Supporting Information

Design of multicomponent photocatalysts for hydrogen production under visible light using water-soluble titanate nanodisks

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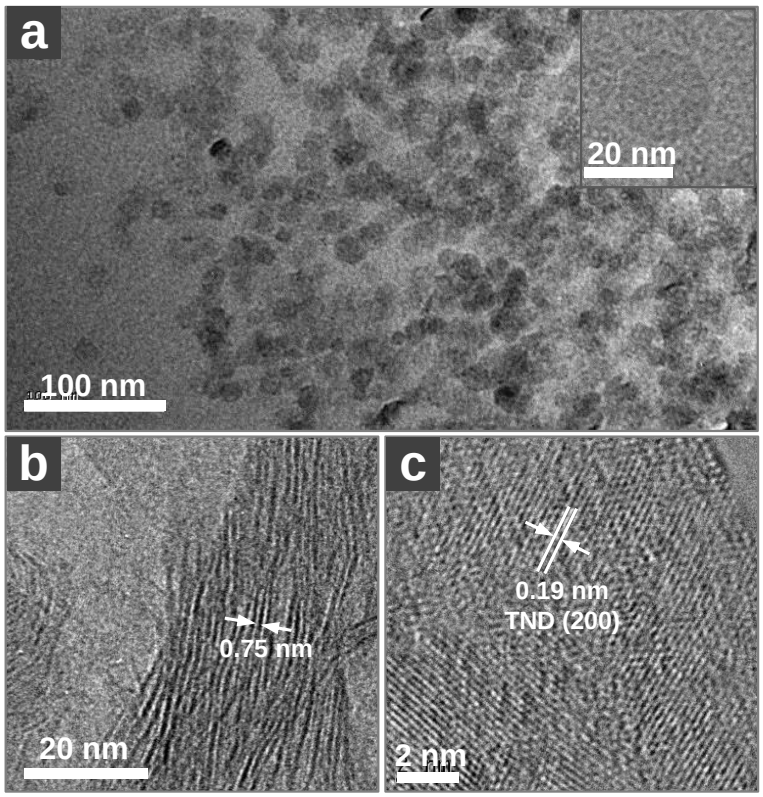

Figure S1. TEM images of the as-synthesized TNDs dispersed in toluene (a), and precipitated in ethanol (b), and HRTEM of TNDs aligned perpendicular to the electron beam (c). Due to the ultrathin structure of TNDs, in the highly dispersed state (i.e. dispersed in toluene), these TNDs tend to lay parallel to the surface of the TEM's grid. Thus, a mean TND's diameter of around 20 nm can be observed (figure a). In the precipitated state (i.e. precipitated in ethanol), some aggregate of TNDs could lay parallel to the direction of the electron beam (figure b), we therefore can calculate the thickness of the TNDs (0.75 nm).

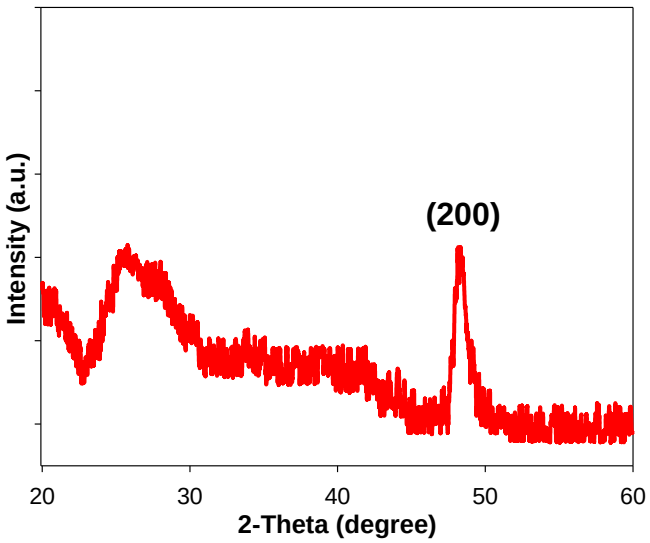

Figure S2. XRD pattern of as-synthesized TNDs.

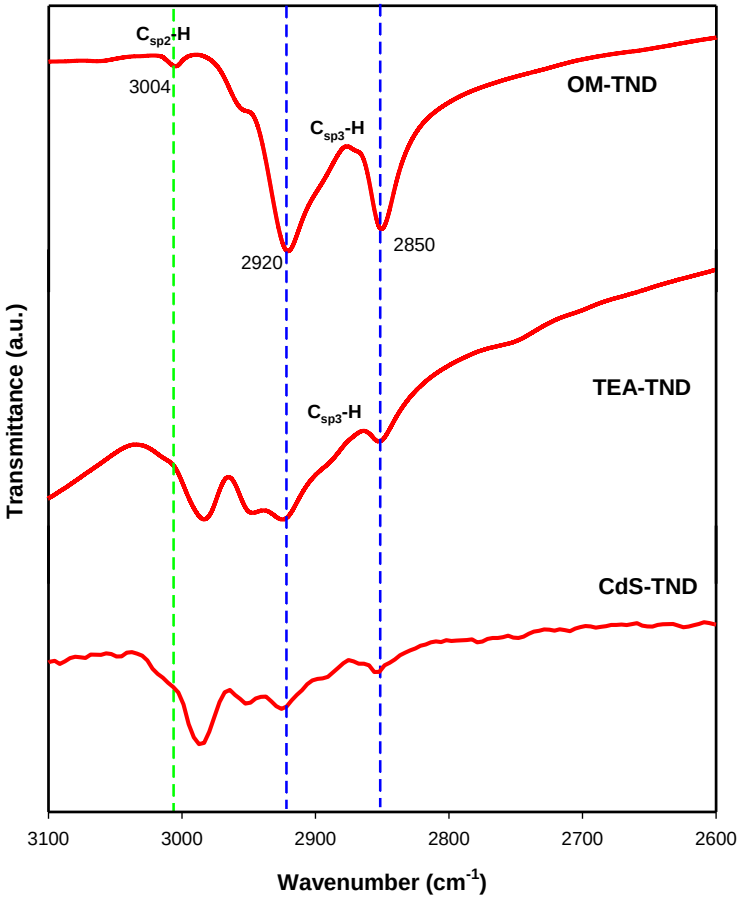

Figure S3. FTIR spectra of as-synthesized OM-TND, TEA-TND obtained by treated OM-TND with TEA, and CdS-TND composites obtained by 5 cycles of CdS growth. FTIR spectra of all samples show two peaks at 2920 and 2850 cm^{-1} corresponding to the asymmetric and symmetric stretching mode of methylene groups present in the alkyl chain of OM and TEA, respectively.

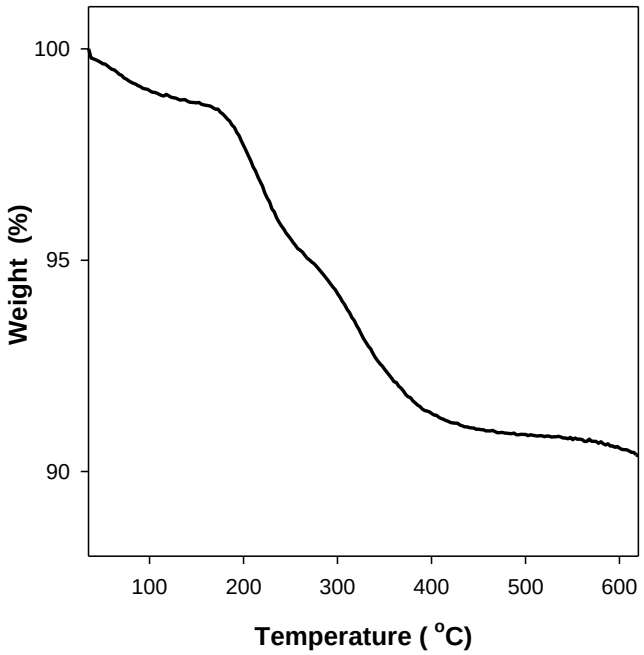

Figure S4. TGA curves of CdS-TND composites obtained by 5 cycles of CdS growth.

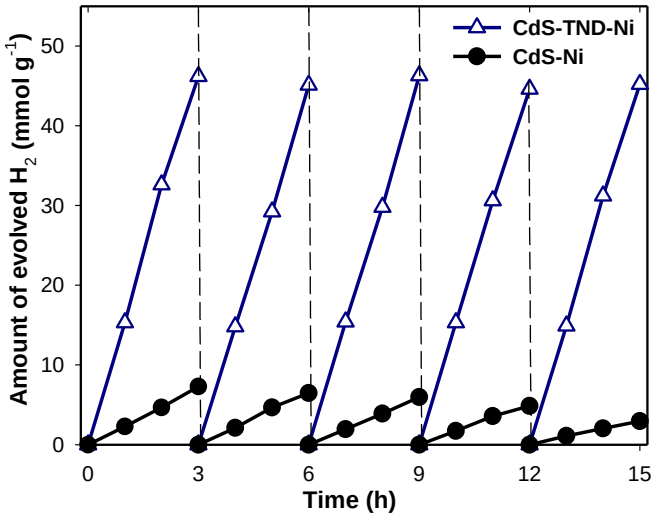

Figure S5. H_2 production on CdS-TND composites obtained through 5 cycles of CdS growth (C_5) and CdS loaded with 2.8 wt% Ni coctalysts under visible light monitored over 15 h. Each 3 h, the reaction system is bubbled with N_2 for 15 min to remove the H_2 inside. Reaction conditions: 20 mg of catalyst; 20 vol% ethanol solution (70 mL); light source is a xenon lamp (300 W) with a cutoff filter ($\lambda > 420$ nm).