

Supplementary Materials: Carbon Dot-Titanium Dioxide (CD/TiO₂) Nanocomposites: Reusable Photocatalyst for Sustainable H₂ Production via Photoreforming of Green Organic Compounds

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The XRD spectra of the 1% w/w CD/TiO₂, 2% w/w CD/TiO₂, and 4% w/w CD/TiO₂ are presented in **Figure S1**. Compared with the XRD of 3% w/w CD/TiO₂ (**Figure 2a**), there were no differences observed. The absence of the diffraction peaks of the CDs in all cases may have been attributable to their extremely small size as well as their uniform and high dispersion on the TiO₂ surface.

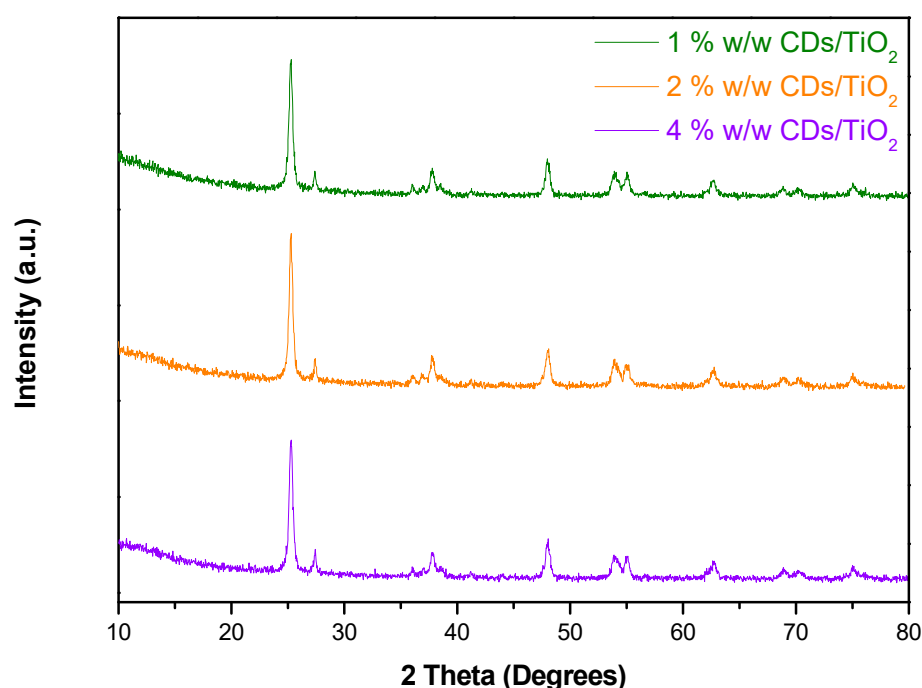


Figure S1. XRD spectra of the 1% w/w CD/TiO₂, 2% w/w CD/TiO₂, and 4% w/w CD/TiO₂.

The FT-IR spectra of 1% w/w CD/TiO₂, 2% w/w CD/TiO₂, and 4% w/w CD/TiO₂ are presented in **Figure S2**. As can be observed, the FT-IR of the 4% w/w CD/TiO₂ sample presented the characteristic peak of C=O, attributed to the CDs at approximately 1700 cm⁻¹. The above results were similar to the FT-IR of the 3% w/w CD/TiO₂ (**Figure 2b**). However, when the concentration of the CDs was further decreased, the C=O absorption peak could not be easily detected.

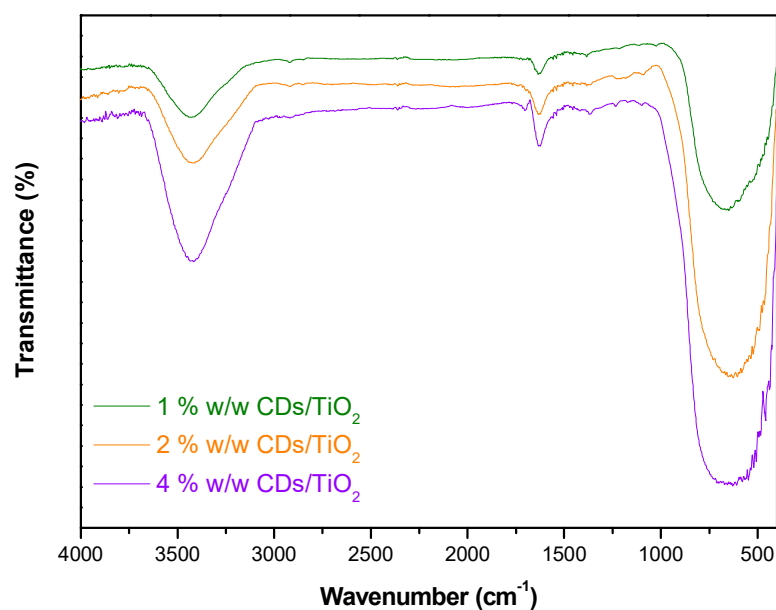


Figure S2. FT-IR spectra of the 1% w/w CD/TiO₂, 2 % w/w CD/TiO₂, and 4% w/w CD/TiO₂.

XRD characterization was conducted before and after the utilization of the CD/TiO₂. More specifically, in **Figure S3**, the XRD spectra of the 3% w/w CD/TiO₂ before and after its use for three cycles are presented. As can be observed, there were no alterations in the structure of the photocatalyst, indicating its good recyclability.

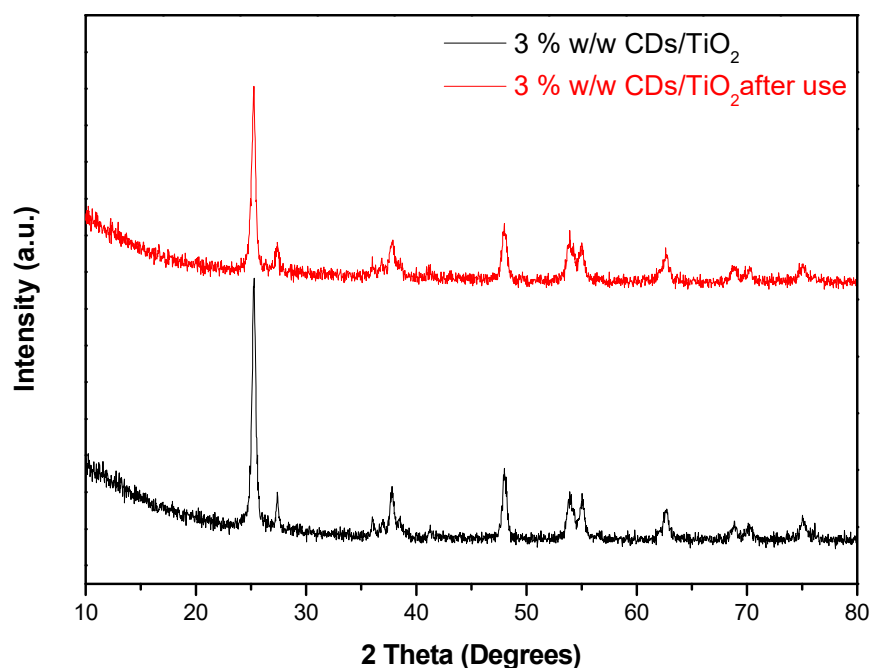


Figure S3. XRD spectra of the 3% w/w CD/TiO₂ before and after utilization.

The reproducibility of the experiments was studied using the 3% w/w CD/TiO₂ in the presence of 25% v/v ethanol. The results are presented in **Figure S4**. As can be observed, the hydrogen production rates were similar in all cases.

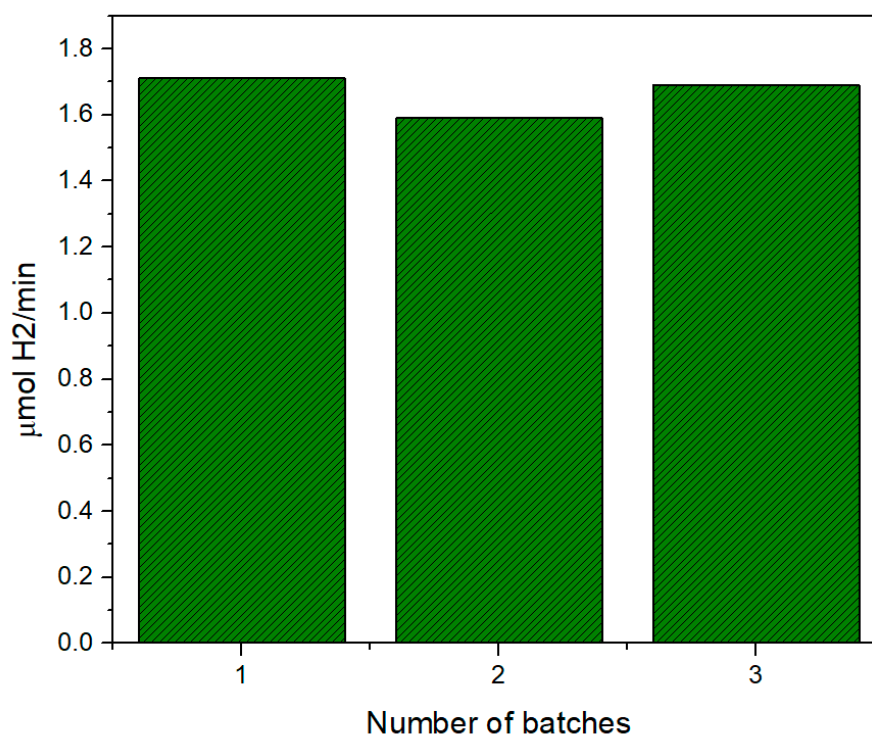


Figure S4. Results of the 3% w/w CD/TiO₂ reproducibility in the presence of 25% v/v ethanol.