

Supplementary information

Highly efficient visible-light-induced photoactivity of CdS-
Mn/MoS₂/CdTe/TiO₂ quaternary photocatalyst for label-free
immunoassay of tris-(2,3-dibromopropyl) isocyanurate
and enhanced solar hydrogen generation

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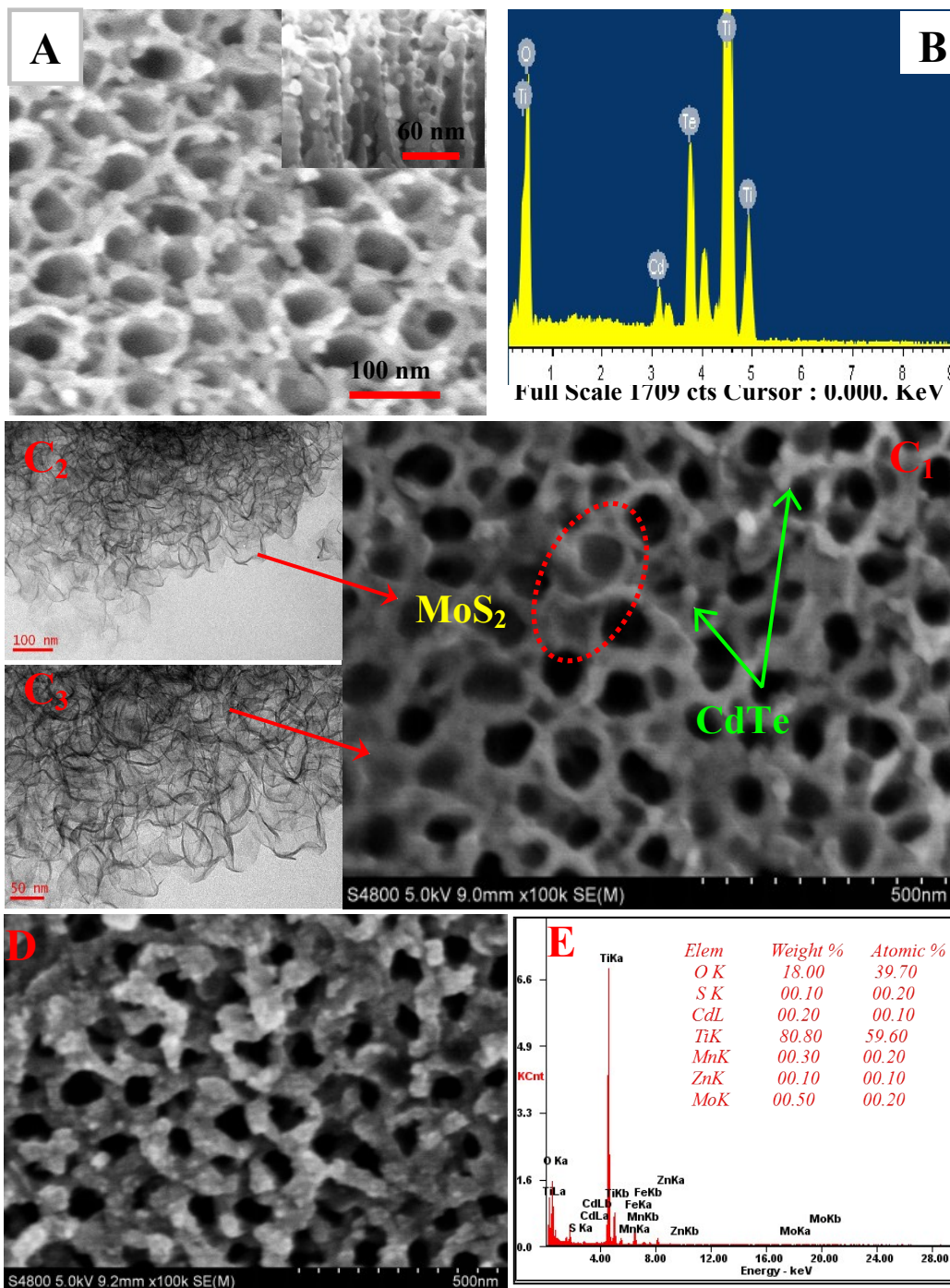


Fig. S-1†: (A) SEM of CdTe / TiO₂, the inset is the corresponding cross-section view. (B) EDX analysis of Cd, Te, O and Ti elements in the CdTe / TiO₂. SEM images of MoS₂/CdTe/TiO₂ NTAs (C₁) and ZnS/CdS-Mn/MoS₂/CdTe/TiO₂ NTAs (D). TEM images of the MoS₂ (marked with arrows and circle in red) under the different sizes of amplification (C₂ to C₃). (E) The corresponding EDX analysis of (D).

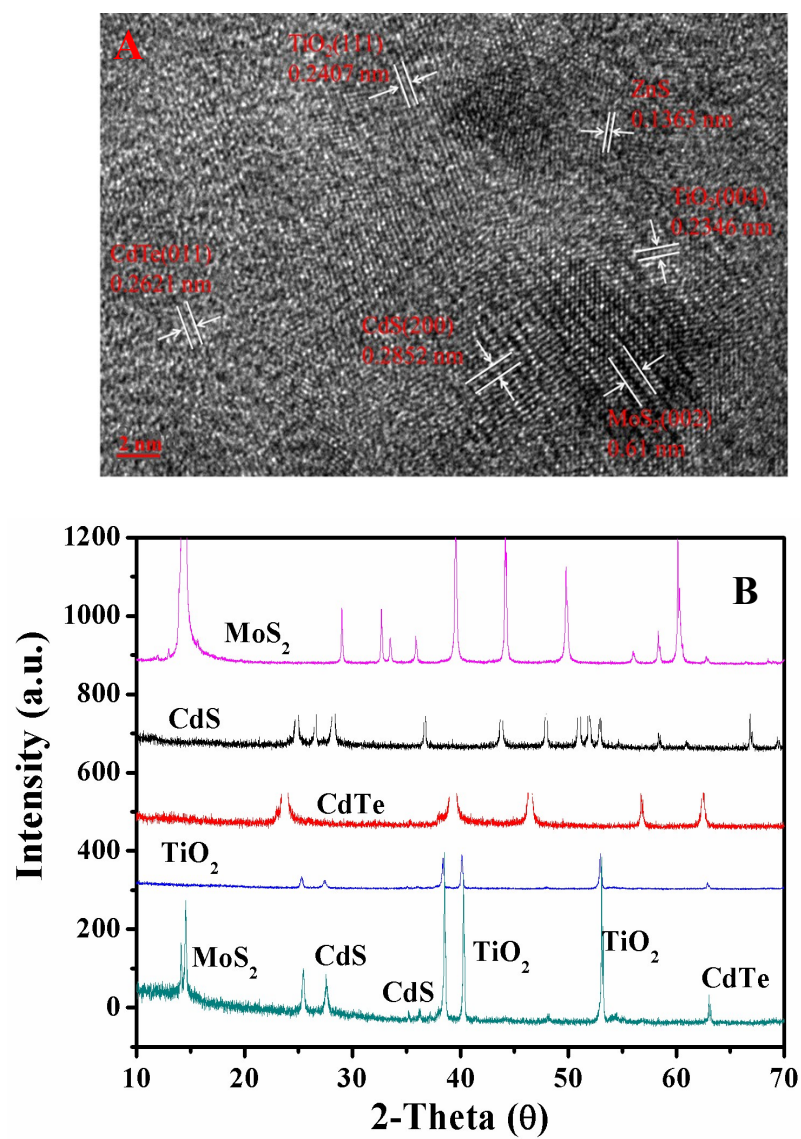


Fig. S-2[†]: HRTEM images of ZnS/CdS-Mn/MoS₂/CdTe/TiO₂ NTAs (A). The corresponding XRD patterns (B).

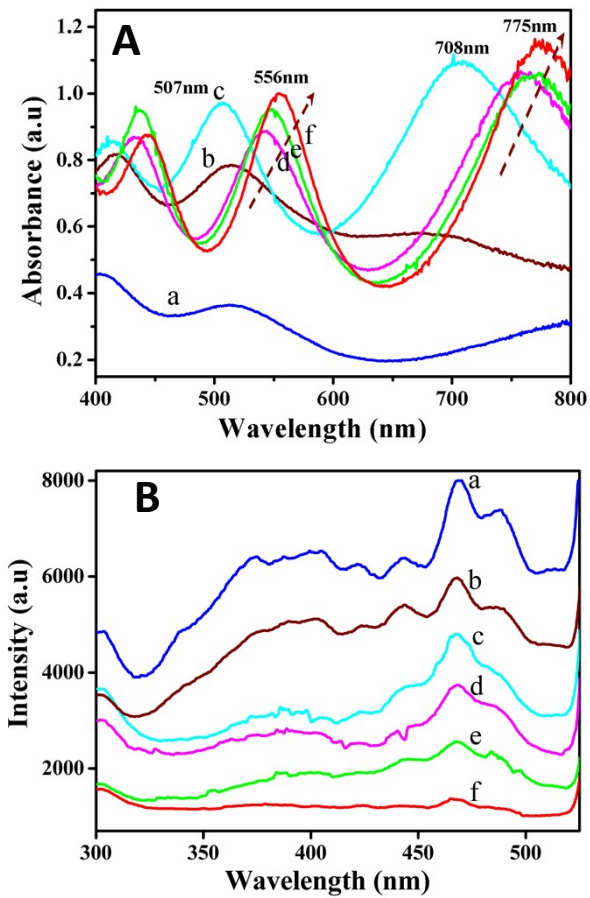


Fig. S-3[†]: (A) Diffuse reflectance absorption spectra of (a) TiO₂ NTAs; (b) CdTe/TiO₂ NTAs; (c) MoS₂/CdTe/TiO₂ NTAs; (d) CdS-Mn/MoS₂/CdTe/TiO₂ NTAs; (e) ZnS/MoS₂/CdTe/TiO₂ NTAs; (f) ZnS/CdS-Mn/MoS₂/CdTe/TiO₂ NTAs. (B) The corresponding PL spectra.

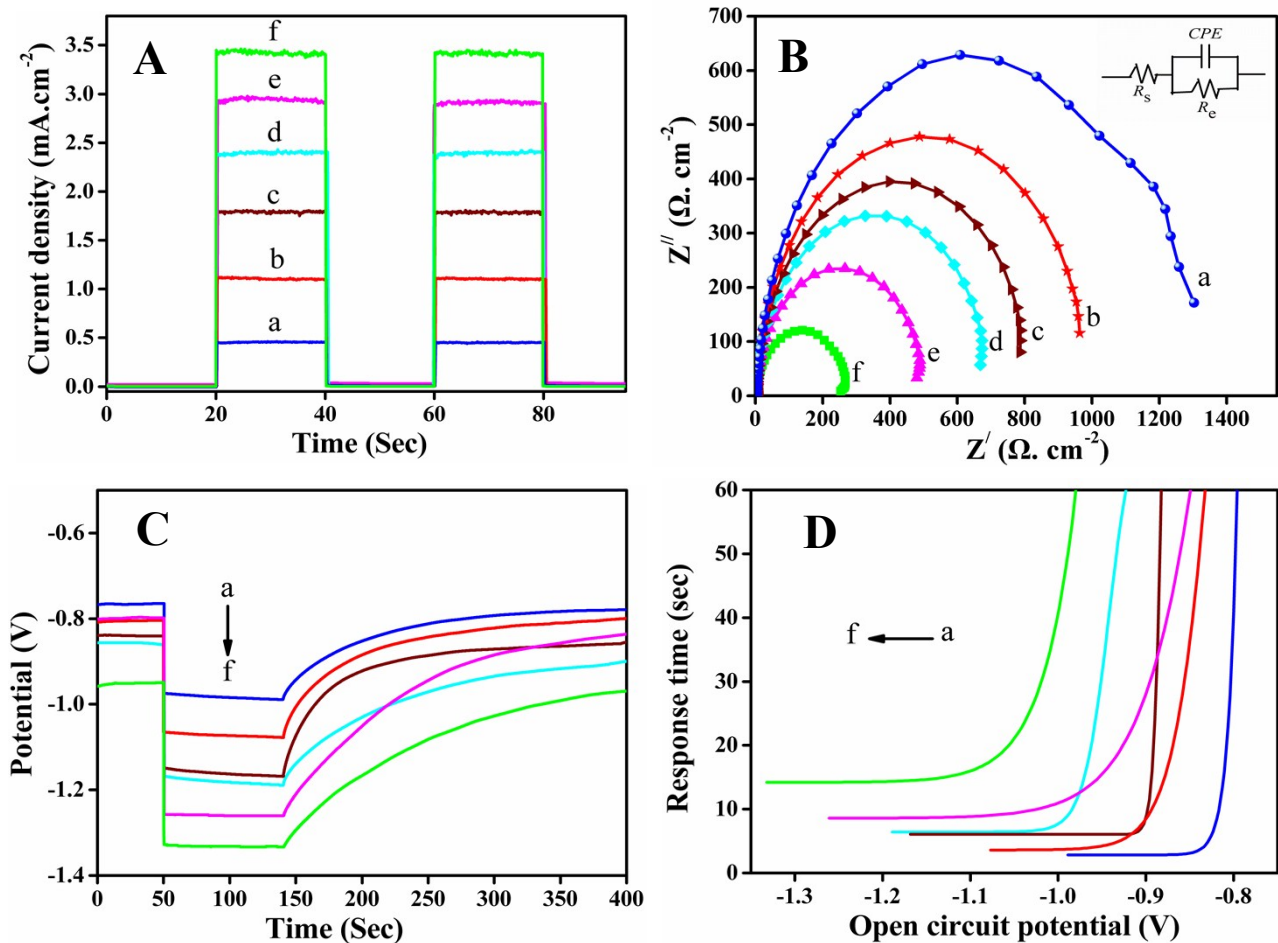


Fig. S-4†: (A) Photocurrent responses of pure TiO₂ NTAs (a); CdTe/TiO₂ NTAs (b); MoS₂/CdTe/TiO₂ NTAs (c); CdS-Mn/MoS₂/CdTe/TiO₂ NTAs (d); ZnS/MoS₂/CdTe/TiO₂ NTAs (e) and ZnS/CdS-Mn/MoS₂/CdTe/TiO₂ NTAs electrodes (f). (B) The corresponding EIS analysis. (C) open-circuit photovoltage responses of these electrodes. (D) Response time determined by open-circuit potential decay for corresponding photoelectrodes shown in (C).

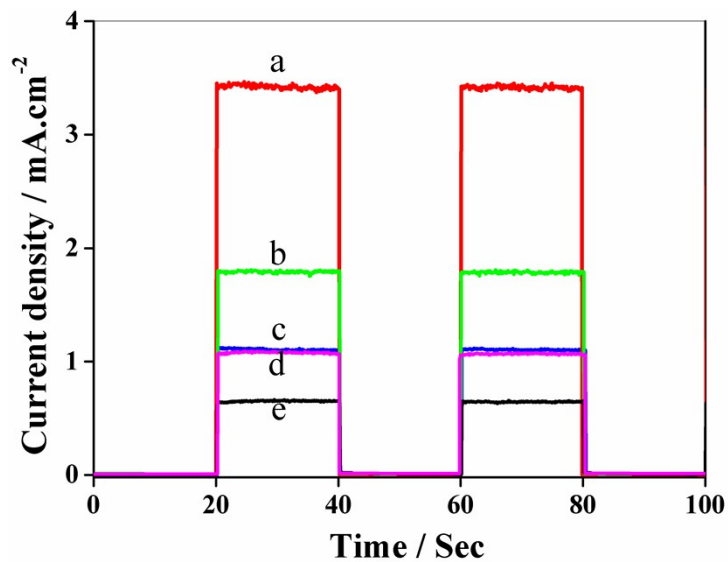


Fig. S-5[†]: Photocurrent responses of ZnS/CdS-Mn/MoS₂/CdTe/TiO₂ NTAs photoelectrode in 0.1 M phosphate buffer solution (PBS pH =7.4): (a) before and (b) after antibody immobilization; (c) after further anchoring OVA; (d) in the absence and (e) presence of 5×10⁻⁸ M TBC.