Supplementary Information

High-Pressure Hydrogenation: A Path to Efficient Methane Production from CO_2

Maitê L. Gothe [1], Adolfo L. Figueredo [1], Laís R. Borges [1], Ruben Ramos [2], Andreia F. Peixoto [3] and Pedro Vidinha [1,*]

[1] Instituto de Química, Universidade de São Paulo, Av Prof Lineu Prestes 748, 05508-900, Butantã, São Paulo, Brazil; maite.gothe@usp.br (M.L.G.); adolfofigueredo@usp.br (A.L.F.); laisreisborges@usp.br (L.R.B.)
[2] Iberian Centre for Research in Energy Storage (CIIAE), 10004 Cáceres, Extremadura, Spain; rrvelarde@hotmail.com
[3] LAQV-REQUIMTE, Departamento de Química e Bioquímica, Faculdade de Ciências, Universidade do Porto, Rua do Campo Alegre s/n, 4169-007 Porto, Portugal; andreia.peixoto@fc.up.pt
* Correspondence: pvidinha@iq.usp.br

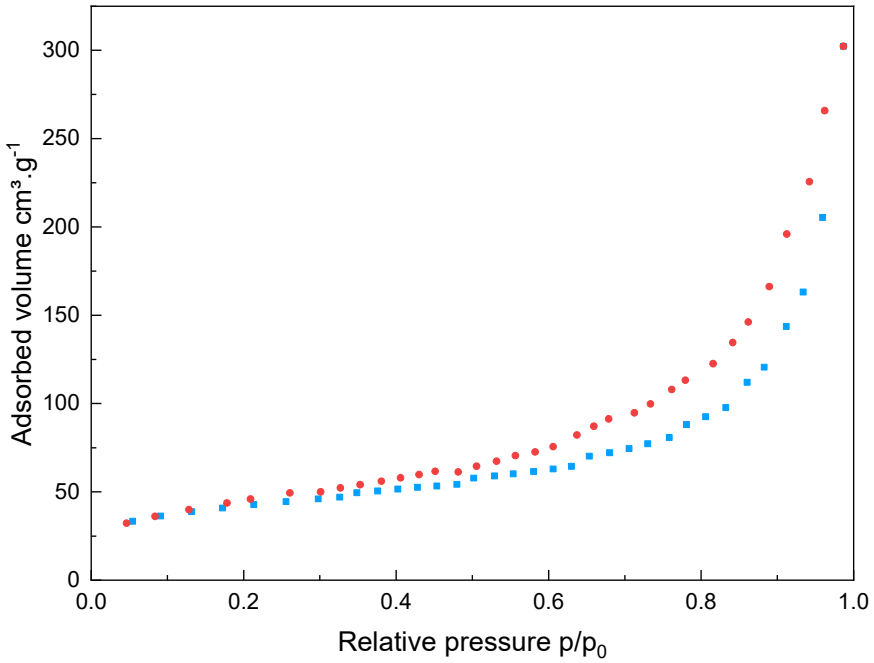

Figure S1. N_2 adsorption and desorption isotherm of as prepared Ni/Al_2O_3-HTC.

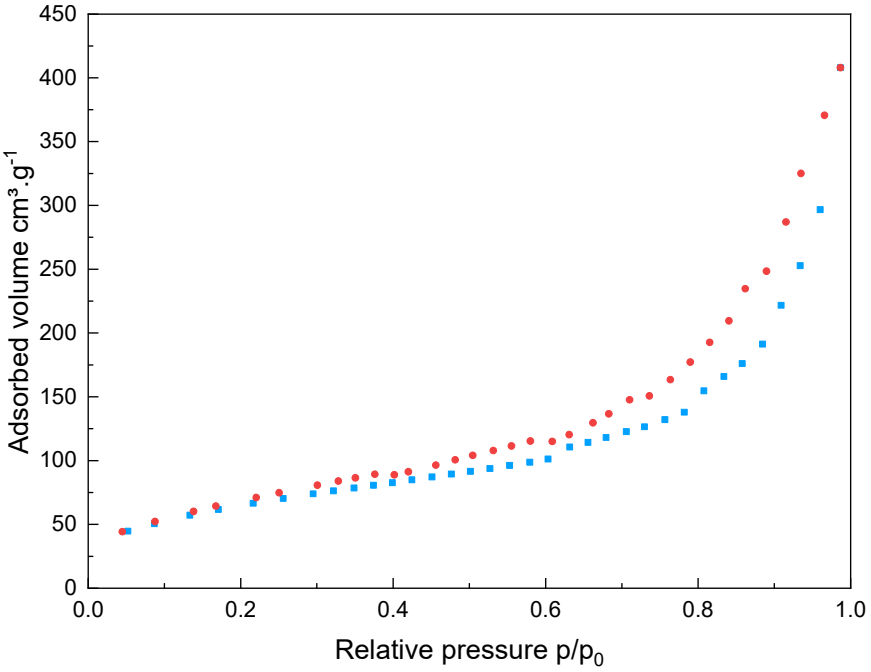

Figure S2. N_2 adsorption and desorption isotherm of Ni/Al_2O_3-HTC reduced at 500 °C under H_2

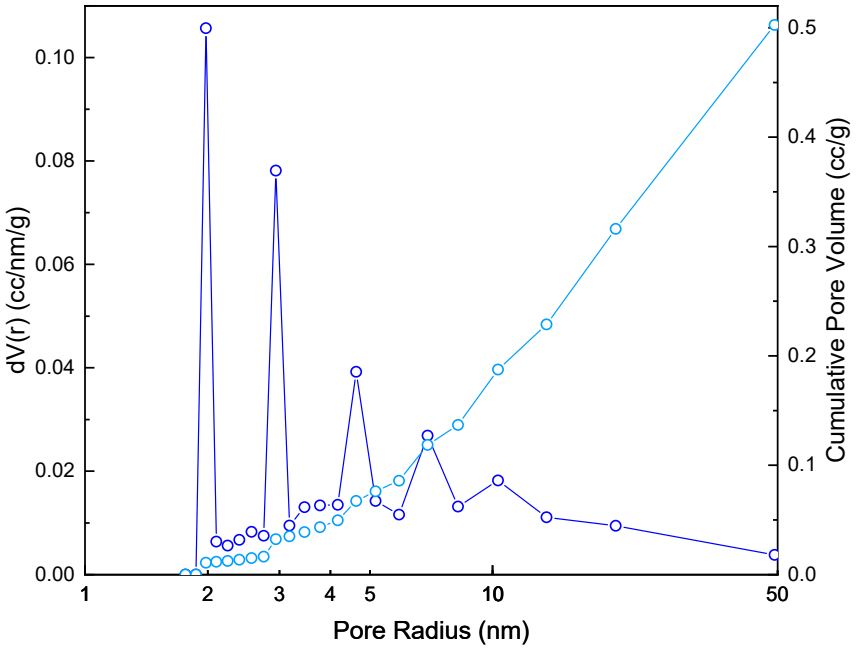

Figure S3. BJH Pore size distribution performed on the adsorption isotherm of as prepared Ni/Al_2O_3-HTC

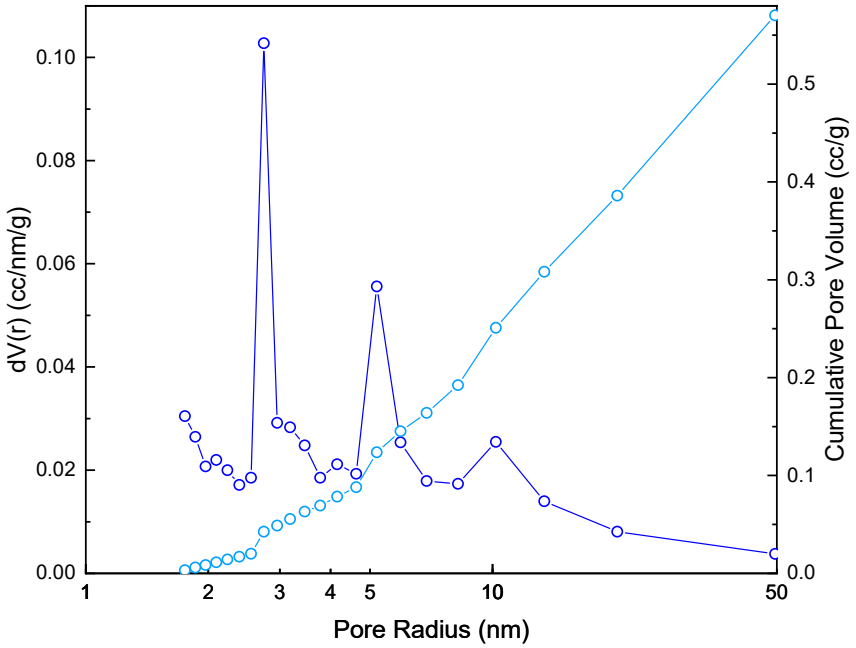

Figure S4. BJH Pore size distribution performed on the adsorption isotherm of Ni/Al_2O_3-HTC reduced at 500 °C under H_2

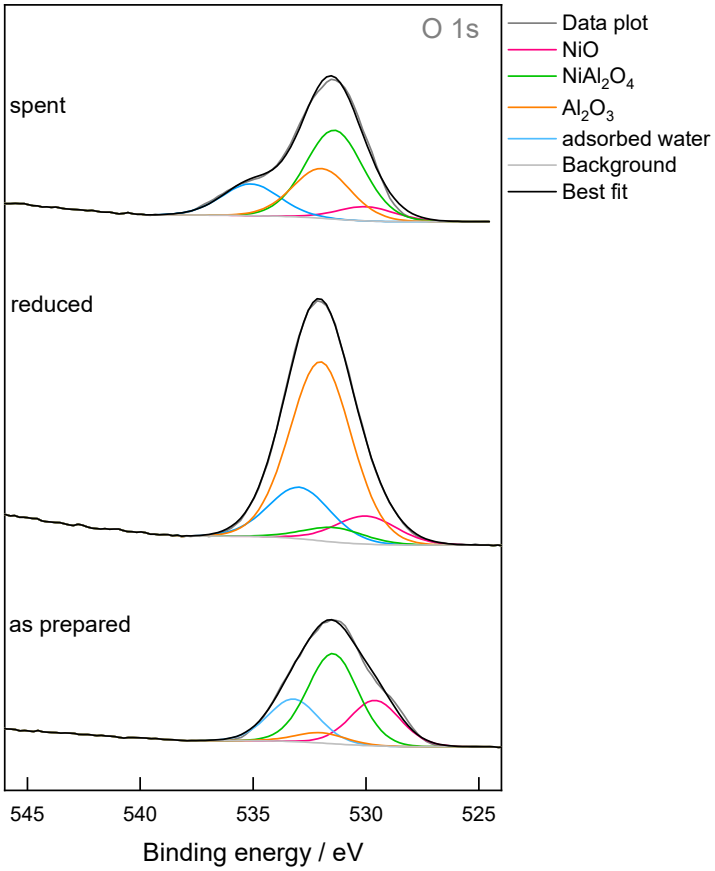

Figure S5. XPS of the O 1s region on Ni/Al_2O_3-HTC

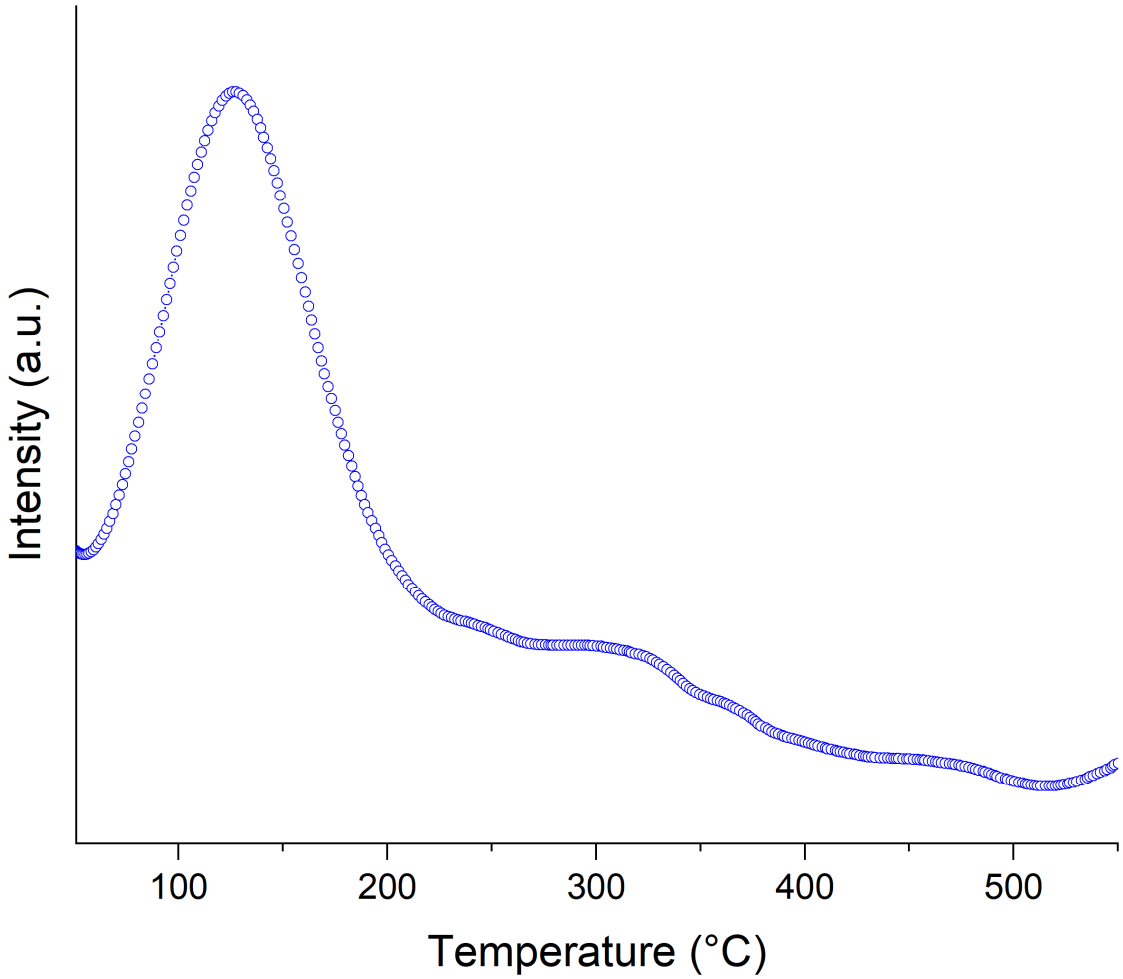

Figure S6. TPD-CO_2 profile of Ni/Al_2O_3-HTC pre-reduced at 500 °C under H_2

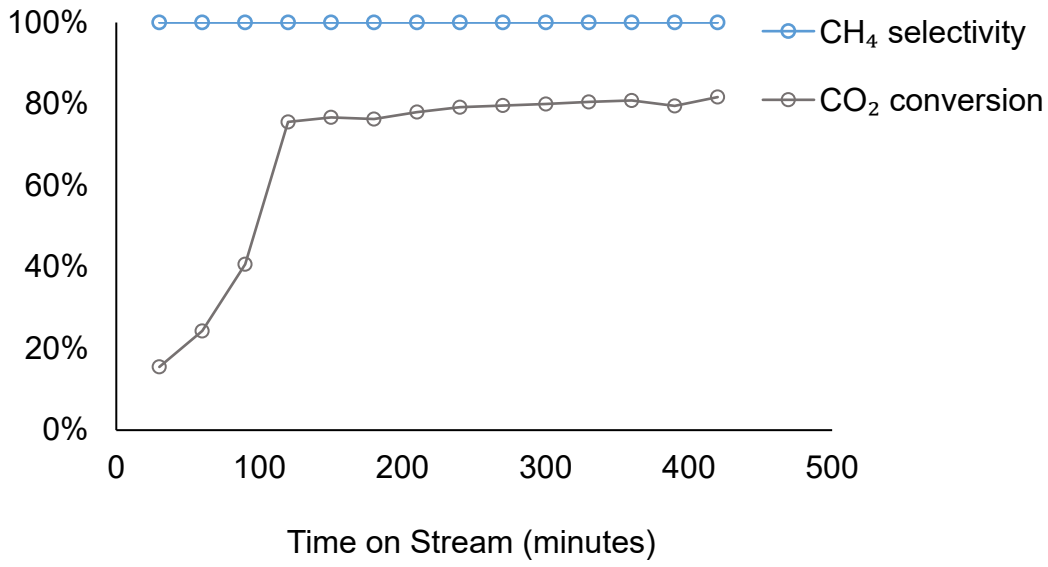

Figure S7. Time on stream plot of the CO_2 methanation reaction over Ni/Al_2O_3-HTC. Reaction conditions: 200 mg of catalyst pre-reduced at 500 °C under H_2 for 1 hour, T = 400 °C, p = 40 bar, GHSV = 30,000 $mL.g_{cat}^{-1}.h^{-1}$.