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Supporting Information

***Operando* Electron Microscopy Study of Cobalt-based Fischer-Tropsch Nanocatalysts**

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Quantitative determination of the catalytic performances

The total outlet flow-rate Q_{out} is calculated according to the formula:

$$Q_{out} = \frac{Q_{He,\epsilon}}{V_{He,out}}$$

where $Q_{(He,in)}$ is the inlet flow-rate of helium, and $V_{(He,out)}$ the measured outlet volume fraction of helium.

The flow-rates $Q_{(i,out)}$ of the compounds i are then given by:

$$Q_{i,out} = Q_{out} \cdot V_{i,out}$$

$V_{i,out}$ being the concentration of the compound i at the outlet.

The CO conversion, the CH_4 , C_2 , C_3 , C_4 and C_{5+} selectivity are given by:

$$CO_{conv.} = \frac{Q_{CO,\epsilon} - Q_{CO,out}}{Q_{CO,\epsilon}}$$

$$S_{CH_4} = \frac{Q_{CH_4,out}}{Q_{CO,\epsilon} - Q_{CO,out}}$$

$$S_{C_i} = \frac{i \cdot Q_{C_i,out}}{Q_{CO,\epsilon} - Q_{CO,out}}, \quad 2 < i < 4$$

$$S_{C_{5+}} = 1 - (S_{CH_4} + S_{C_2} + S_{C_3} + S_{C_4})$$

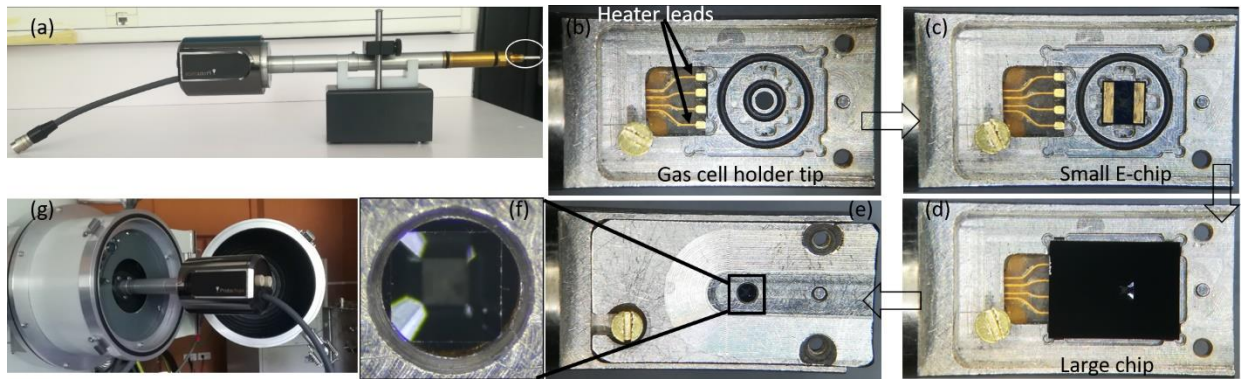


Figure SI-1: Photographs of the gas cell holder used for the in situ TEM experiments (a), the chips mounting on the tip of the holder, their alignment and sealing (b-e), zoom-in on the viewing area of the holder tip (f), and the holder insertion inside the microscope (g).

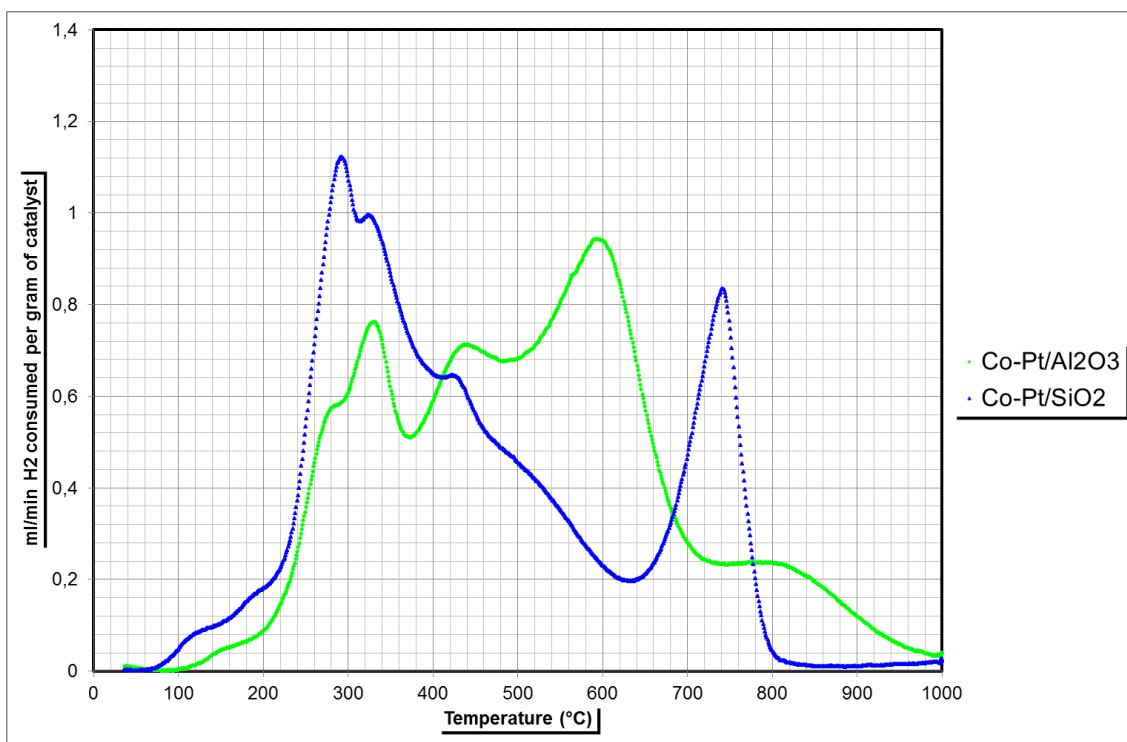


Figure SI-2: Temperature programmed reduction of the two Co-Pt catalysts deposited on silica and alumina.

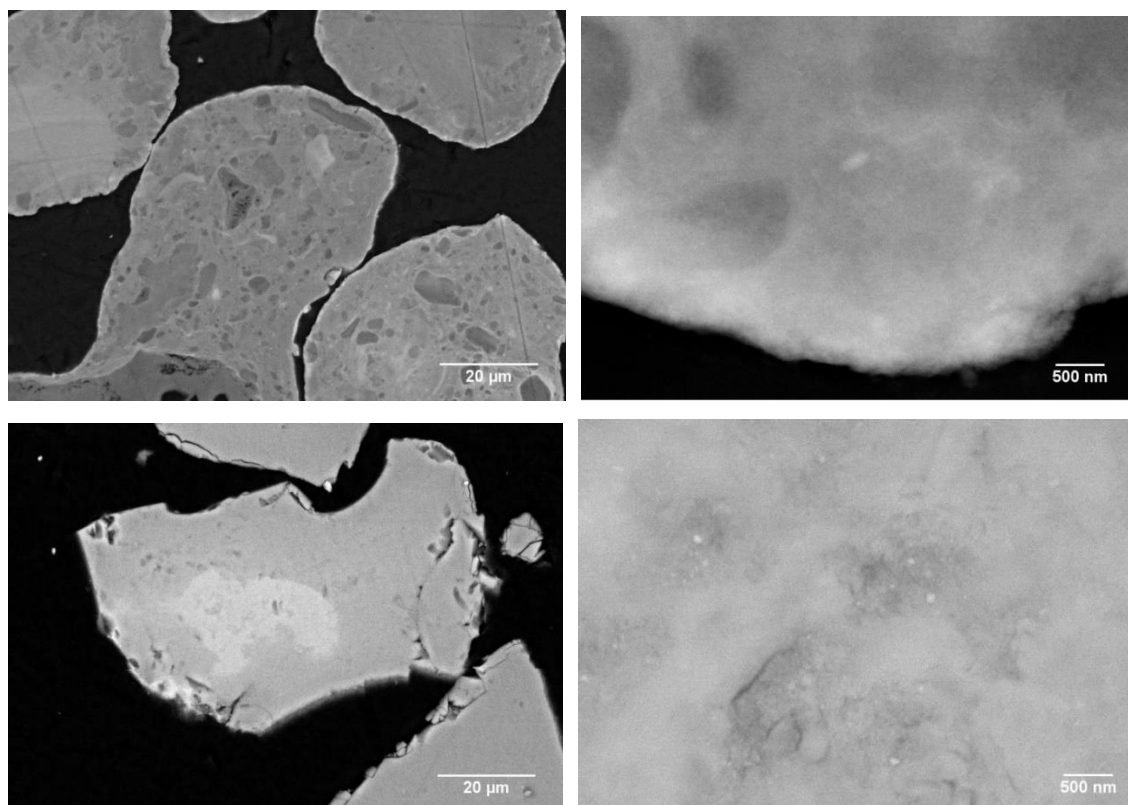


Figure SI-3: Typical scanning electron microscopy (SEM) images acquired on Co-Pt/Al₂O₃ (top) and Co-Pt/SiO₂ (bottom) catalysts.

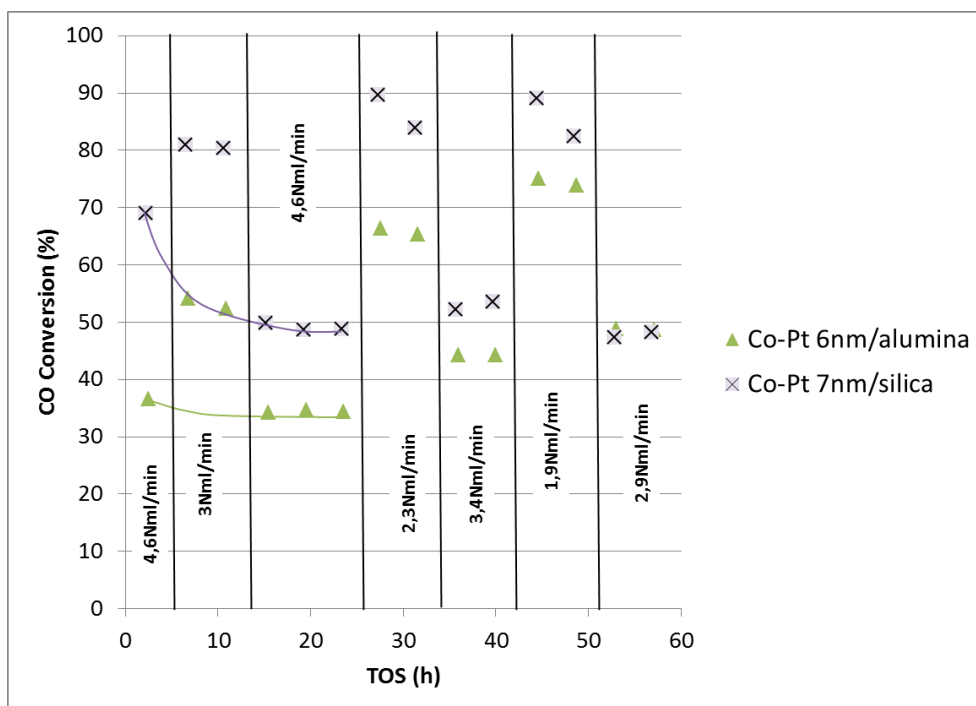


Figure SI-4: CO conversion as a function of time on stream with variable CO flow rates for Co-based catalysts supported on alumina or silica.

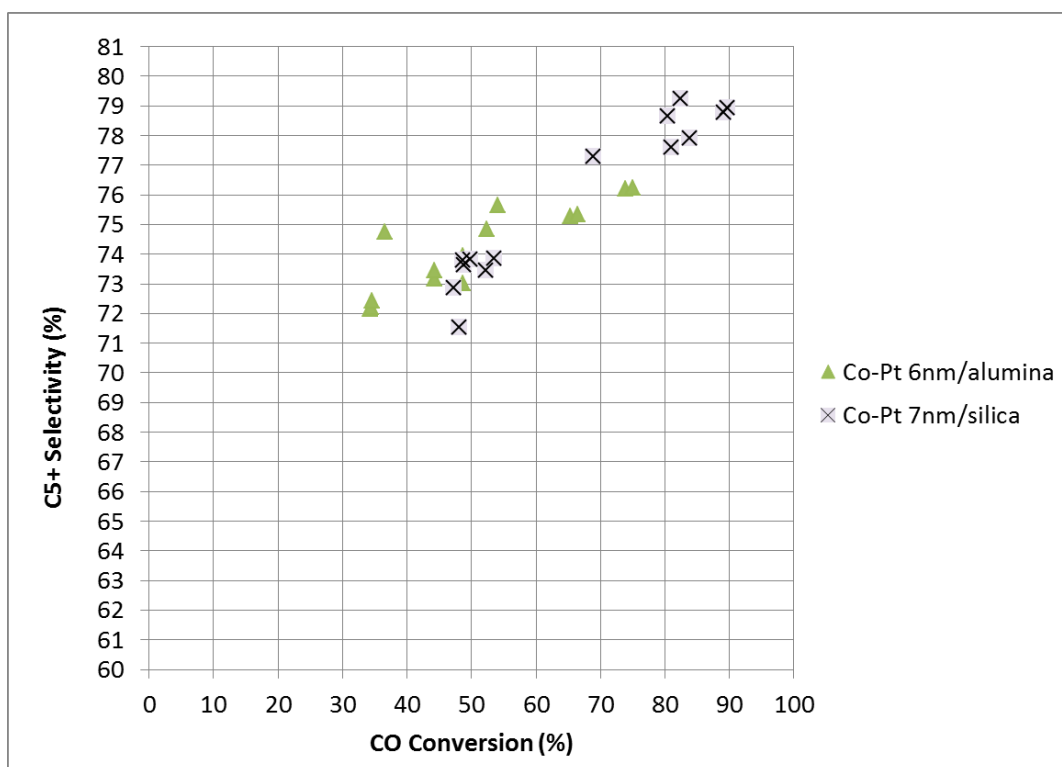


Figure SI-5: C5+ selectivity as a function of CO conversion for Co-based catalysts supported on alumina or silica.