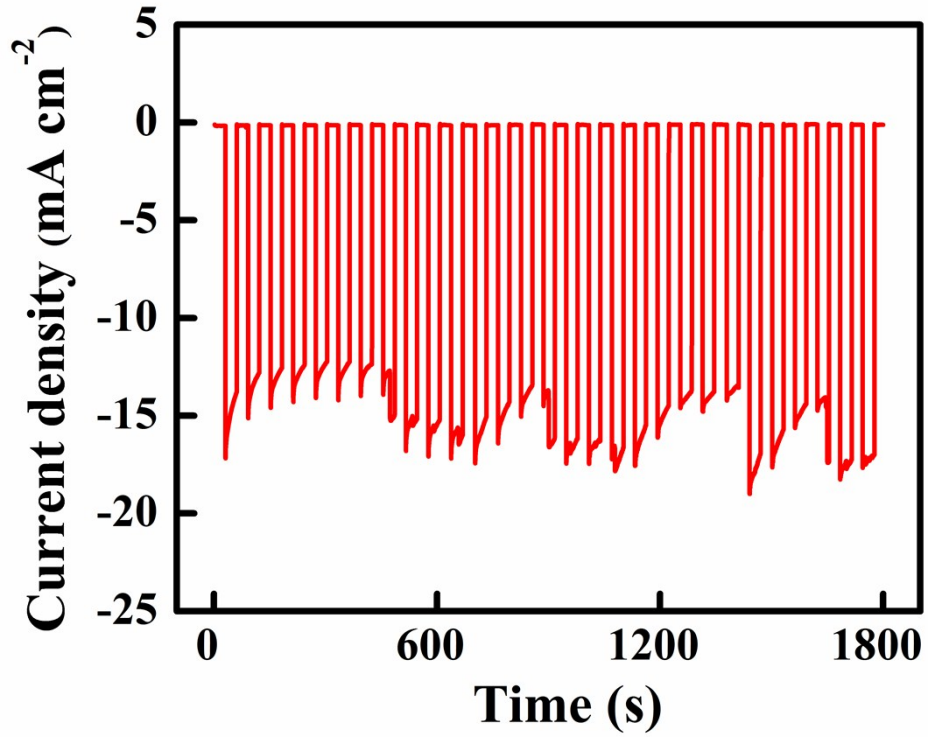

Fig. S4 Plot of the transient current time responses to on-off cycles of illumination on SiNWs/MoS_2 photocathode at zero overpotential.

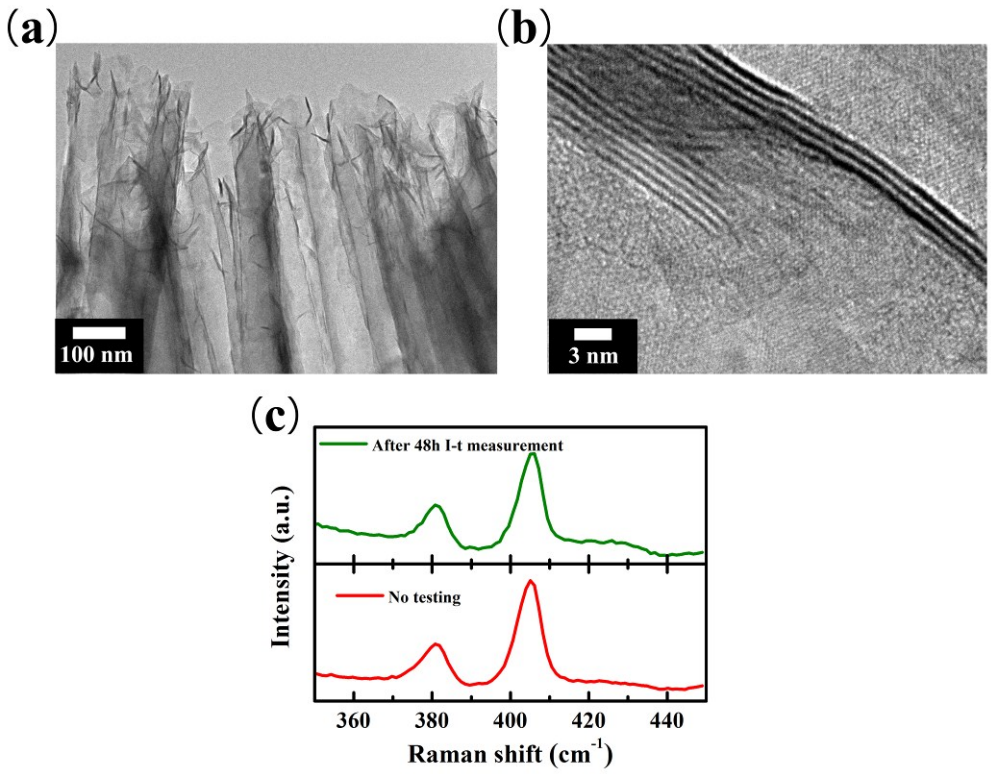

Fig. S5 TEM image (a) and HRTEM image (b) of SiNWs/MoS_2 photocathode after 48 h I-t measurement, exhibiting negligible change in morphology and structure compared with the fresh sample. (c) Raman spectra measured before and after 48 h I-t measurement.

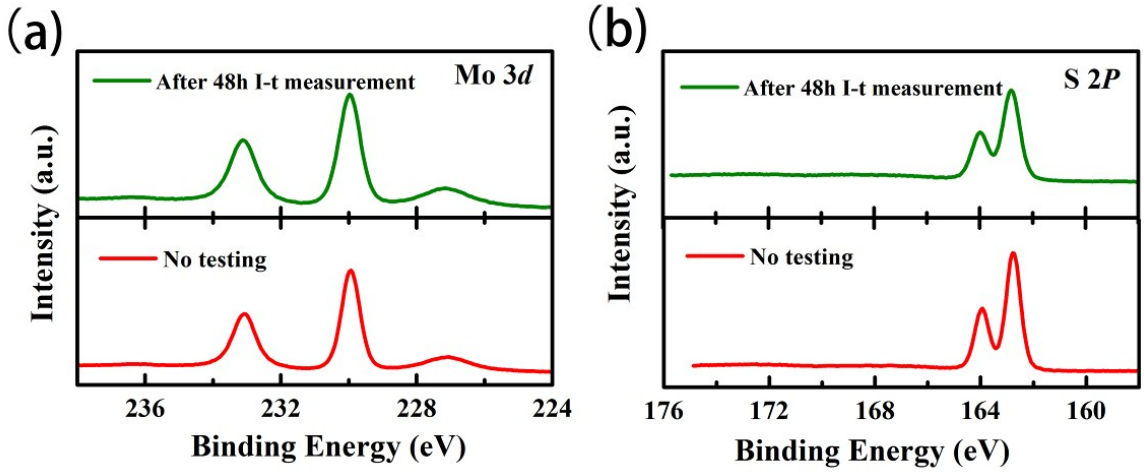

Fig. S6 (a) and (b) XPS spectra of Mo and S from SiNWs/MoS_2 sample before and after 48 h I-t measurement, showing no obvious change of the oxidation states, indicating superior stability of the MoS_2 nanosheets on the surface of SiNWs.

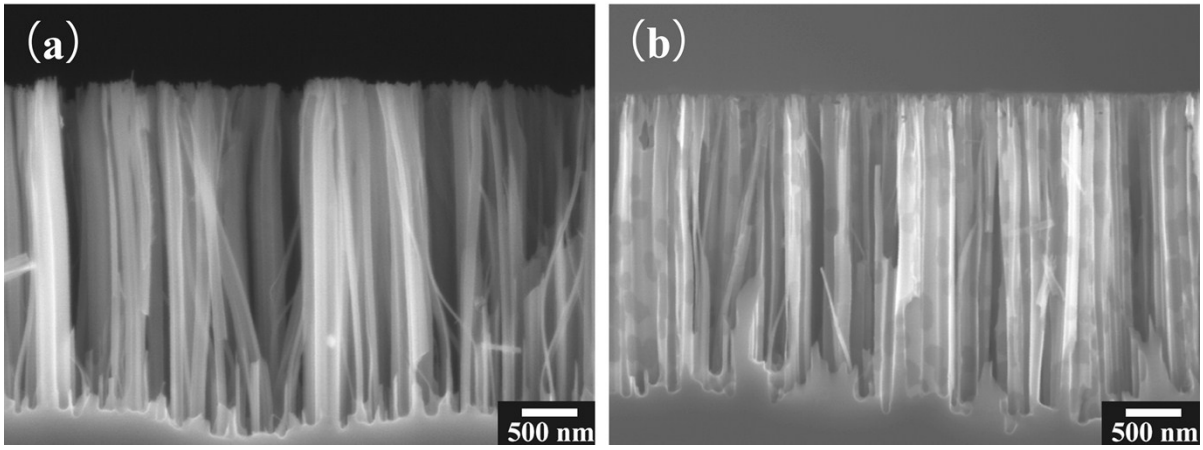

Fig. S7 The cross-section SEM images of (a) the bare SiNWs photocathode and (b) the fabricated SiNWs/MoS_2 photocathode.