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Supplementary Information

Co₃O₄ morphology in the preferential oxidation of CO

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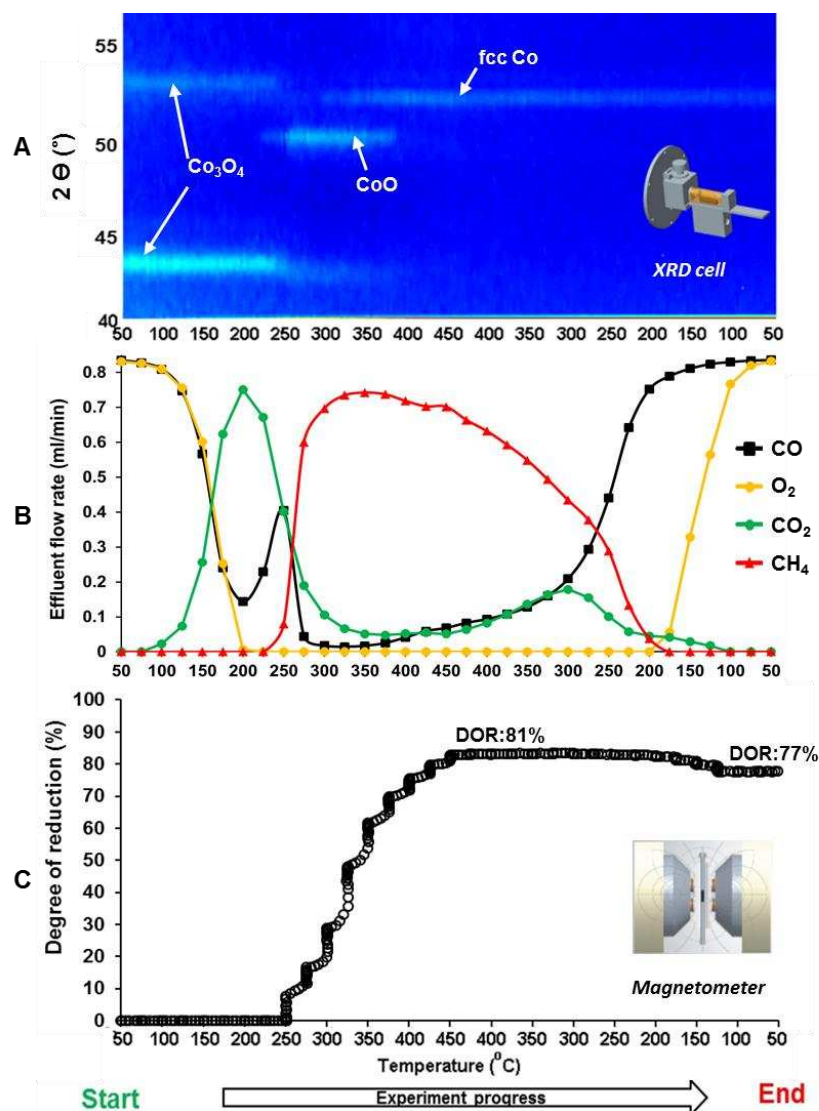


Figure S1: In situ XRD scans and degree of reduction from magnetometer measurements for nanosheets/SiO₂. A: in situ XRD on top view. B: effluent flow rate of CO, CO₂, CH₄ and O₂. C: degree of reduction measured in the magnetometer. (Temperature: 450 °C, Heating rate: 50 °C to 450 °C back to 50 °C holding for 1 hr every 25 °C with a ramp rate of 1 °C/min, magnetic readings: taken at -20, 0, 20 and 0 kOe every 10 min).

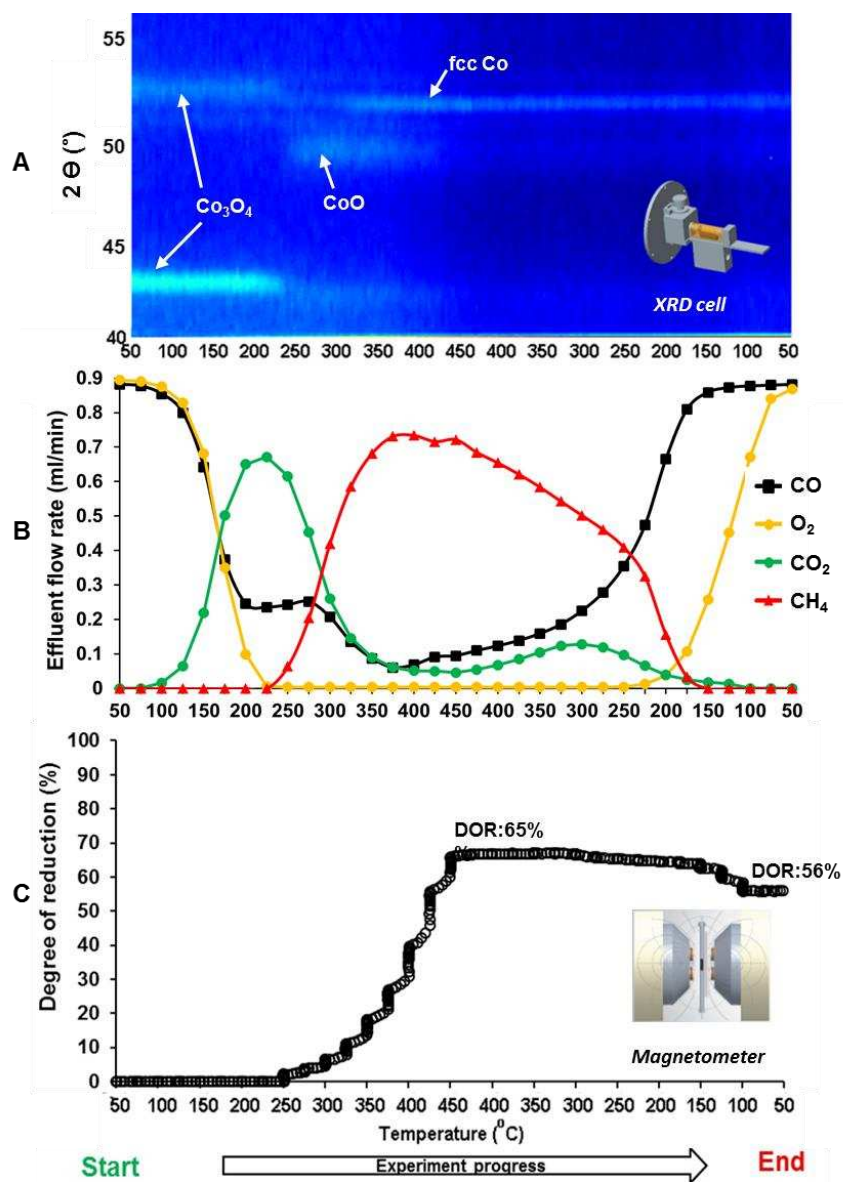
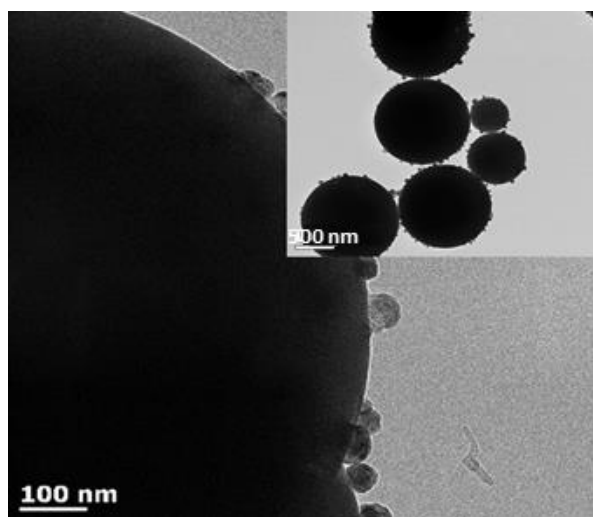
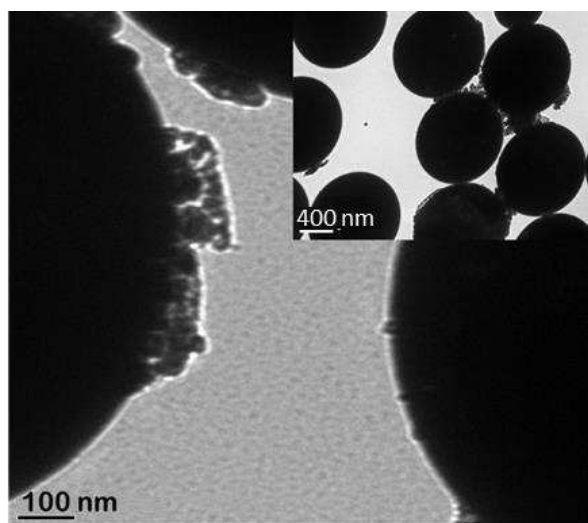


Figure S2: In situ XRD scans and degree of reduction from magnetometer measurements for nanobelts/SiO₂. A: in situ XRD on top view. B: effluent flow rate of CO, CO₂, CH₄ and O₂. C: degree of reduction measured in the magnetometer. (Temperature: 450 °C, Heating rate: 50 °C to 450 °C back to 50 °C holding for 1 hr every 25 °C with a ramp rate of 1 °C/min, magnetic readings: taken at -20, 0, 20 and 0 kOe every 10 min).

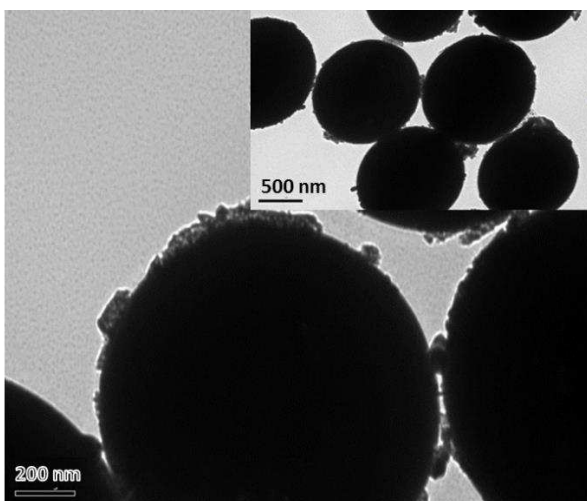
Nanocubes/SiO₂



Nanosheets/SiO₂



Nanobelts/SiO₂



Nanoparticles/SiO₂

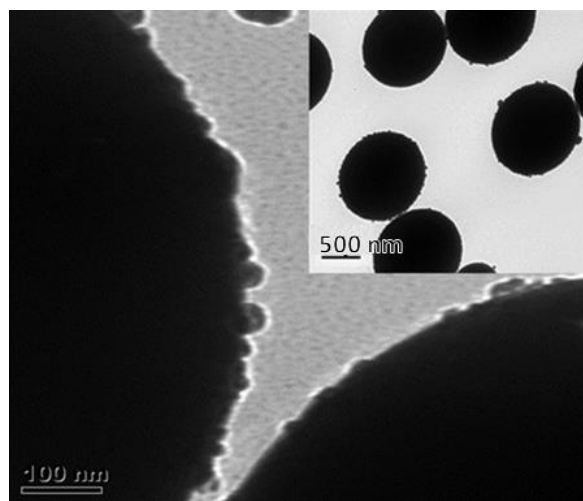
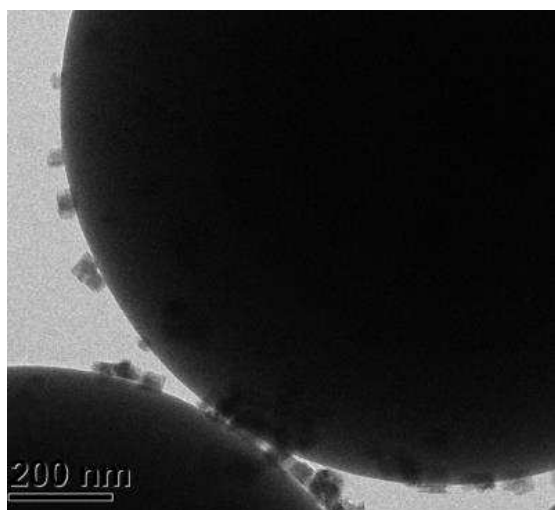
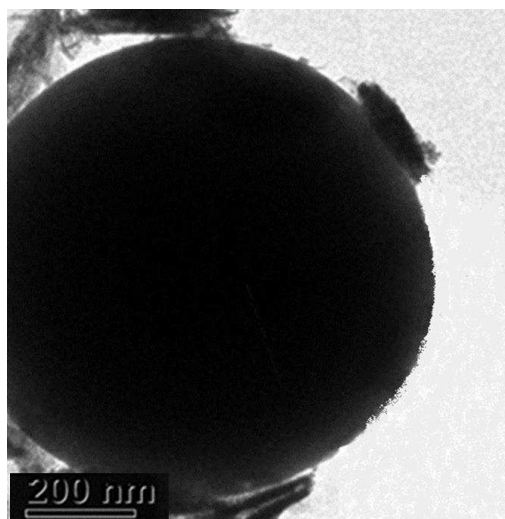


Figure S3: TEM micrographs of spent Co₃O₄/SiO₂ model catalysts after exposure to CO-PROX reaction conditions at maximum temperature of 450 °C.

Nanocubes/SiO₂



Nanosheets/SiO₂



Nanobelts/SiO₂

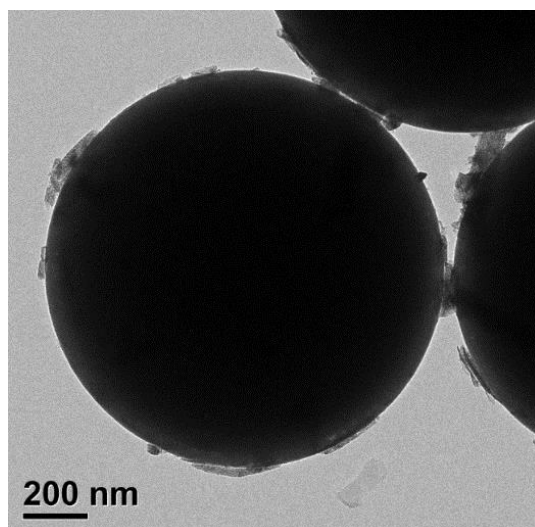
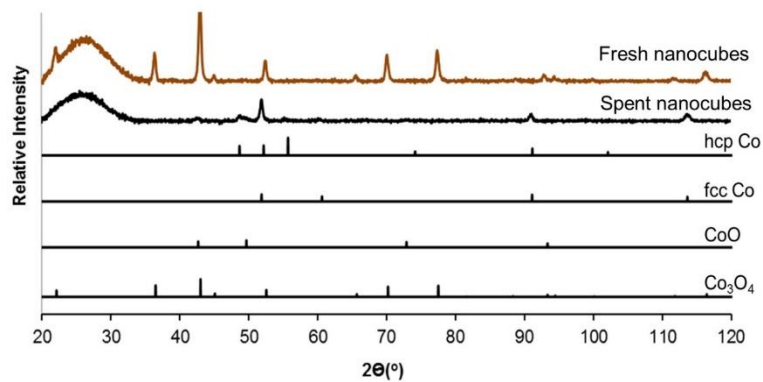
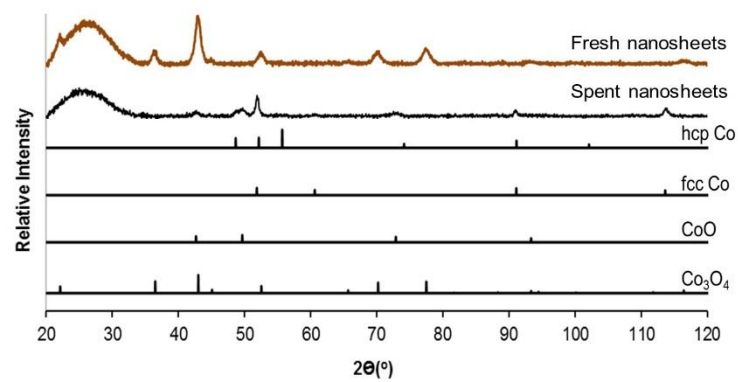


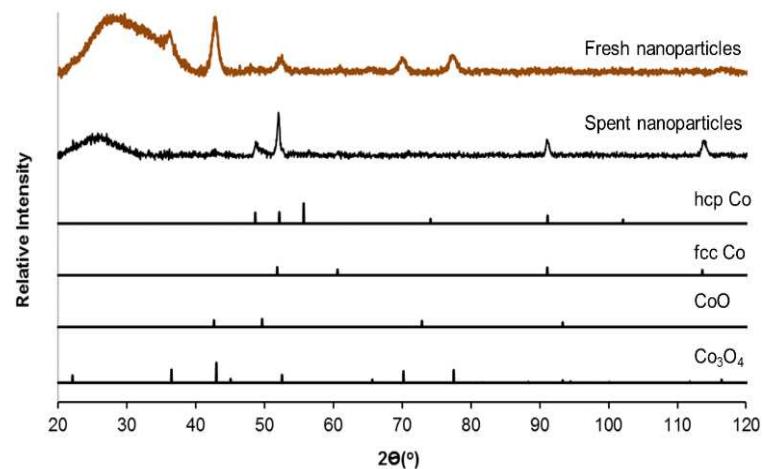
Figure S4: TEM micrographs of Co₃O₄/SiO₂ model catalysts after exposure to CO-PROX reaction conditions up to a temperature of 270°C for the nanocubes and 250°C for the nanosheets and nanobelts. XRD confirms the reduction to CoO.



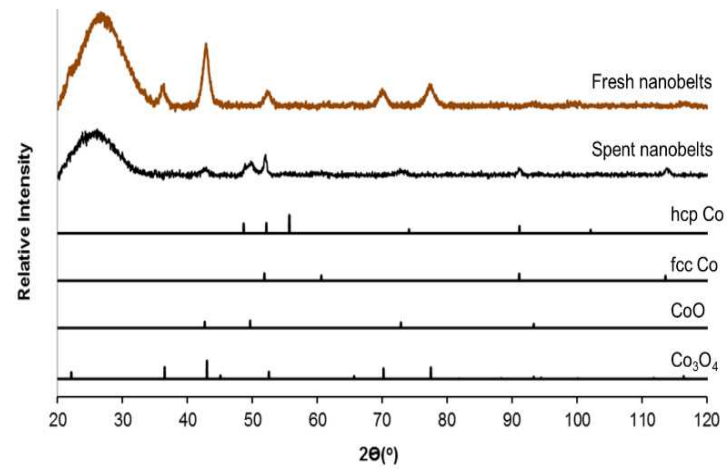
A



B



C



D

Figure S5: XRD scans of fresh and spent $\text{Co}_3\text{O}_4/\text{SiO}_2$ model catalyst (A) nanocubes, (B) nanosheets, (C) nanobelts, (D) nanoparticles and reference cobalt diffraction patterns.

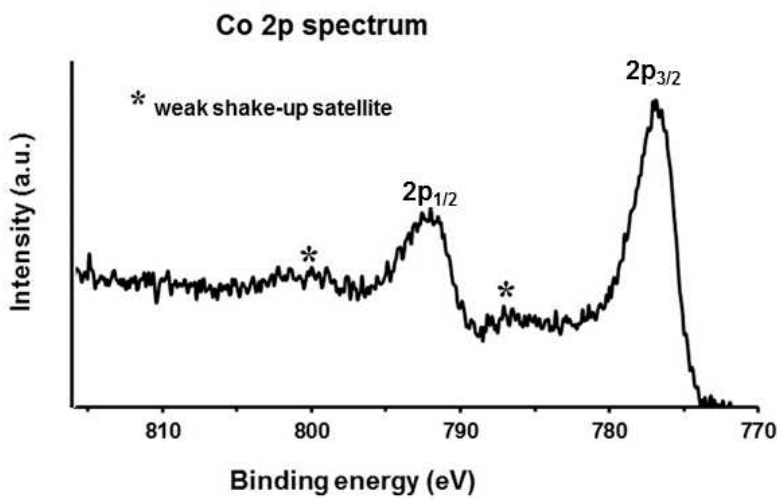
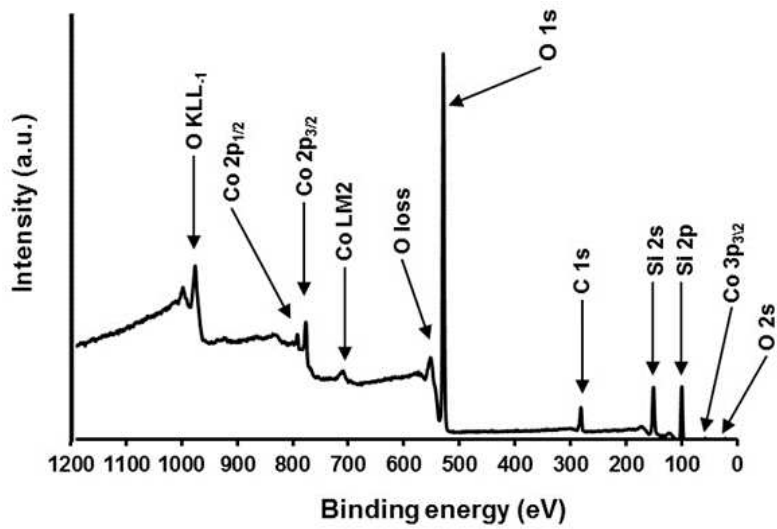


Figure S6: XPS profiles of wide spectrum, Co 2p in the Co₃O₄/SiO₂ (nanocubes)

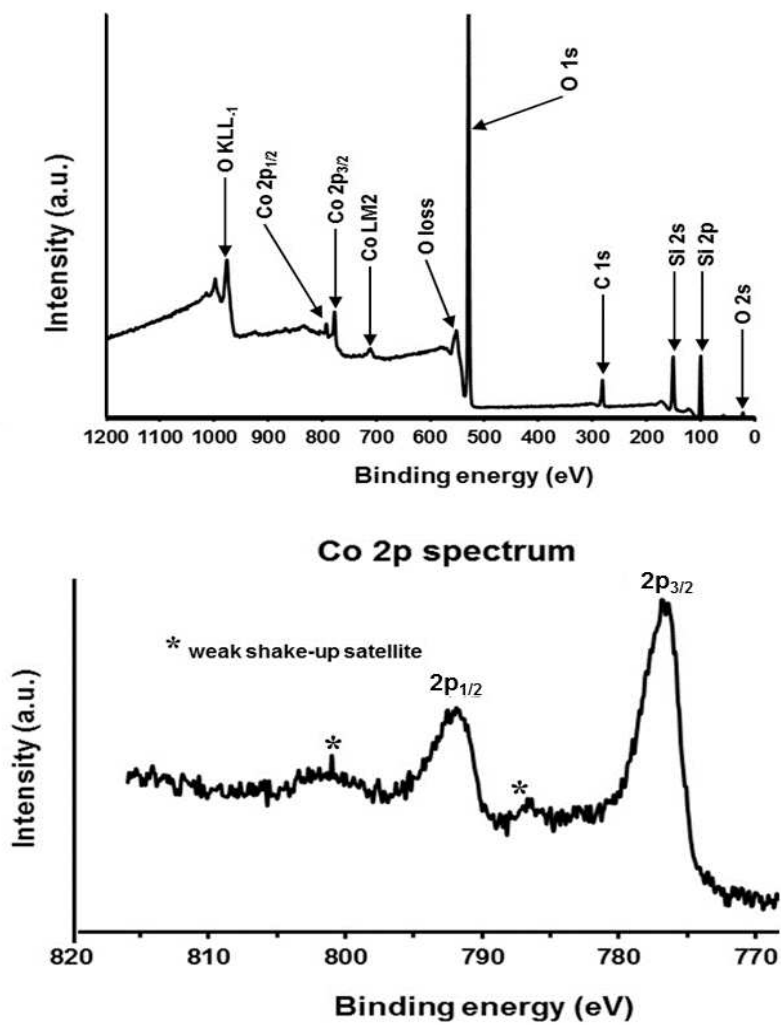


Figure S7: XPS profiles of wide spectrum, Co 2p in the $\text{Co}_3\text{O}_4/\text{SiO}_2$ (nanosheets)

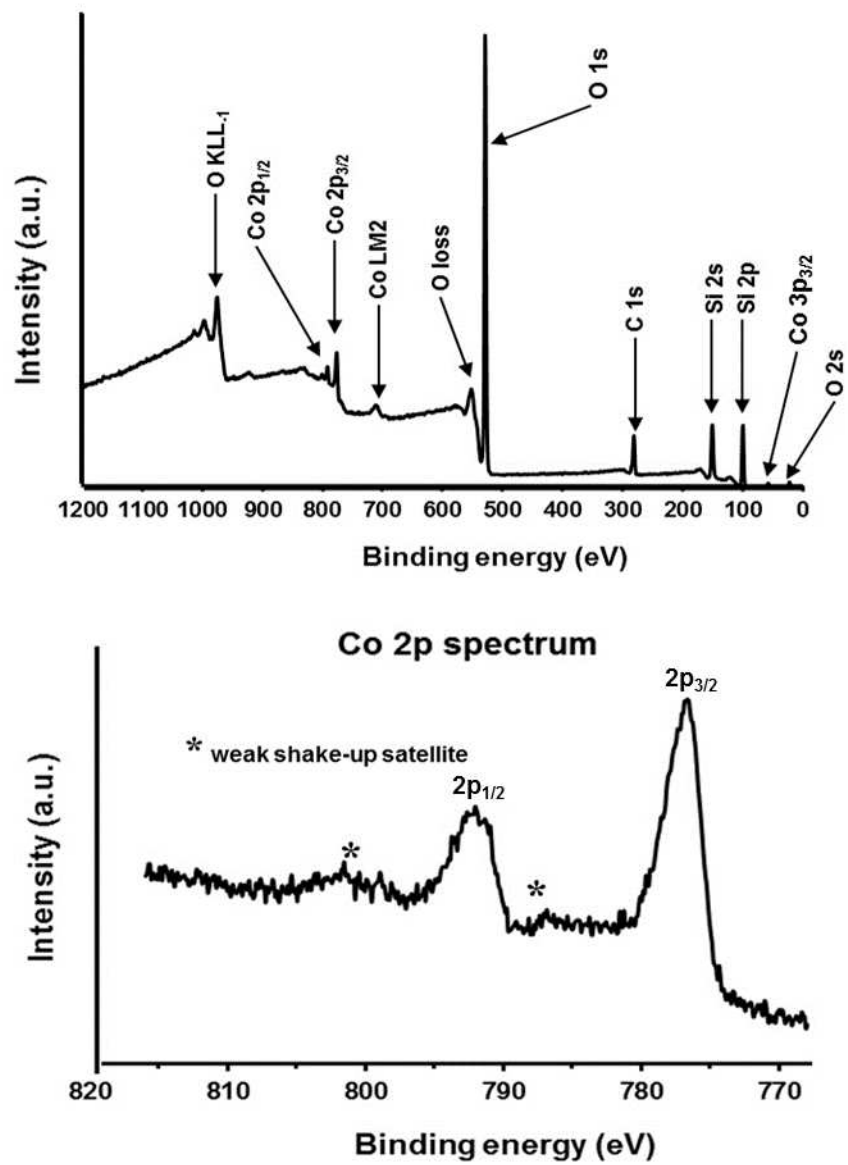


Figure S8: XPS profiles of wide spectrum, Co 2p in the $\text{Co}_3\text{O}_4/\text{SiO}_2$ (nanobelts)

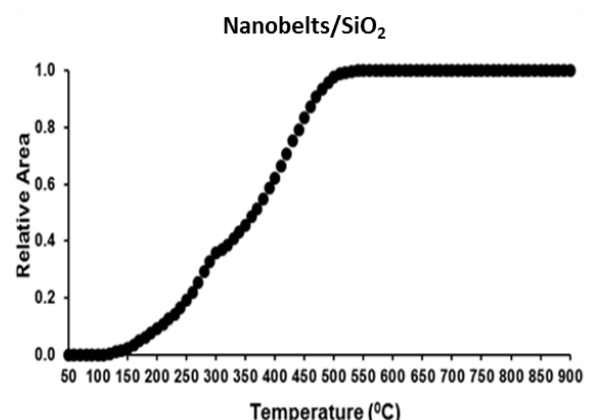
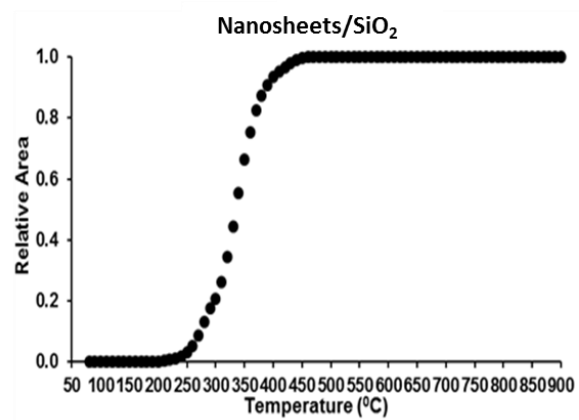
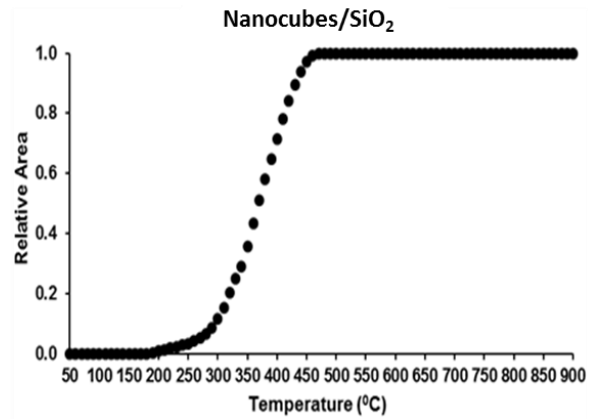
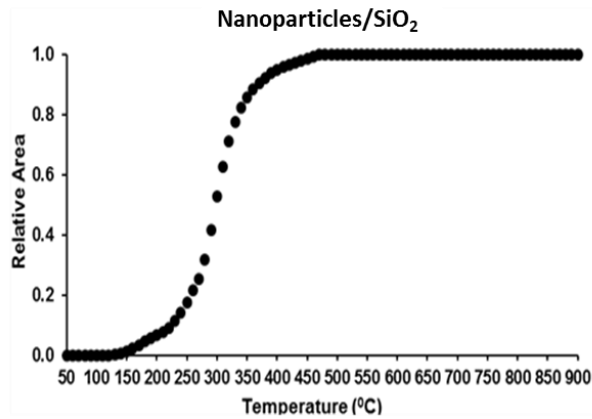


Figure S9: Cumulative area under the H₂-TPR for the supported nanoparticles, nanocubes, nanosheets and nanobelts model catalysts