Supplementary Material (ESI) for Chemical Communications

Electronic supplementary information (ESI)

Combined sulfating and non-sulfating support to prevent water and sulfur poisoning of Pd catalysts

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Experimental

Preparation of the catalyst:

The precursors were mixed in appropriate amounts and refluxed under stirring at 80 °C. An aqueous solution of acetic acid at pH 5 was added at 80 °C in order to catalyse the simultaneous hydrolysis of both precursors. The gel was kept at this temperature for 1 h and then dried at 110 °C for 6 h in order to remove the solvent. The product was finally calcined at 450 °C for 4 h.
Then, palladium (1 wt.%) was deposited over the mixed oxide by impregnation using an aqueous solution of palladium nitrate. The sample was dried at 120 °C overnight and calcined at 400 °C for 4 h.

Equipments for the catalytic tests:

The inlet and outlet gas composition was analyzed by online mass quadrupole spectrometer (Thermostar, Balzers). IR analyzers (ABB Uras 14 and 26) were used for monitoring CO, CO_2 and CH_4 and a paramagnetic analyzer (ABB Magnos 206) for monitoring O_2.

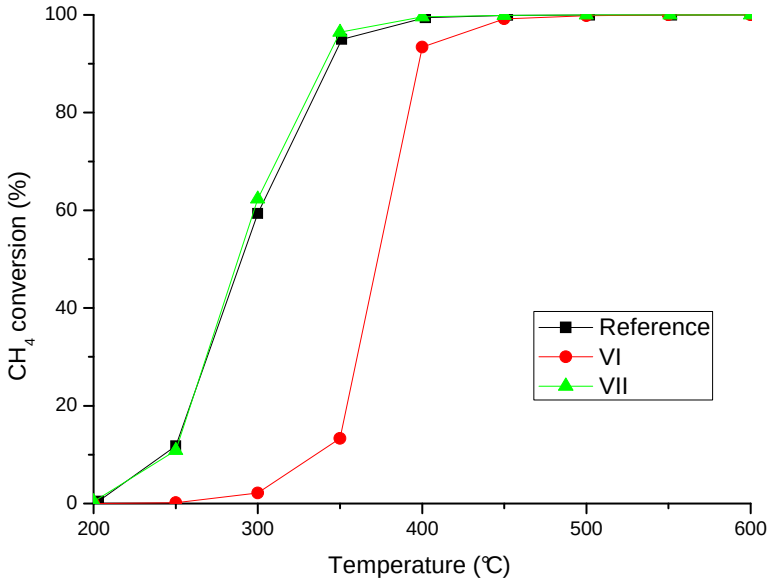

Fig. S1: Influence of an overnight treatment with H_2O + SO_2 on the conversion of methane: Reference curve obtained for Pd/TiO_2(10%)-SiO_2 (lean burn conditions), curve VI (1st run after the overnight treatment), curve VII (2nd run after the overnight treatment)

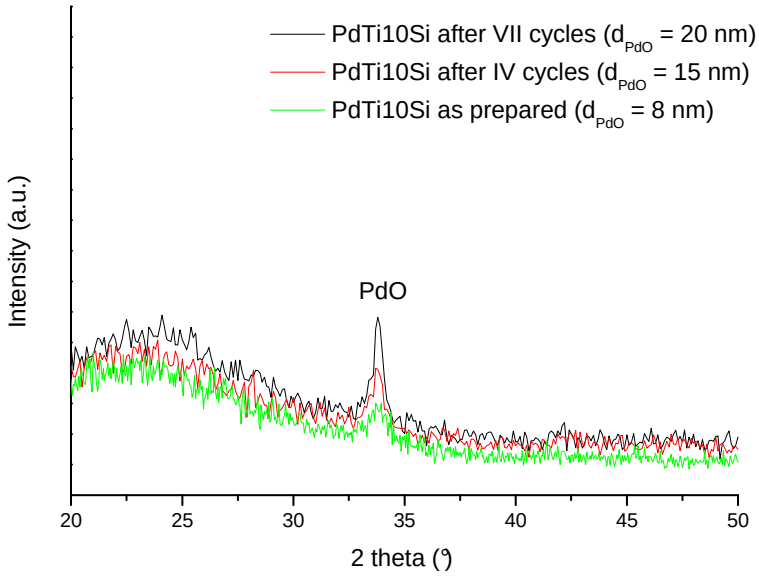

Fig. S2: XRD pattern of Pd/TiO_2(10%)-SiO_2: the peak centered on 34° is corresponding to PdO(101) while the broad peak centered on 23° can be attributed to amorphous SiO_2.