

Supporting Information

Plasma-assisted preparation of highly dispersed cobalt based catalysts with enhanced Fischer-Tropsch synthesis performance

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Figures

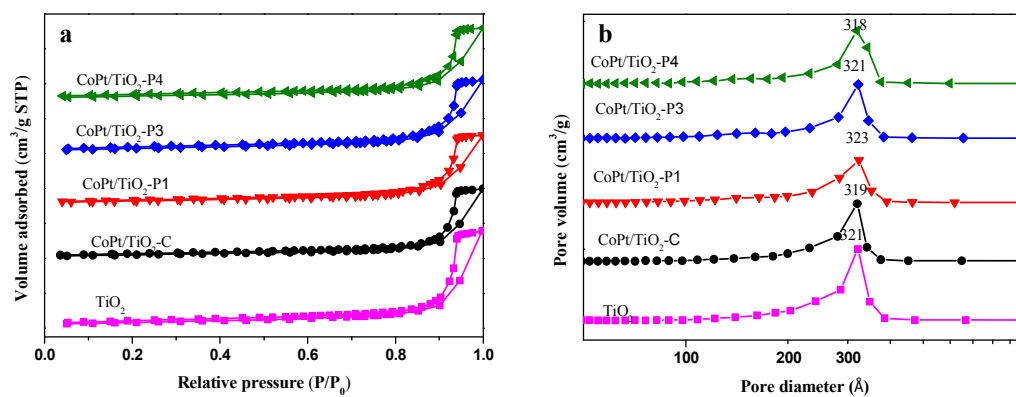


Figure S1. (a) N₂ adsorption-desorption isotherms (b) Pore size distribution curves of calcined and plasma treated CoPt/TiO₂ catalysts.

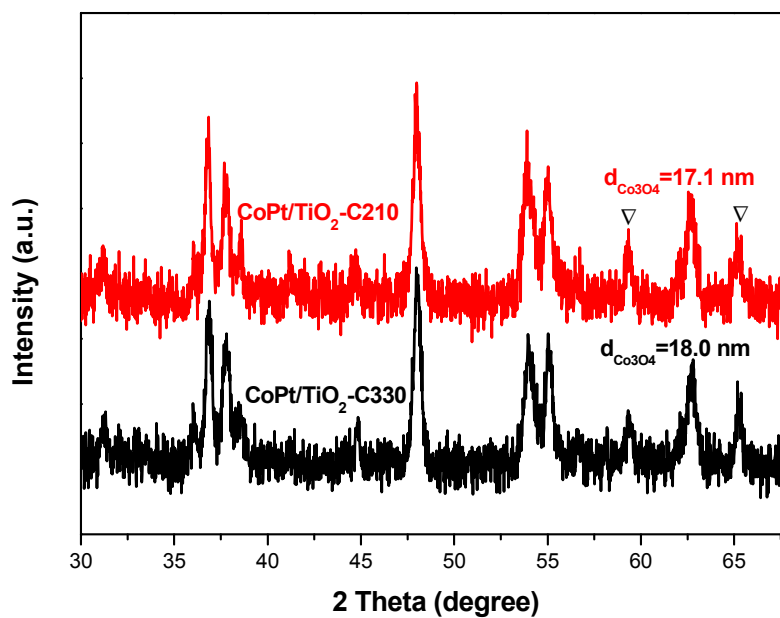


Figure S2. XRD patterns of 210 °C and 330 °C calcined CoPt/TiO₂ catalysts.

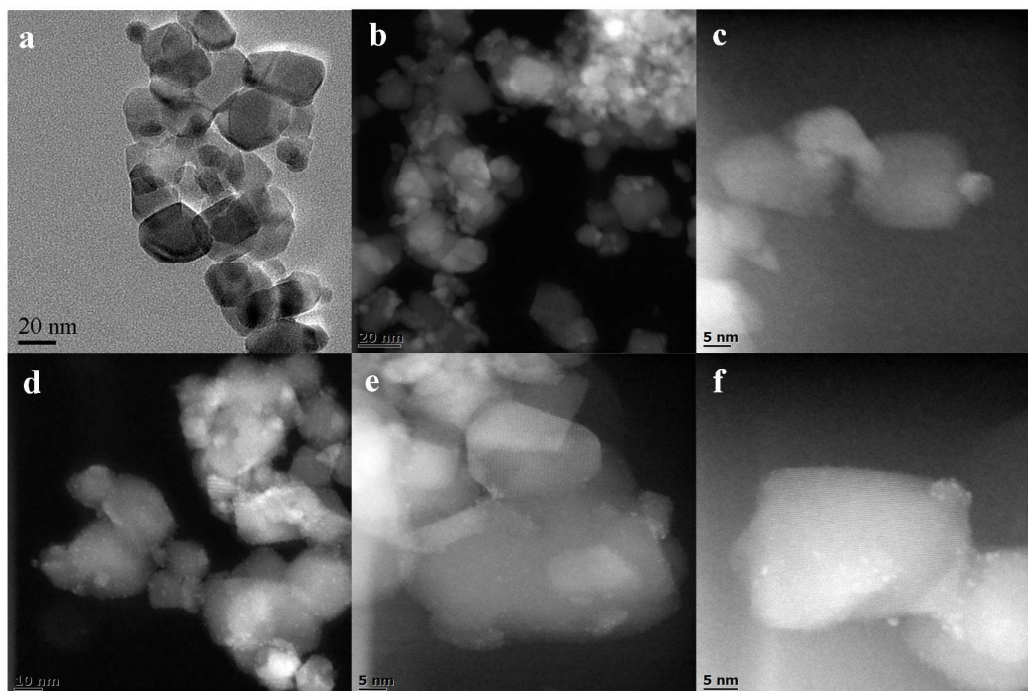


Figure S3. Supplementary TEM images of CoPt/TiO₂ catalysts: (a) CoPt/TiO₂-C, (b-c) CoPt/TiO₂-P1 and (d-f) CoPt/TiO₂-P4.

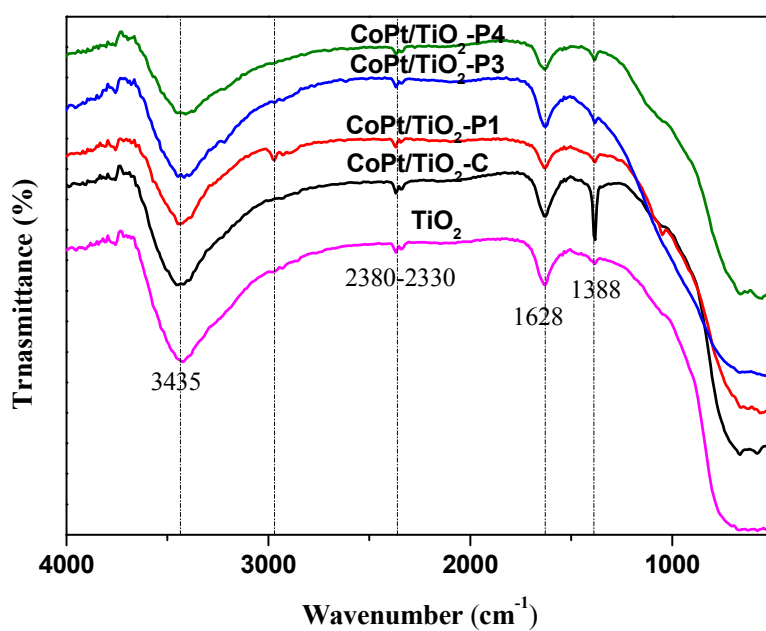


Figure S4. FT-IR spectra of CoPt/TiO₂-C and CoPt/TiO₂-P catalysts.

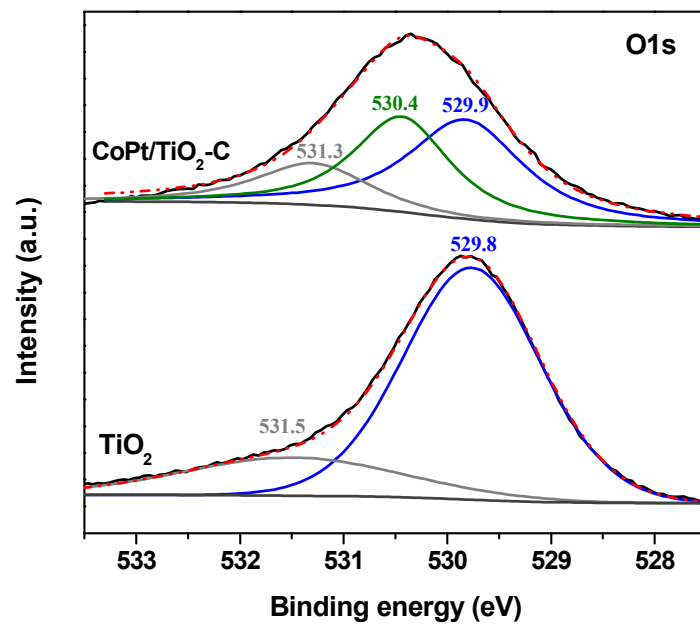


Figure S5. O1s XPS spectra of TiO₂ support and CoPt/TiO₂-C catalyst.

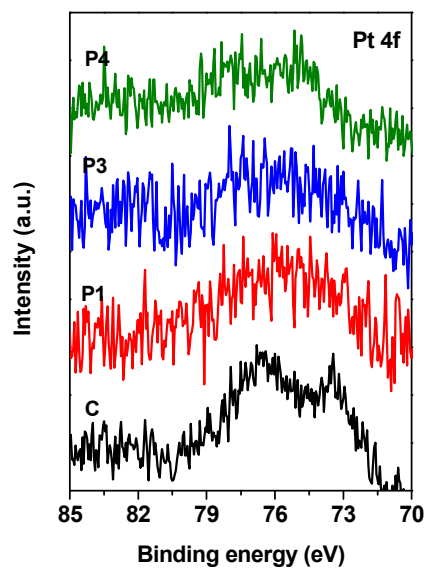


Figure S6. Pt 4f XPS spectra of CoPt/TiO₂-C and CoPt/TiO₂-P catalysts.

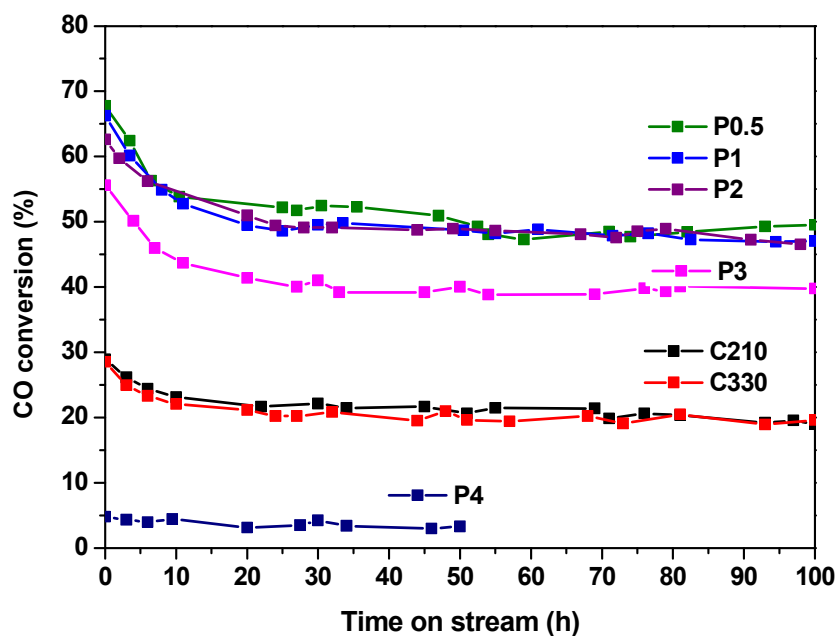


Figure S7. CO conversion as a function of time on stream (TOS) on CoPt/TiO₂ catalysts; C210, C330 indicate catalyst calcined at 210 °C and 330 °C, respectively; P corresponds to catalyst with plasma treatment, the following number is the treating duration time.

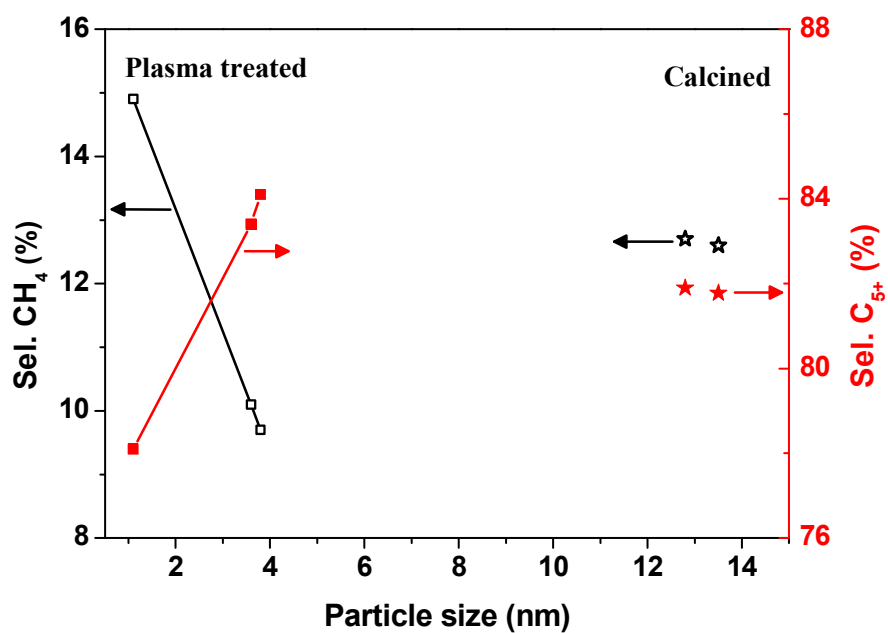


Figure S8. CH₄ selectivity, C₅₊ selectivity as a function of cobalt particle size on

CoPt/TiO₂ catalysts.

Tables

Table S1

Integration data of TPR reduction peaks of calcined and plasma-treated CoPt/TiO₂

catalysts

Catalyst	Area 1 st peak	Area 2 st peak	Area ratio of Peak 2/Peak 1
CoPt/TiO ₂ -C	1589	3694	2.32
CoPt/TiO ₂ -P1	1135	3580	3.15
CoPt/TiO ₂ -P3	1456	4340	2.98
CoPt/TiO ₂ -P4	1231	3921	3.19

Table S2

H₂-TPD and O₂ titration results for calcined and plasma treated catalysts

Catalyst	H ₂	D	<i>d</i>	O ₂	Reducibility	<i>d</i> _{corrected}	D _{corrected}
	desorbed	uncorrected	uncorrected	uptake	(%)	(nm)	(%)
	(μmol/g)	(%)	(nm)	(μmol/g)			
CoPt/TiO ₂ -C210	104.4	10.5	10.0	698.5	51.9	5.2	20.4
CoPt/TiO ₂ -C330	103.1	10.1	10.2	851.5	62.4	6.4	16.2
CoPt/TiO ₂ -P0.5	133.0	13.2	7.9	699.3	51.8	4.1	25.5
CoPt/TiO ₂ -P1	148.8	14.6	7.0	740.2	54.3	3.8	26.9
CoPt/TiO ₂ -P2	153.7	14.7	6.9	737.7	54.1	3.7	27.2

CoPt/TiO ₂ -P3	157.1	14.8	6.8	730.0	53.5	3.6	27.8
CoPt/TiO ₂ -P4	405.2	39.8	2.2	690.5	51.3	1.1	73.7
