In situ photodeposition of MoS_2 on CdS nanorods as a highly efficient cocatalyst for photocatalytic hydrogen production

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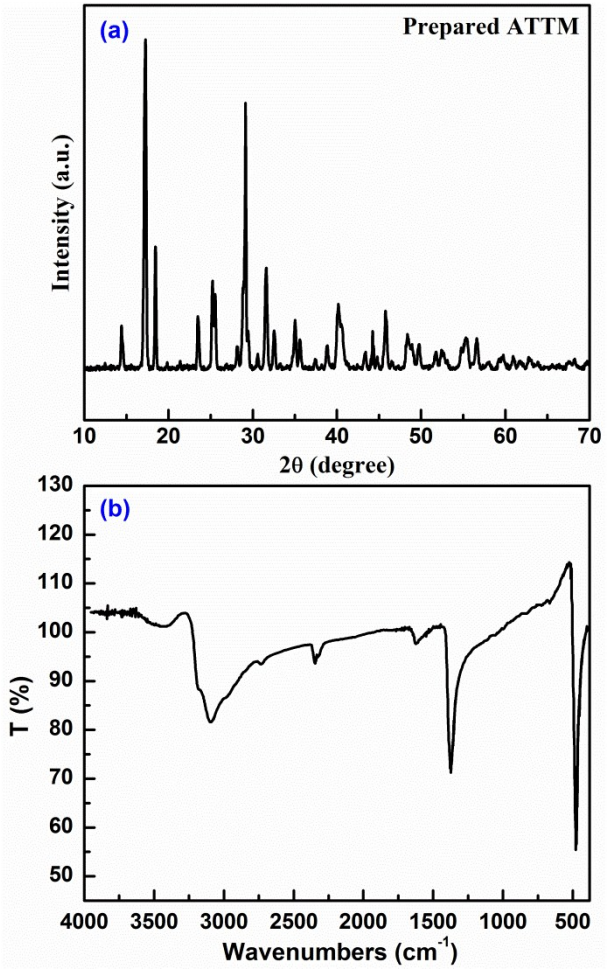
Electronic Supplementary Information (ESI)

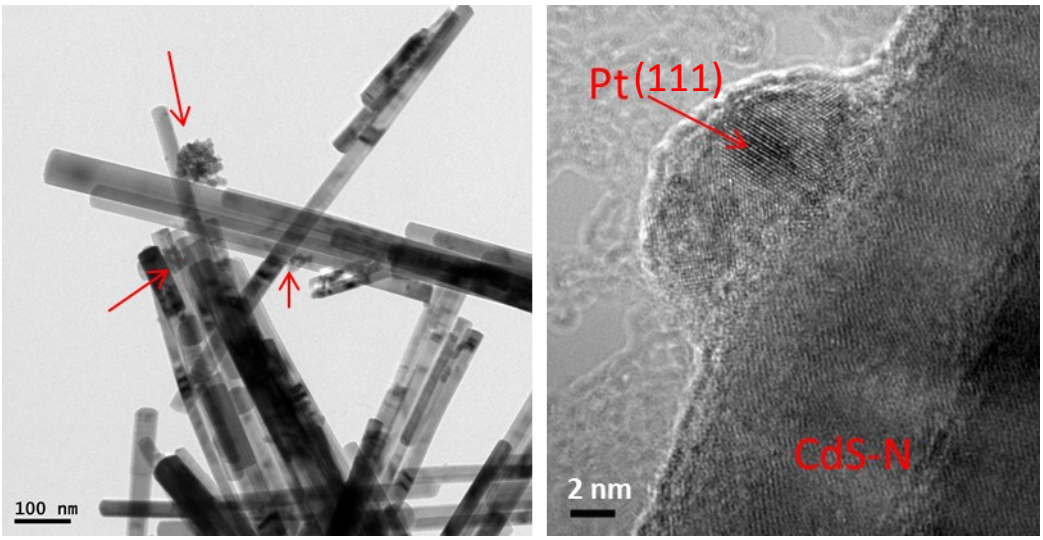
Fig. S1 (a) XRD and (b) FT-IR spectrum of the prepared ATTM.



The XRD result (Fig. S1a) indicated that the prepared ATTM is in a highly crystalline orthorhombic structure and the diffraction peaks can be indexed to standard $(NH_4)_2MoS_4$ (ICDD-JCPDS Card No. 48-1662).

The FTIR spectrum (Fig. S1b) is consistent with the reported $(NH_4)_2MoS_4$ reference spectrum[1] and the Mo-S stretching bands at 487 cm^{-1} can be observed.

Fig. S2 TEM and HRTEM image of Pt/CdS-N prepared by a photodeposition method.



Photodeposition route has been extensively used for the loading of noble metal like Pt and Pd on photocatalyst since it reported in 1978. [2] The validity of this method has been fully confirmed by the reported works. The related works have been commented by a recent review paper. [3] Using this method for the deposition of Pt on CdS also has been reported. [4] Thus, theoretically, we believe that Pt can be loaded on CdS-N by photodeposition route. Here, the TEM and HRTEM images of Pt modified CdS-N were measured. Some Pt particles can be identified as denoted by the arrows.

The actual Pt loading amount was determined to be 0.13% by ICP (Fig. S3). At last, compared with pristine CdS-N, the improved HER activity for the Pt/CdS-N also suggests the loading of Pt on CdS-N. Therefore, the experimental results also confirmed that Pt can be loaded on CdS-N by photodeposition route.

Fig. S3 the characteristic ICP emission line (265. 9 nm) of Pt element.

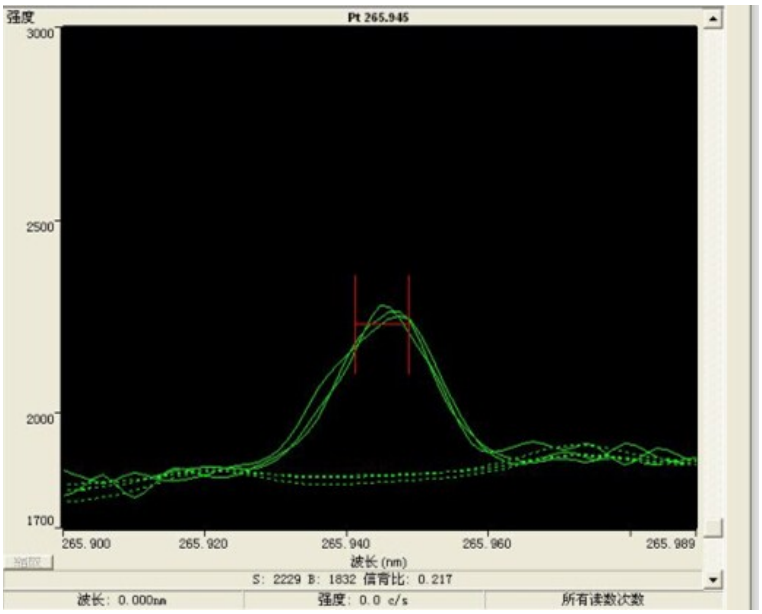
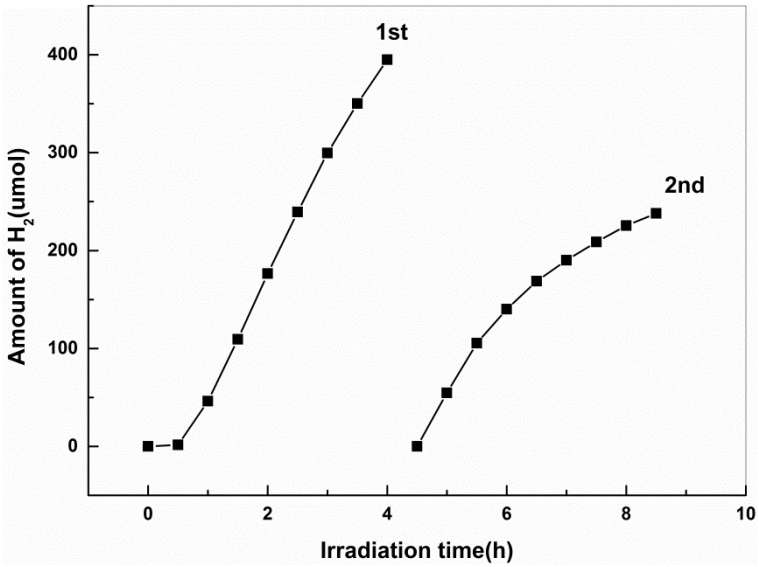


Fig. S4 Cycling photocatalytic HER over pristine CdS-N under visible light irradiation for 2 runs.



References

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