PET waste as organic linker source for the sustainable preparation of MOF-derived methane dry reforming catalysts

Electronic Supplementary Material (ESI) for Materials Advances.

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Supplementary informations

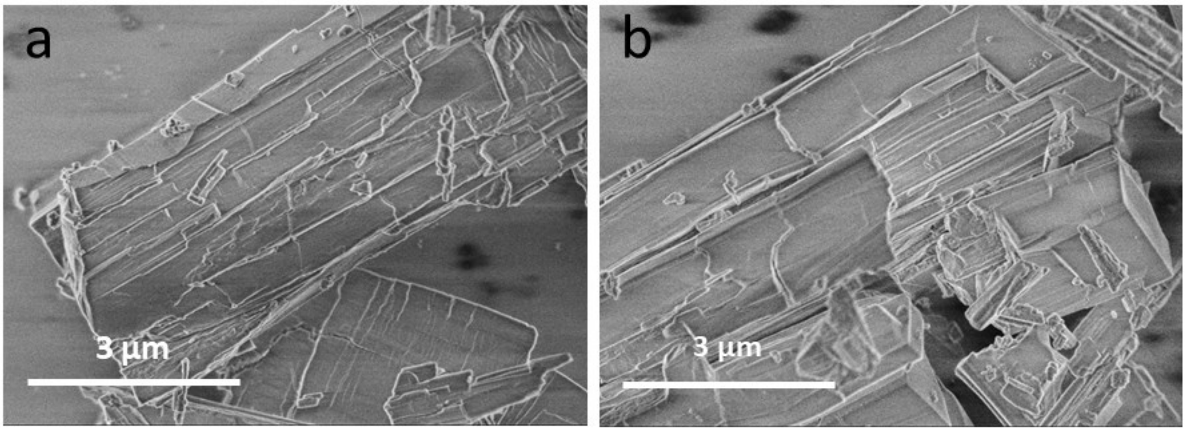

Figure S1. SEM images of (**a**) *MIL-53-PET*$_{AC}$ and (**b**) *Ni-MIL-53-PET*$_{Imp}$

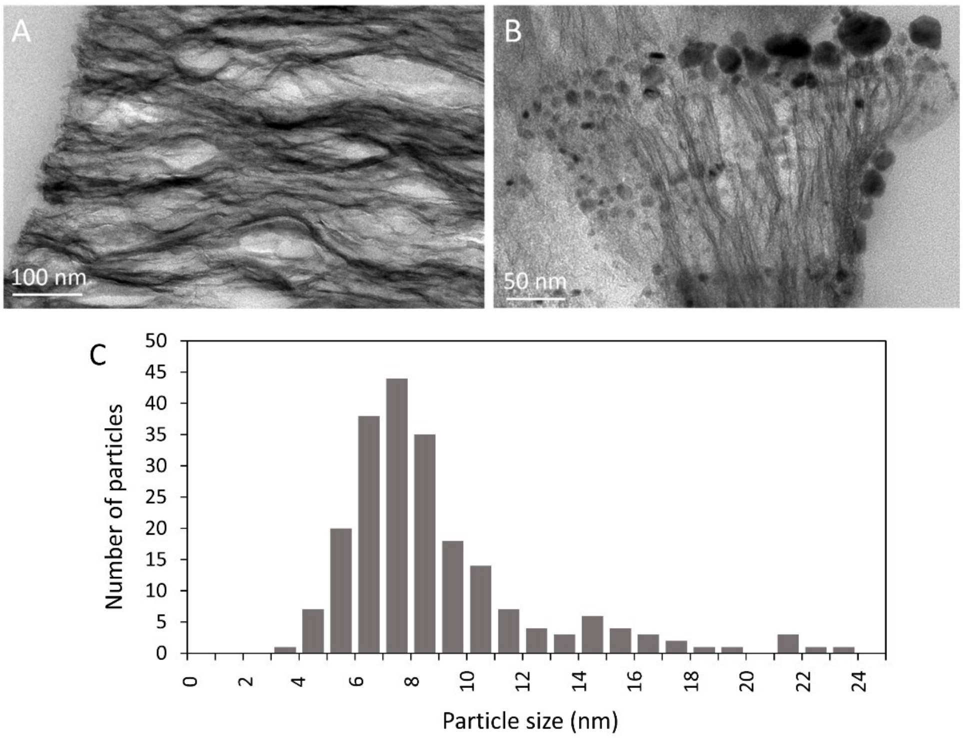

Figure S2: TEM image of (A) a microtome cut of calcined Ni-Al_2O_3-BDC and (B) of the same sample after reduction at 800°C under H_2 (Ni^0-Al_2O_3-BDC). (C) Histogram established from *22*0 Ni^0 nanoparticles in typical TEM images of Ni^0-Al_2O_3-*BDC*.

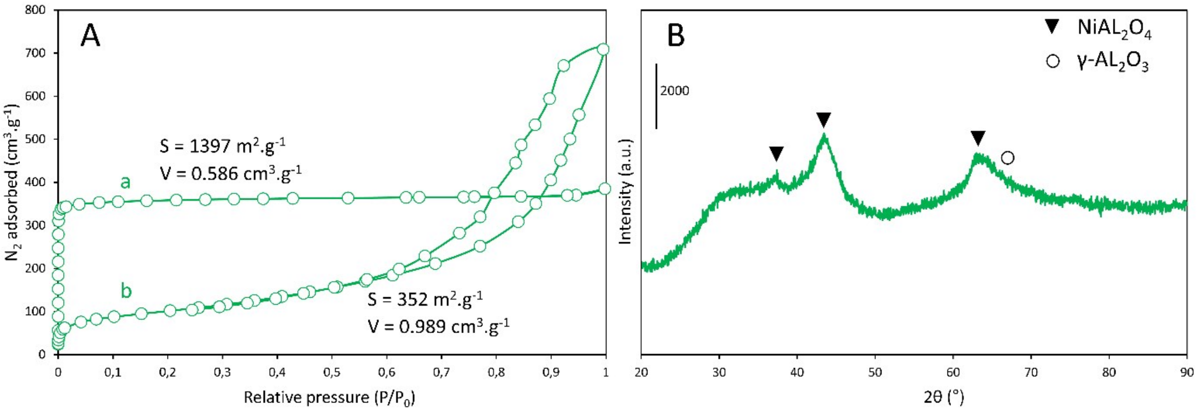

Figure S3: (A) N_2 sorption analyses and textural properties (BET Surface are and pore volume) of (a) *MIL-53-BDC$_{AC}$* and (b) *Ni-Al_2O_3-BDC*; (B) X-ray diffraction pattern of *Ni-Al_2O_3-BDC*.

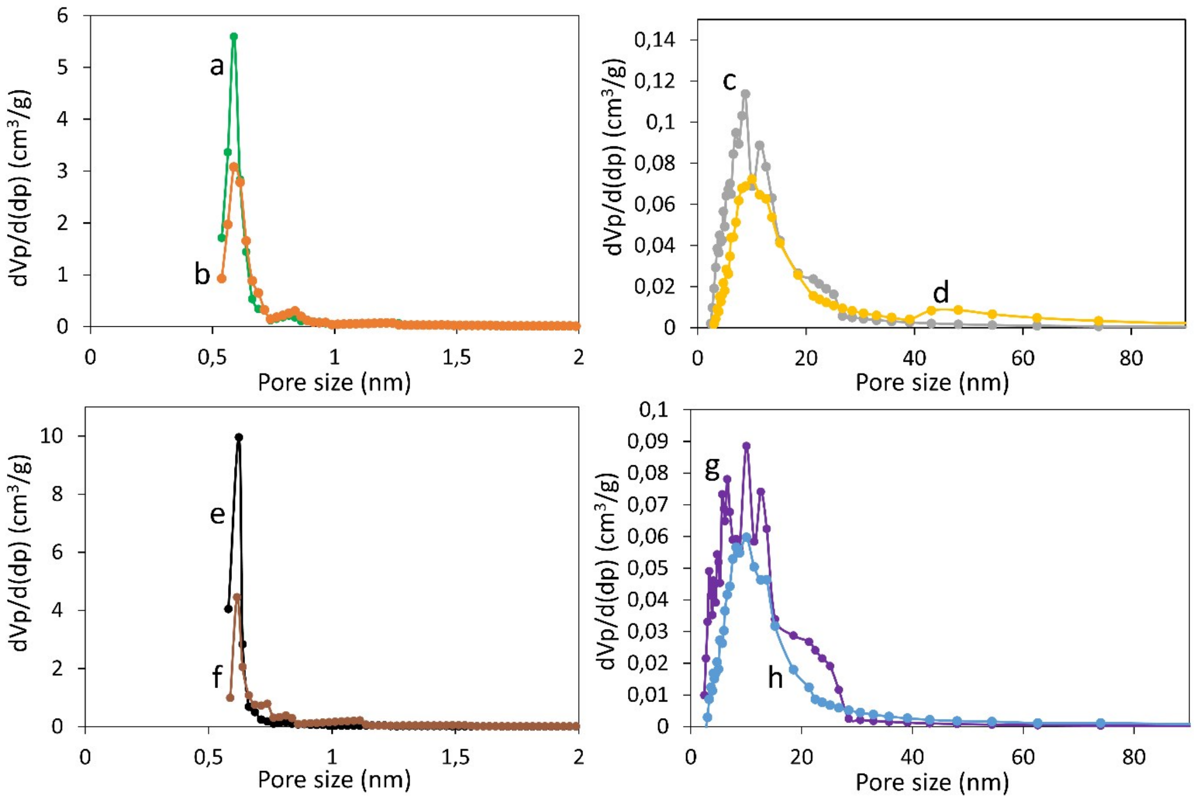

Figure S4. Pore size distributions assessed by applying the Horvath-Kawazoe model of (a) MIL-53-PET$_{AC}$, (b) Ni-MIL-53-PET, (c) Ni-Al_2O_3-PET, (d) Ni^0-Al_2O_3-PET, (e) MIL-53-BDC$_{AC}$, (f) Ni-MIL-53-BDC, (g) Ni-Al_2O_3-BDC and (d) Ni^0-Al_2O_3-BDC.

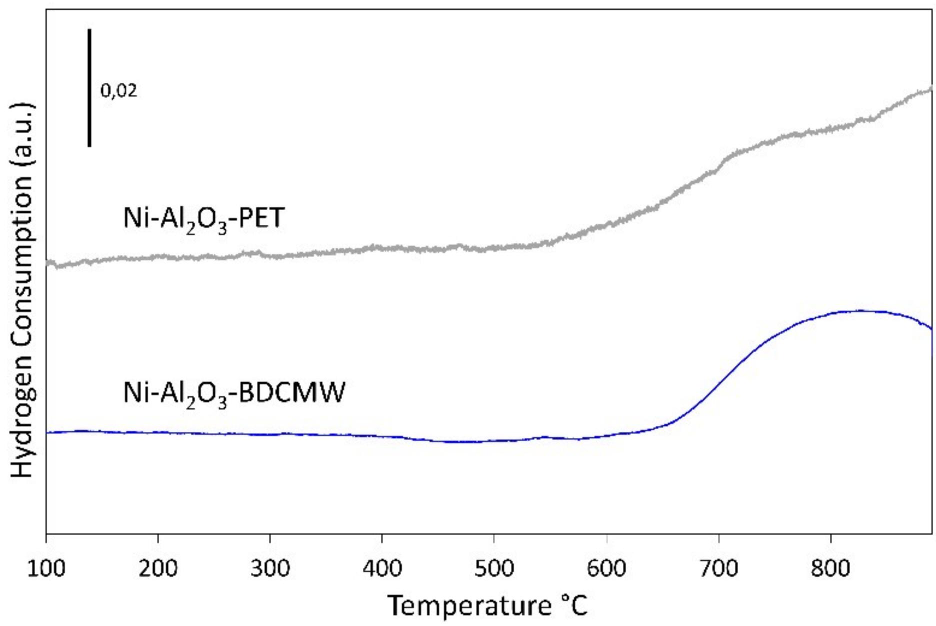

Figure S5. TPR profiles of the samples Ni-Al_2O_3-PET and Ni-Al_2O_3-BDC$_{MW}$.

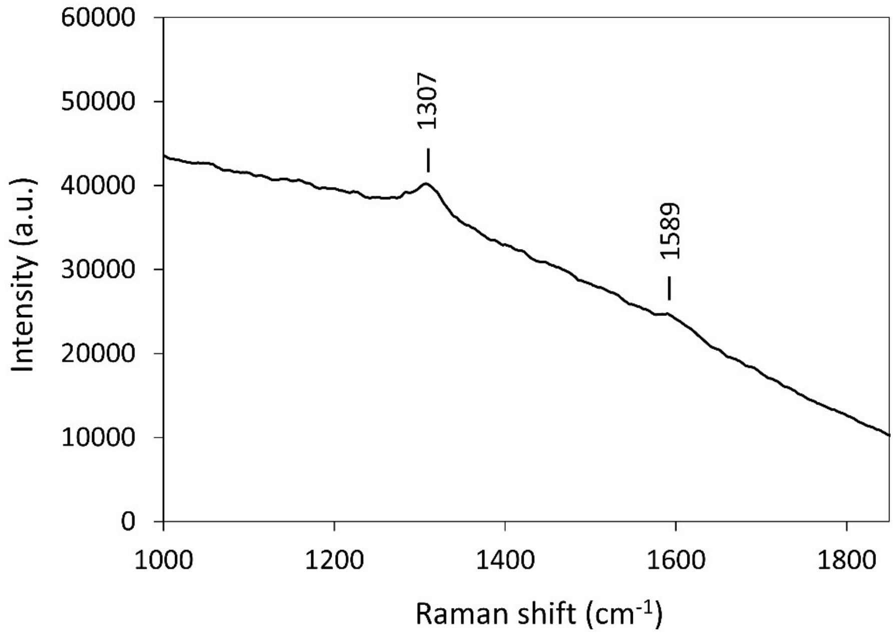

Figure S6. Raman spectroscopy profiles of the spent Ni-Al_2O_3-PET catalyst (the wavy baseline is supposedly due to fluorescence coming from the glass wool used in the test reactor). The two bands at 1307 cm^{-1} and 1589 cm^{-1} correspond to the D and G bands typical of the doubly degenerated phonon mode of carbon atoms on the sp2 carbon network with high degree of symmetry and order (graphitic carbon, G-band, 1589 cm^{-1}) and of a disordered structural mode of carbon species (D-band, 1307 cm^{-1}).