Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting information

Subnanometric Pt clusters dispersed over Cs-doped TiO_2 for CO_2 upgrading via low-temperature RWGS reaction: *operando* mechanistic insights to guide an optimal catalysts design

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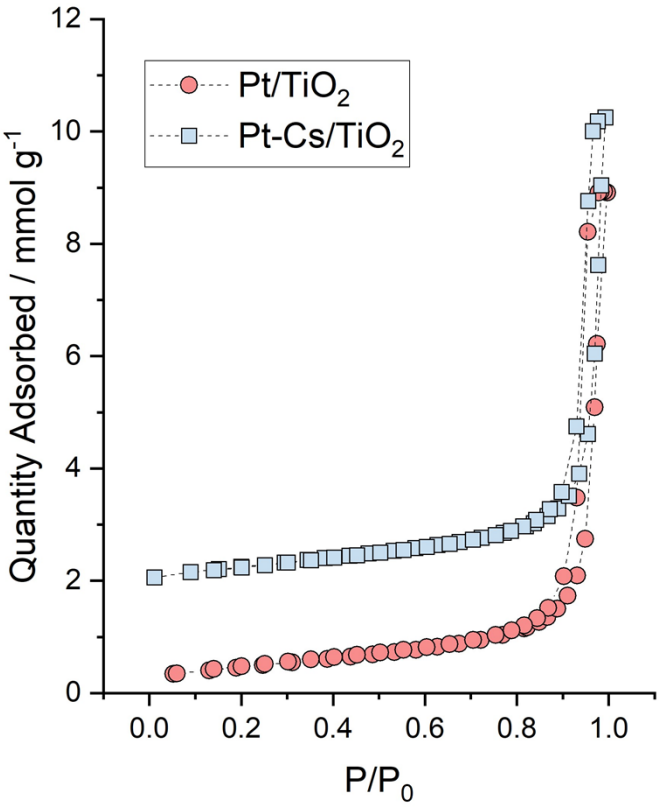

Figure S1. N_2 adsorption-desorption isotherms at 77 K for both Pt/TiO2 and Pt-Cs/TiO_2 catalysts

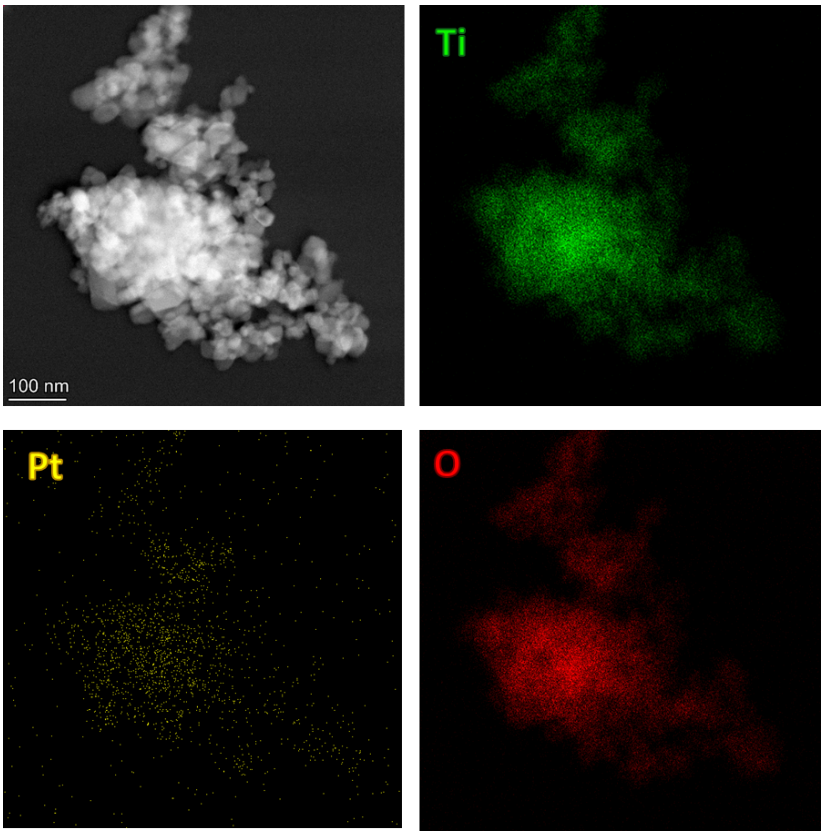

Figure S2. HAADF-STEM with elemental mapping images of Pt/TiO_2 catalyst after pre-treatment at 550 ºC in 50 % H_2/N_2 for 3 h

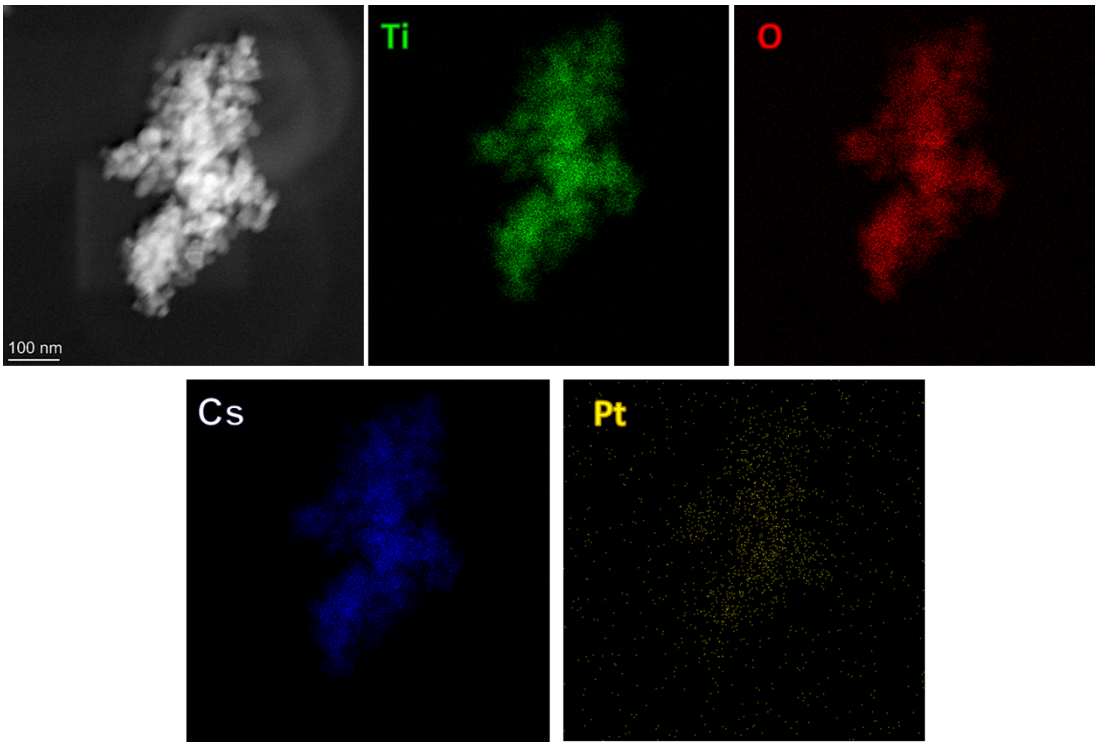

Figure S3. HAADF-STEM with elemental mapping images of Pt-Cs/TiO_2 catalyst after pre-treatment at 550 ºC in 50 % H_2/N_2 for 3 h

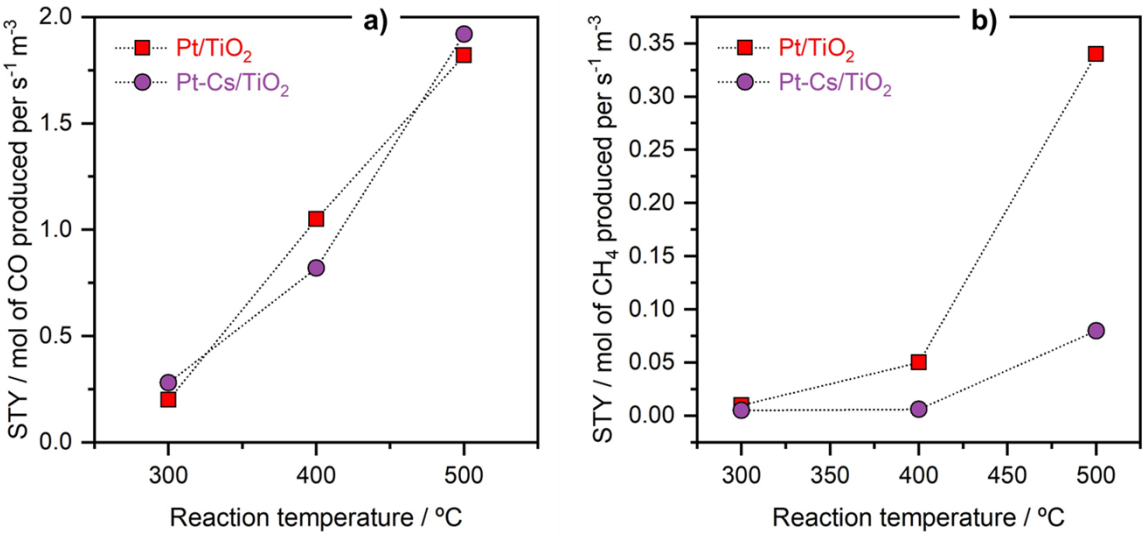

Figure S4. Space-time yield (STY) in terms of CO production **(a)** and CH_4 production **(b)** for Pt/TiO_2 and Pt-Cs/TiO_2 catalysts.

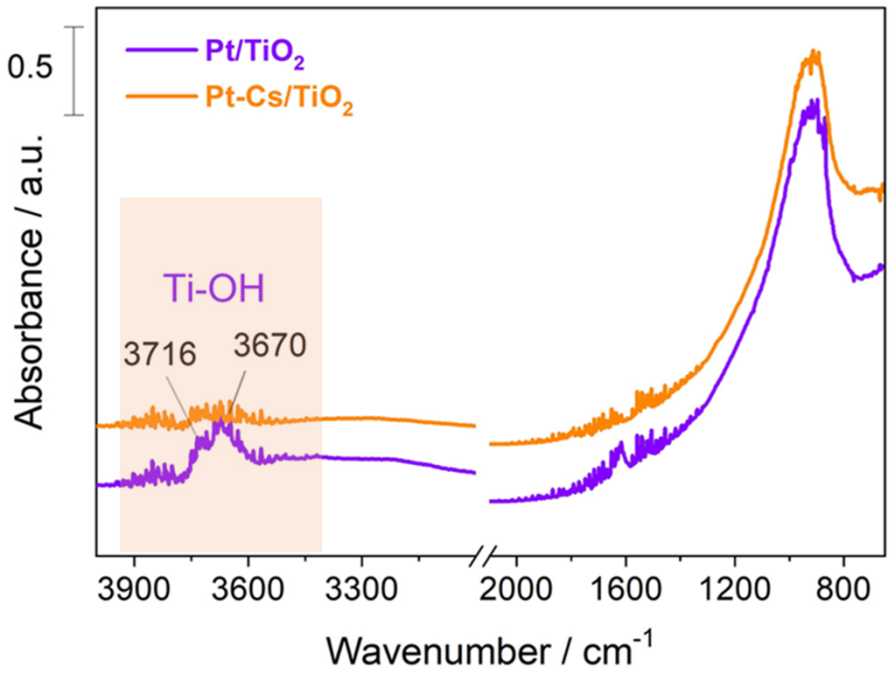

Figure S5. DRIFTS spectra of Pt/TiO_2 and $Pt\text{-}Cs/TiO_2$ after being activated at 400 ºC for 1 h with a flow of 50 mL min^{-1} of 10% H_2/Ar

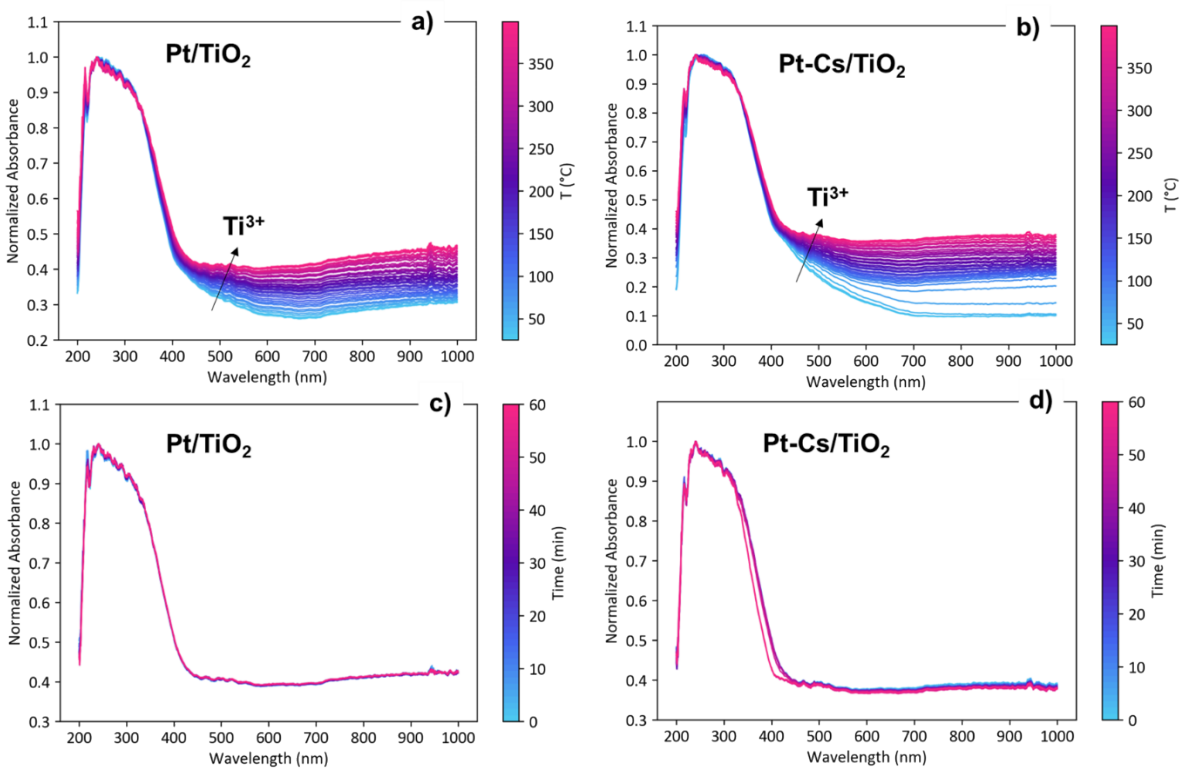

Figure S6. Evolution of UV-Vis spectra as a function of the temperature during the activation pretreatment in flow of 10% H_2/Ar (**a-b**) and as a function of the time during the RWGS reaction (5/20/25 mL min^{-1} of CO_2/H_2/Ar, WHSV = 30 L g^{-1} h^{-1} and 1 bar) at 400 ºC (**c-d**) for both catalysts.

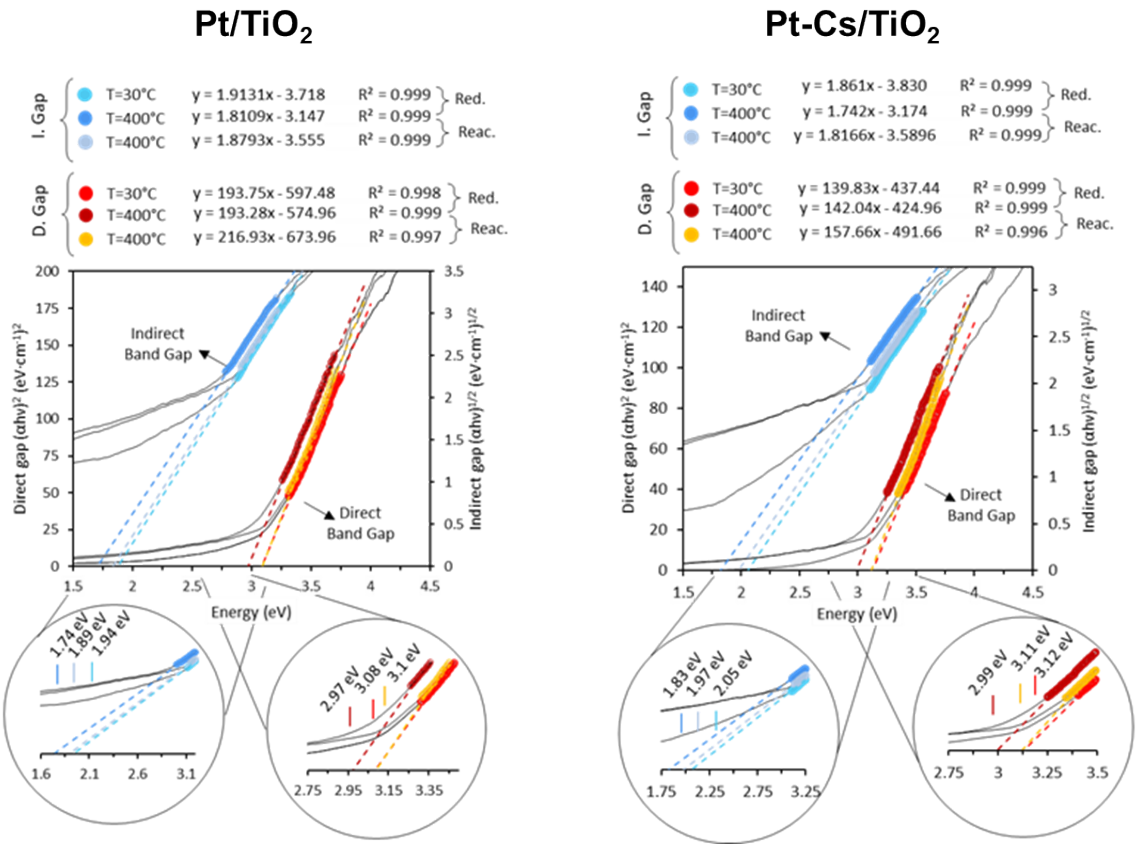

Figure S7. Estimation of direct and indirect energy band gaps using the Tauc plot method for both fresh catalysts, after activation (50 mL min^{-1} 10% H_2/Ar, 400 ºC, 1h) and after 1h of RWGS reaction (5/20/25 mL min^{-1} of CO_2/H_2/Ar, WHSV = 30 L g^{-1} h^{-1}, 400 ºC and 1 bar)