Electronic Supplementary Information (ESI)

Construction of dual-channel mode for wide-spectrum-driven photocatalytic H_2 production

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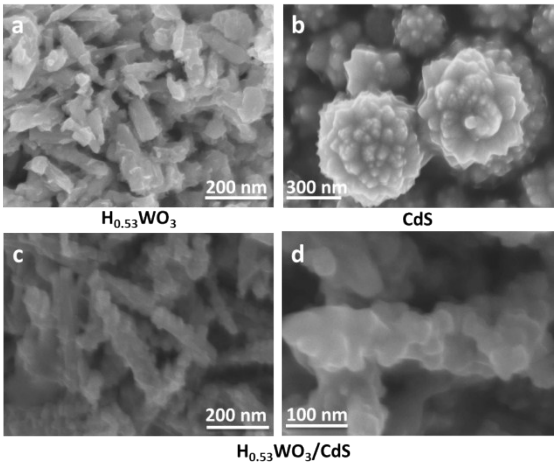

Fig. S1. SEM patterns of the samples (a) $H_{0.53}WO_3$, (b) CdS and (c,d) $H_{0.53}WO_3$/CdS.

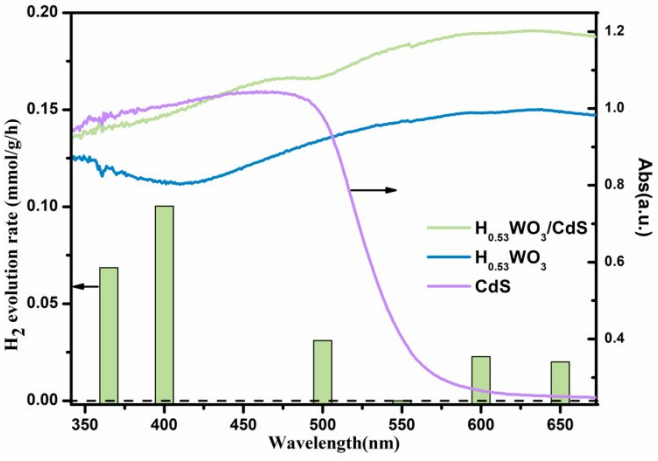

Fig. S2.Wavelength dependence of activity of $H_{0.53}WO_3$/CdS.

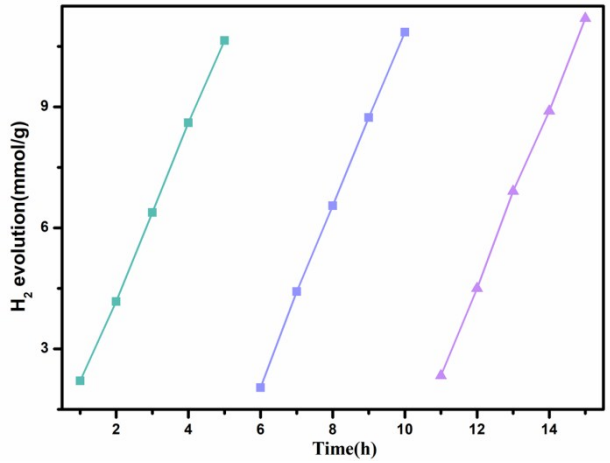

Fig. S3. Time-circle photocatalytic H2 evolution rate on $H_{0.53}WO_3$/CdS.

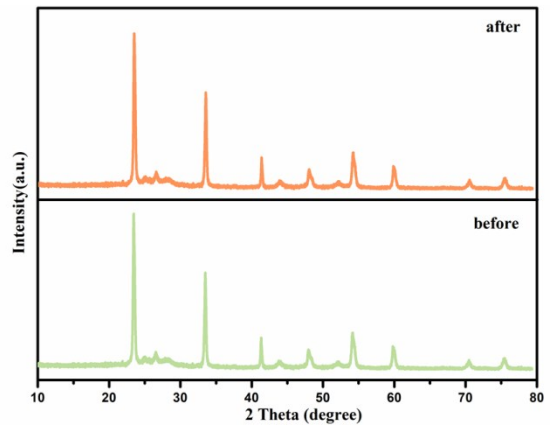

Fig. S4. XRD pattern of $H_{0.53}WO_3$/CdS before and after 15 hour cycling test.

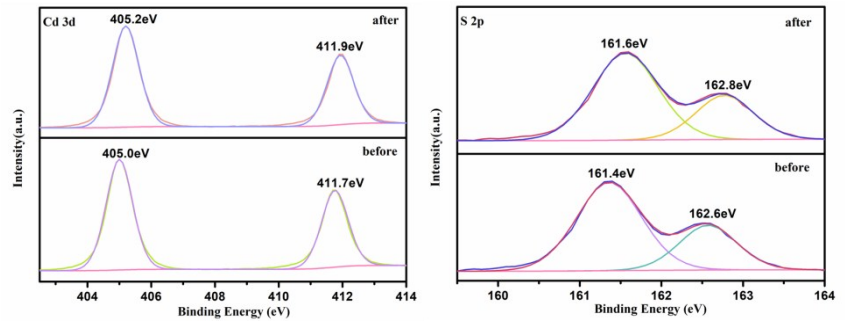

Fig. S5. Cd 3d (a) and S 2p (b) XPS spectra of $H_{0.53}WO_3$/CdS before and after 15 hour cycling test.

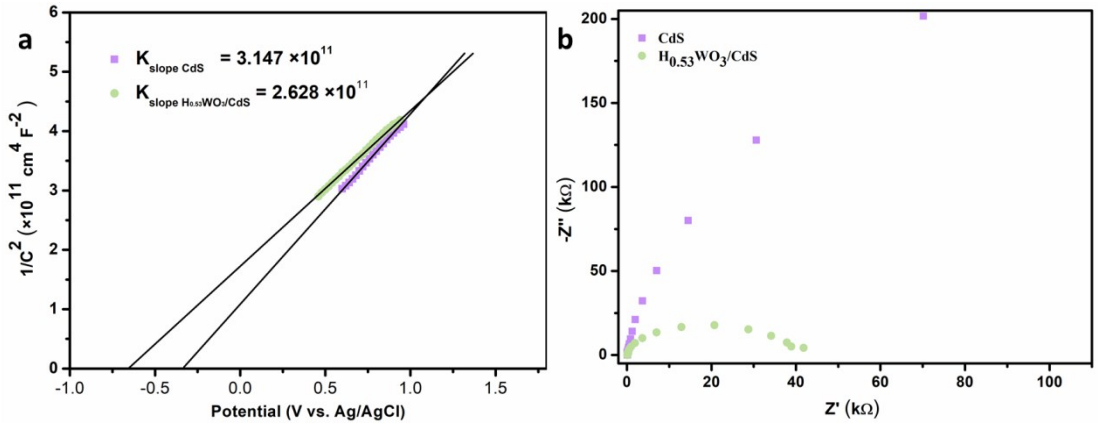

Fig. S6. (a)Mott-schottky plots of CdS and $H_{0.53}WO_3$/CdS. (b) photo-electrochemical impedance spectra of CdS and $H_{0.53}WO_3$/CdS.

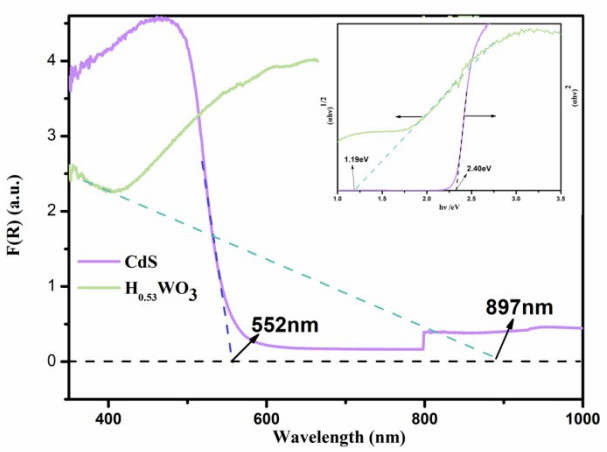

Fig. S7. UV-vis diffuse reflectance spectrum of CdS and $H_{0.53}WO_3$. Inset is Tauc's Plots of the $(\alpha h\nu)^2$ vs photon energy ($h\nu$) for CdS, plots of the $(\alpha h\nu)^{1/2}$ vs photon energy ($h\nu$) for $H_{0.53}WO_3$.

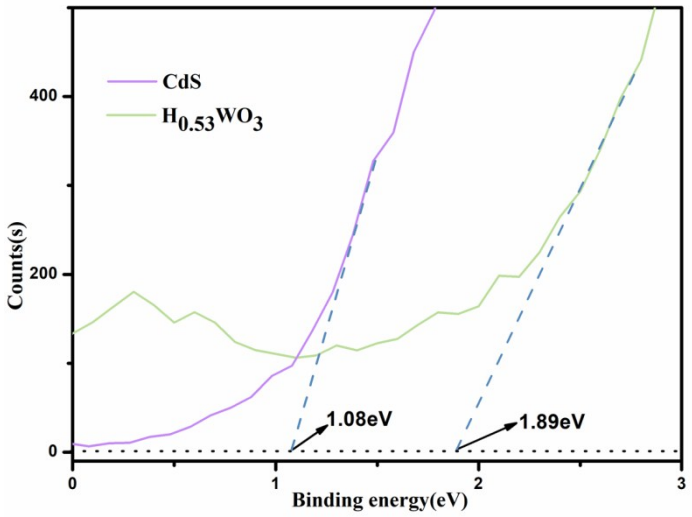

Fig. S8. XPS valence band spectra of CdS and $H_{0.53}WO_3$.

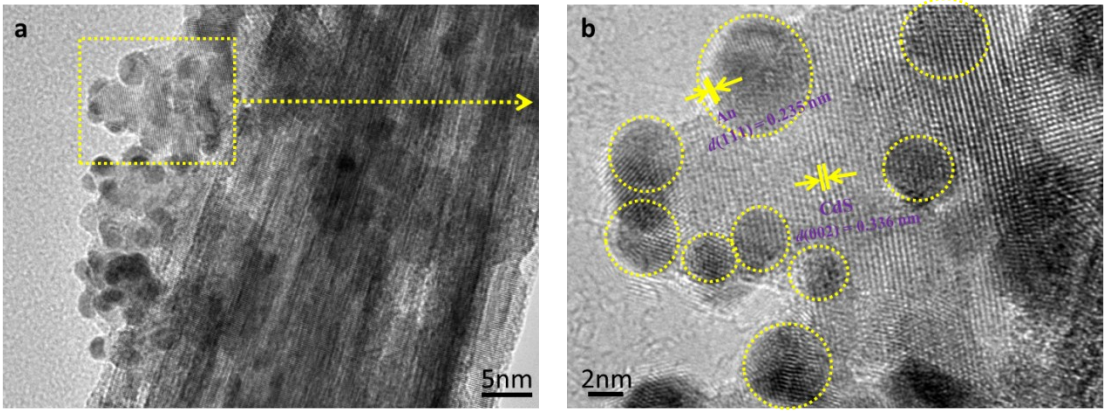

Fig. S9. TEM patterns of the sample $H_{0.53}WO_3$/CdS-Au.

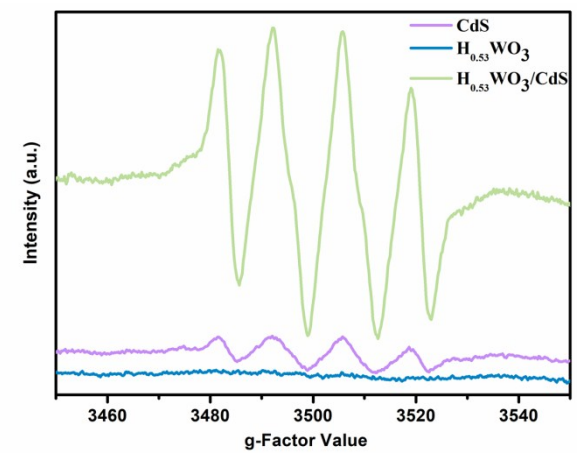

Fig. S10. Room-temperature ESR spectra of the as-prepared samples.

Table S1. Fermi level difference (ΔE_F) between CdS and $H_{0.53}WO_3$ measured by OCP technique in 0.5M Na_2SO_4 solution.

Samples	E_F (eV)
$H_{0.53}WO_3$	-0.015
CdS	-0.605
ΔE_F	+0.59

Table S2. The specific surface area of $H_{0.53}WO_3$, CdS and $H_{0.53}WO_3$/CdS.

Samples	$S_{BET}[m^2g^{-1}]$
$H_{0.53}WO_3$	17.86
CdS	8.63
$H_{0.53}WO_3$/CdS	25.42