Pt nanocluster co-catalysts for photocatalytic water splitting

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Supporting Information

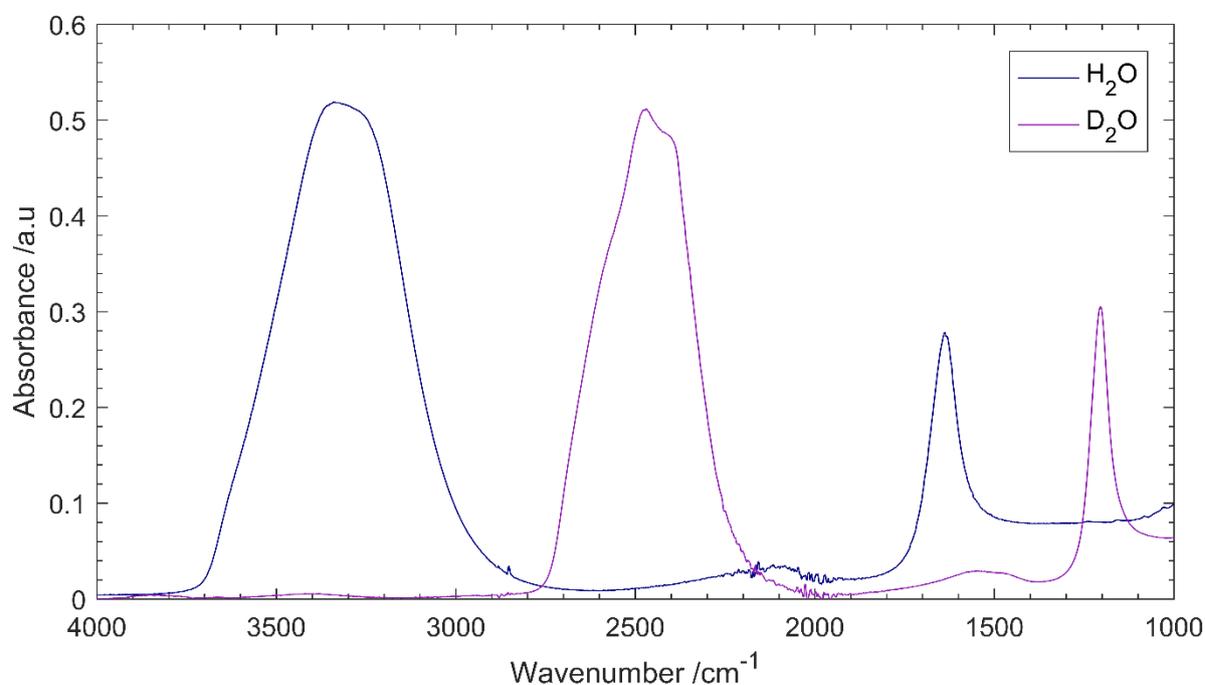**Figure S1.** ATR-FTIR spectra showing absorbance of H_2O (navy series) and D_2O (purple series) placed onto the ATR crystal which shows that the D_2O is pure.
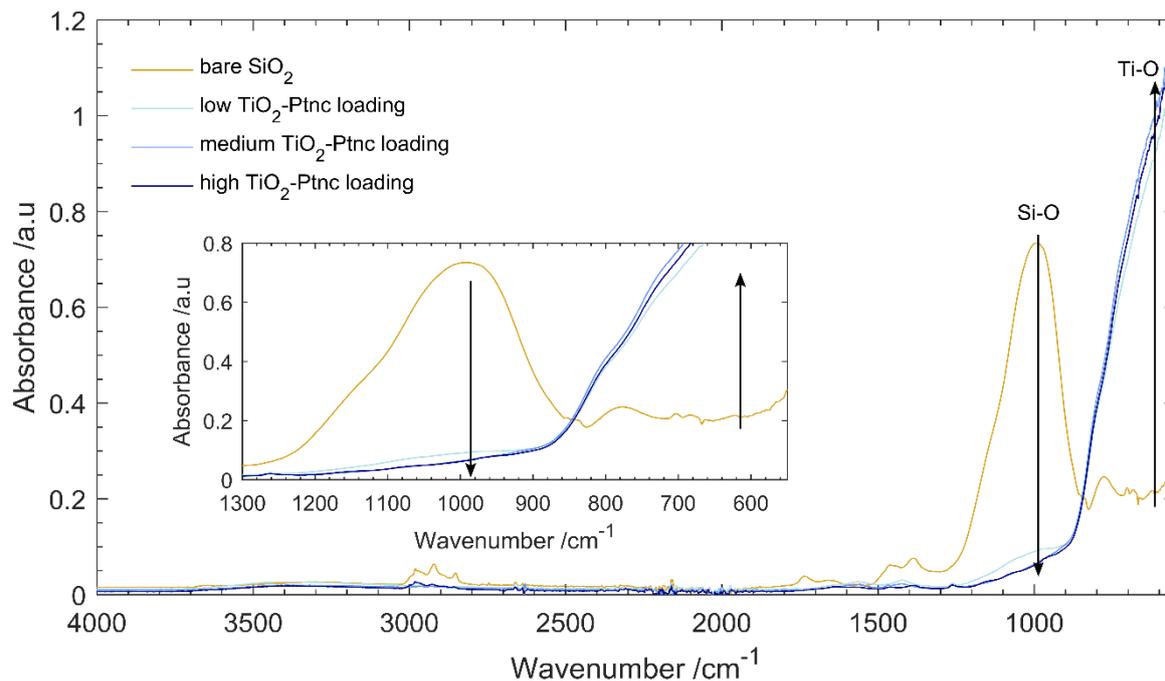
Figure S2. ATR-FTIR spectra of glass microfibre discs loading with increasing mass/area P25-Ptnc photocatalyst showing bare (0 mg/cm), low (~1.5 mg/cm), medium (~3 mg/cm) and high (~5 mg/cm) loading. From the disappearance of the Si-O stretch at 1000 cm^{-1}, the surface is coated for the medium and high loadings and the low loading has a very small fraction of uncoated surface.
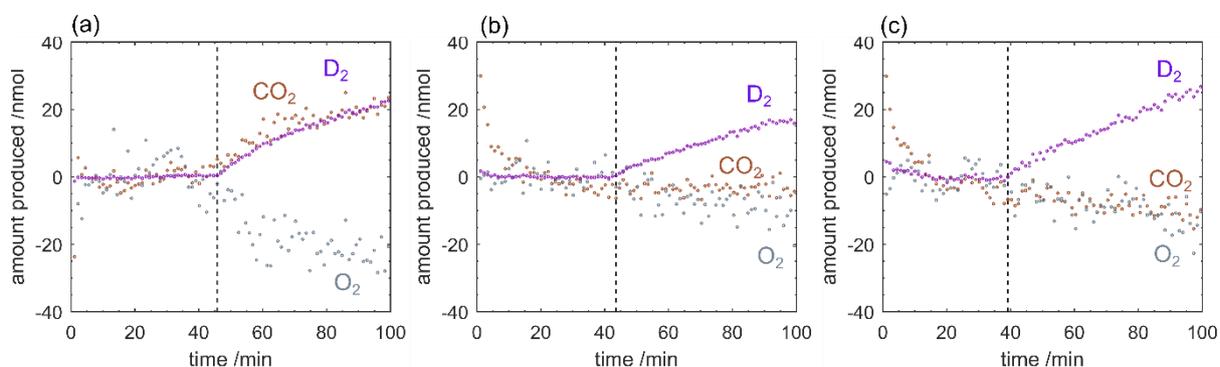

Figure S3. Repeated photocatalysis experiments for a Pt-nc sample (1 wt%) showing the production of D_2 (purple, m/z = 4), O2 (grey, m/z = 32) and CO_2 (brown, m/z = 44) for repeated experiments. In the first experiment, CO_2 is produced and O_2 is consumed. In subsequent experiments CO_2 and O_2 are not produced or consumed. Investigation is continuing to determine why O_2 is not produced.
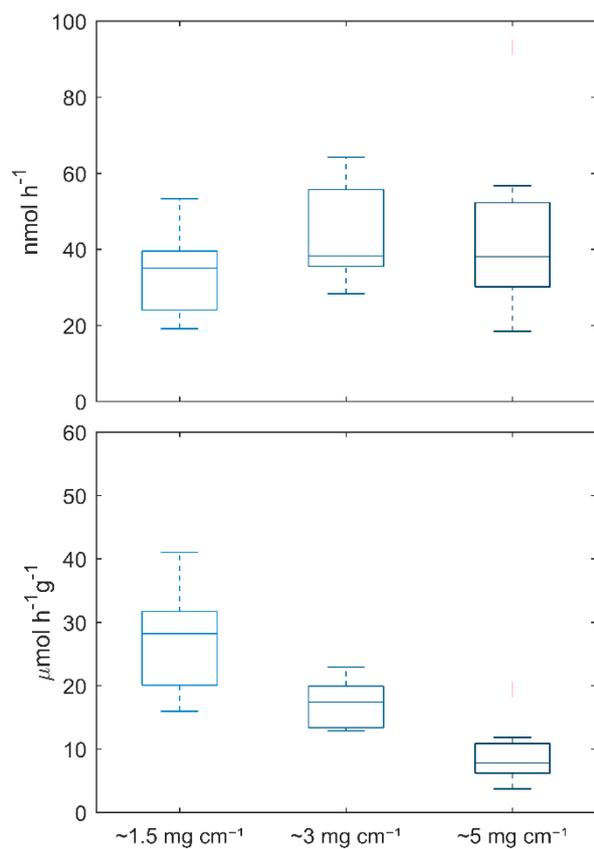
Figure S4.: Comparison of D_2 production rates with photocatalyst (P25-Ptnc-2wt%) loading. The data are presented with (upper figure) and without (lower figure) dividing by photocatalyst mass.
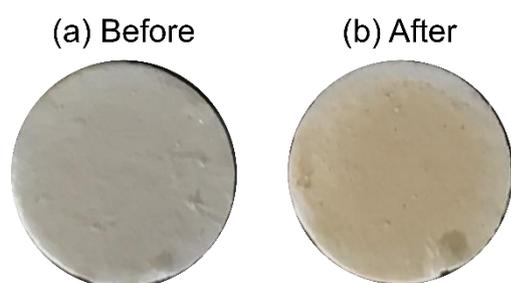

Figure S5. Digital photographs of P25-Pt-nc-1wt% photocatalytic disc (a) before and (b) after 3 repeated UV photocatalytic D_2 production experiments.