Supplementary Materials

The synergistic effects of Pt-OH and Pt^0 enhanced the low-temperature catalytic performance of Pt/CNTs for preferential CO oxidation in a H_2 stream

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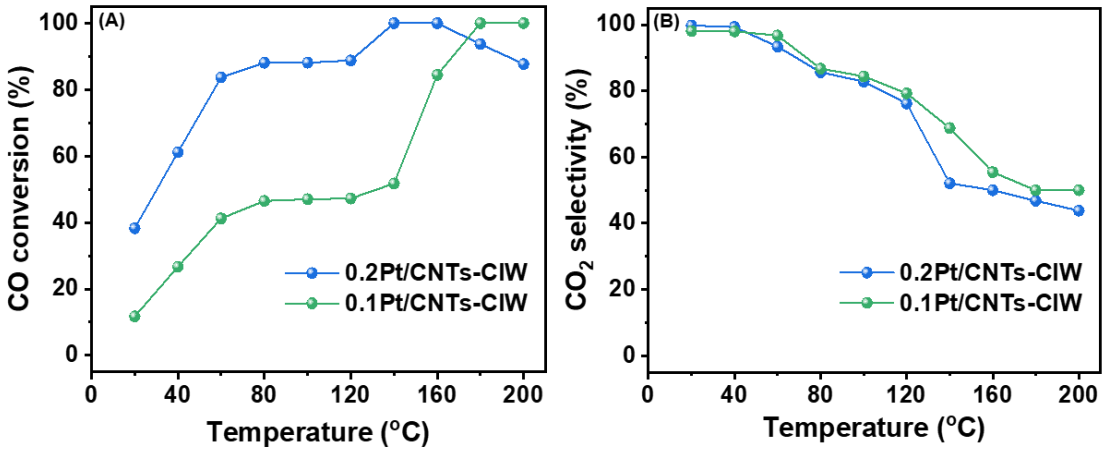
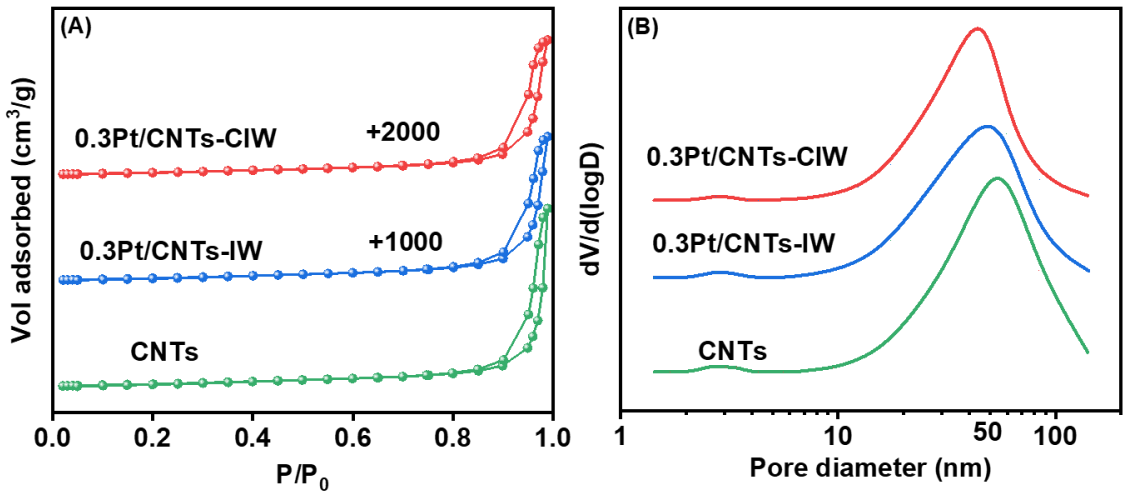
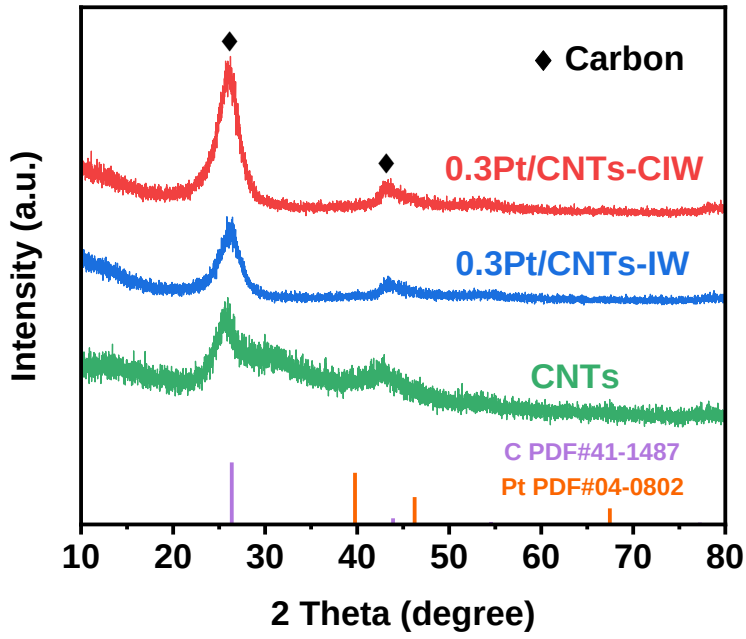


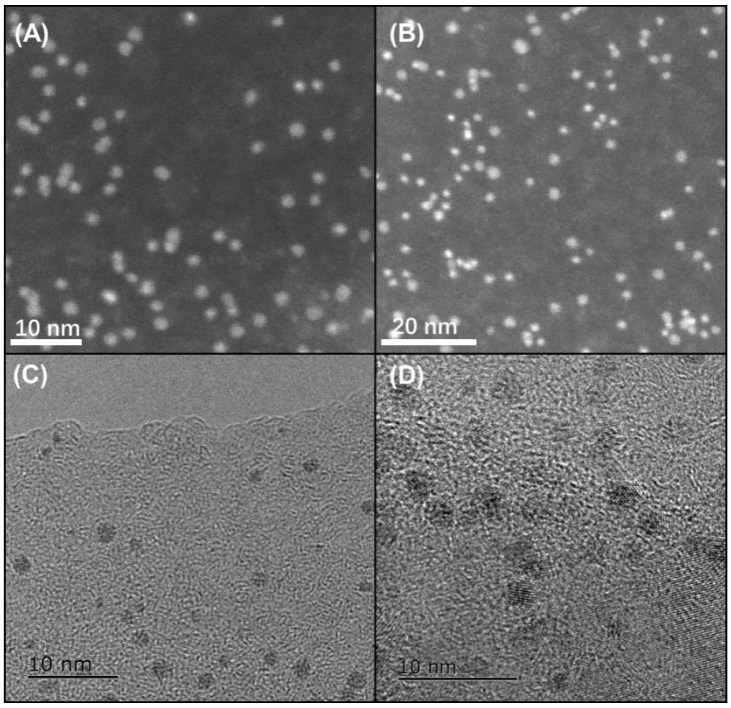
Supplementary Figure 1. (A) CO conversion and (B) CO_2 selectivity as a function of temperature for 0.2Pt/CNTs-CIW and 0.1Pt/CNTs-CIW catalysts in CO-PROX reaction. Reaction conditions: 1 vol% CO + 1 vol% O_2 + 40 vol% H_2, and Ar balance, WHSV: 18,000 mL h^{-1} g_{cat}^{-1}.



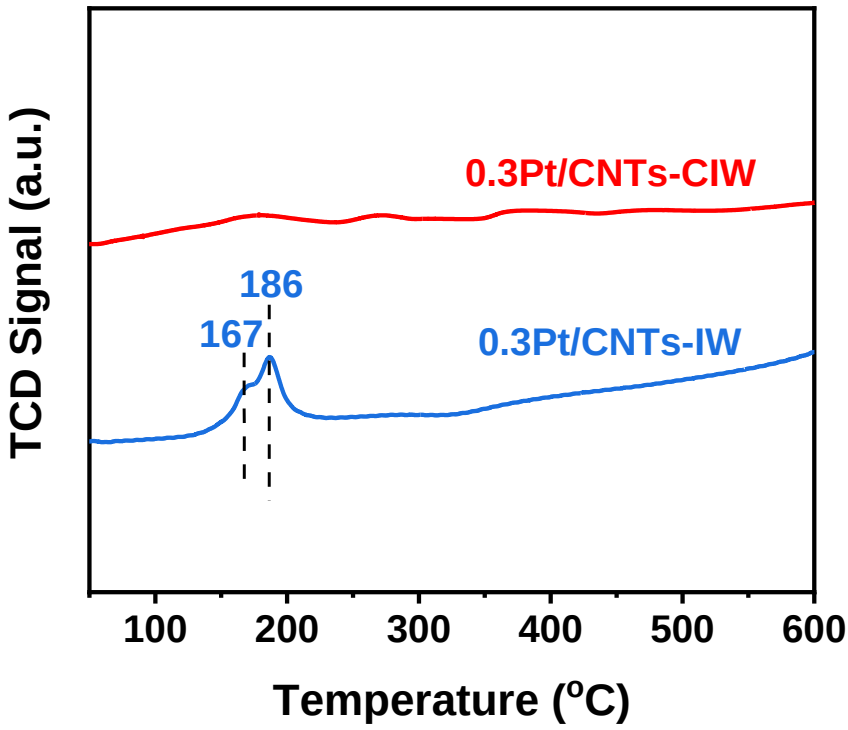
Supplementary Figure 2. N_2 sorption isotherms and pore size distribution plots of CNTs, Pt/CNTs-CIW and Pt/CNTs-IW.



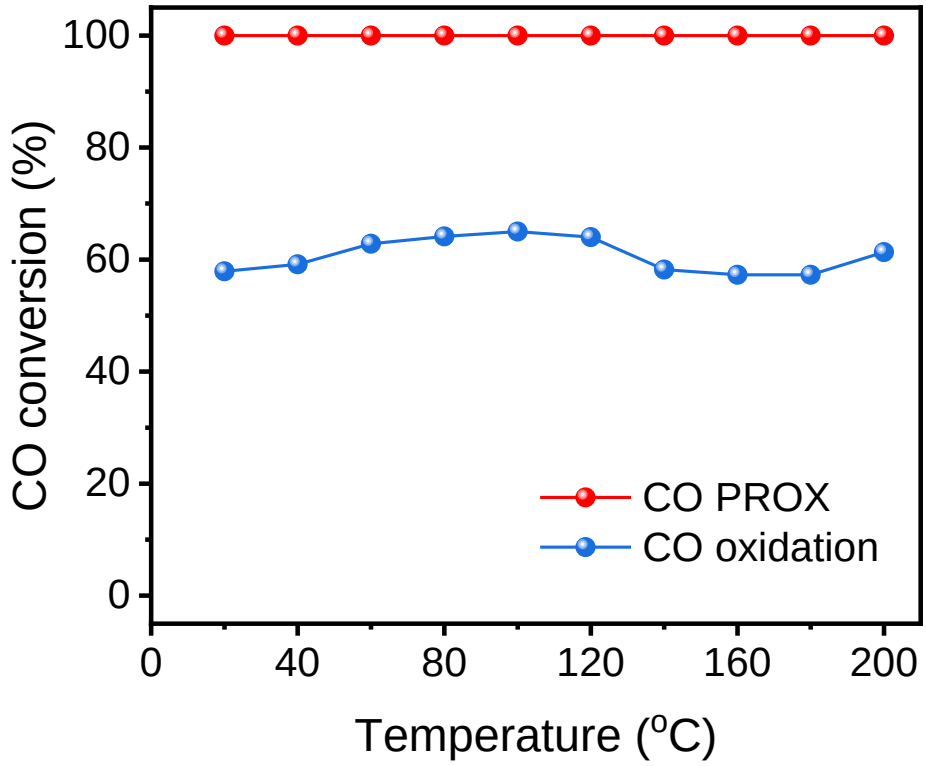
Supplementary Figure 3. XRD patterns of CNTs, the reduced 0.3Pt/CNT-CIW and 0.3Pt/CNT-IW catalysts



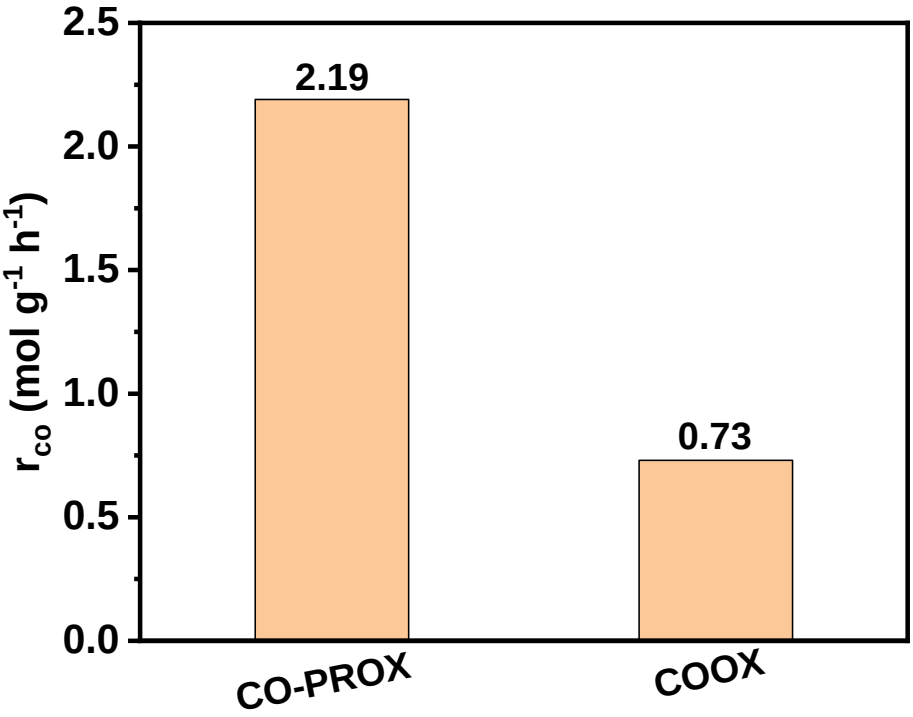
Supplementary Figure 4. STEM (A, B) and HRTEM (C, D) images of Pt colloids



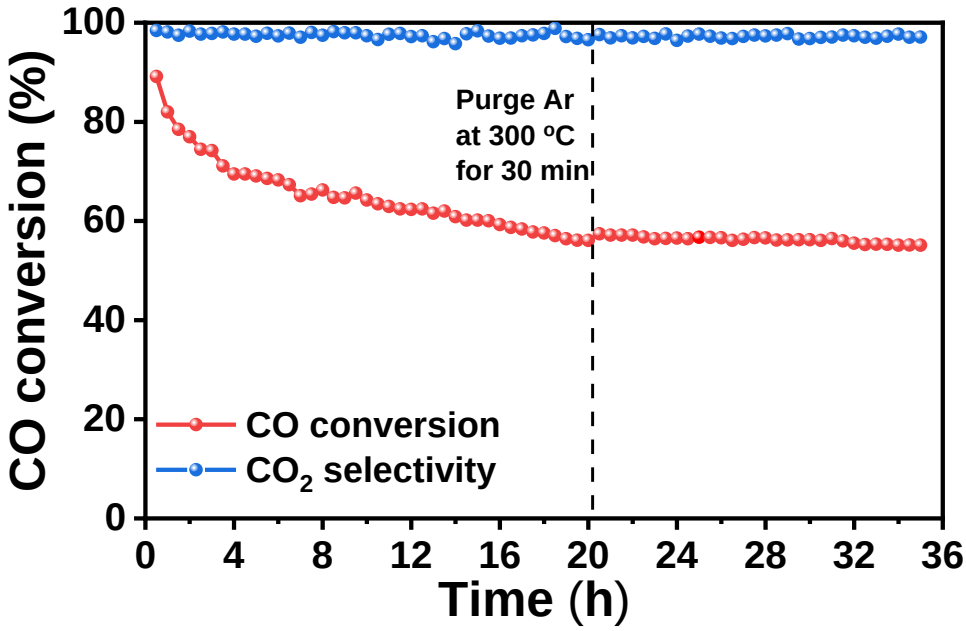
Supplementary Figure 5. H_2-TPR of 0.3Pt/CNTs-CIW and 0.3Pt/CNTs-IW.



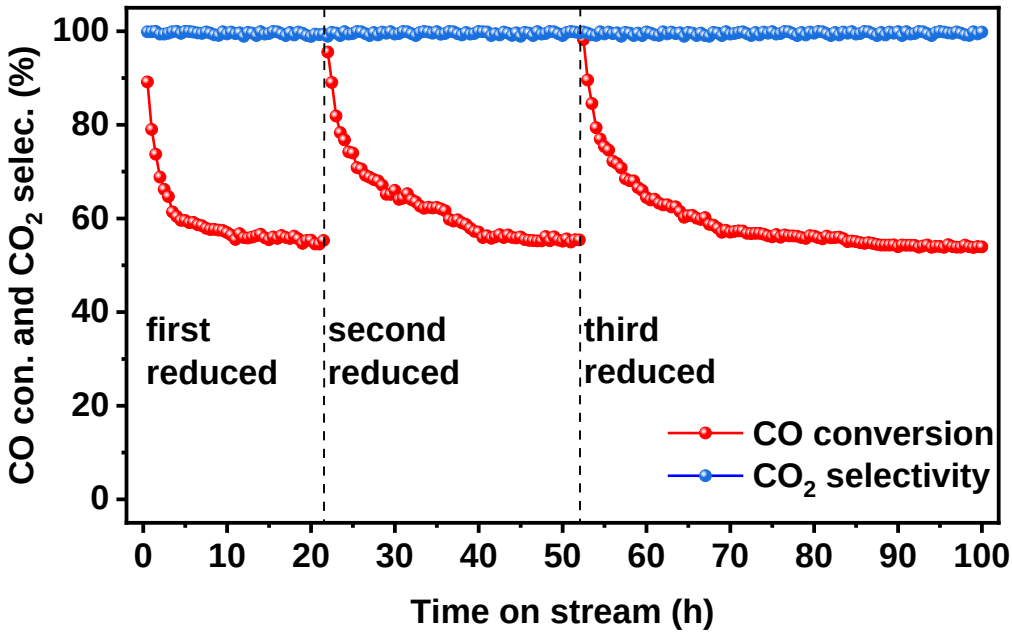
Supplementary Figure 6. CO conversion as a function of temperature under atmosphere COOX and CO-PROX over 0.3Pt/CNTs-CIW. Reaction conditions: 1% CO, 1 %O_2 (40% H_2) and Ar balance, WHSV: 18,000 mL h^{-1} g_{cat}^{-1}.



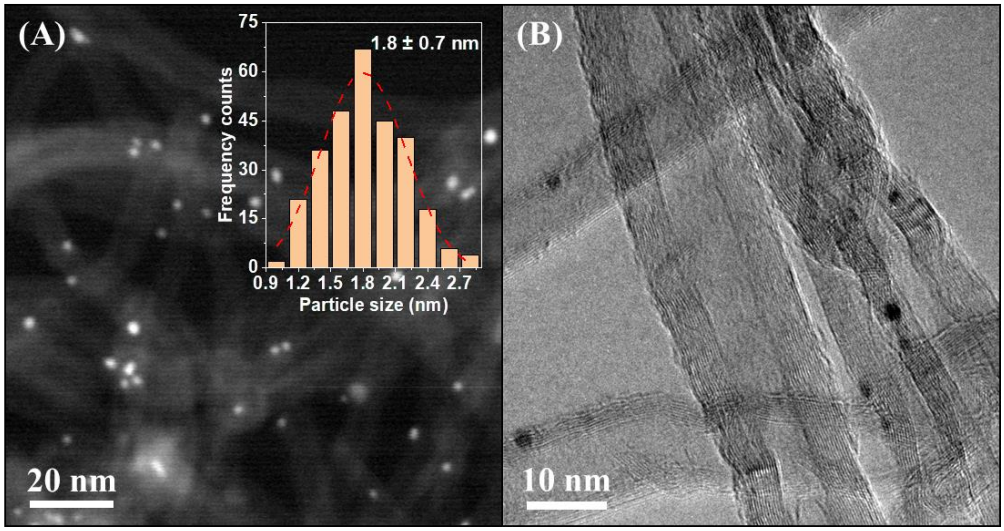
Supplementary Figure 7. The specific reaction rates of 0.3Pt/CNTs-CIW at 90 ºC in CO-PROX and COOX reaction.



Supplementary Figure 8. CO conversion with time on stream at 80 °C over 0.3Pt/CNTs-CIW catalyst. Reaction conditions: 1 vol% CO, 1 vol% O_2, 40 vol% H_2 and Ar balance, WHSV: 22,500 mL h^{-1} g_{cat}^{-1}.



Supplementary Figure 9. CO conversion with time on stream at 80 °C over 0.3Pt/CNTs-CIW catalyst. Reaction conditions: 1 vol% CO, 1 vol% O_2, 40 vol% H_2 and Ar balance, WHSV: 22,500 mL h^{-1} g_{cat}^{-1}.



Supplementary Figure 10. (A) STEM and (B) TEM images of 0.3Pt/CNT-CIW-used.

Supplementary Table 1. Textural properties and Pt average particle size of 0.3Pt/CNTs-CIW and 0.3Pt/CNTs-IW

Sample	[a]Pt loading (wt%)	BET ($m^2 g^{-1}$)	Pore size (nm)	Total pore volume ($cm^3 g^{-1}$)	Pt average size (nm)
CNTs	/	247	53.7	2.66	/
0.3Pt/CNTs-CIW	0.30	207	44.0	2.02	1.5 ± 0.3
0.3Pt/CNTs-IW	0.27	229	48.6	2.16	1.6 ± 0.5

[a]Determined by ICP results.

Supplementary Table 2. The Pt^0 and Pt^{2+} ratio of the surface Pt species according to Pt 4f XPS spectra

Catalysts	Pt species Area (%)	
	Pt^0 (71.8 eV)	Pt^{2+} (72.9 eV)
0.3Pt/CNTs-CIW	75.3	24.7
0.3Pt/CNTs-IW	45.1	54.9

Supplementary Table 3. The ratio of oxygen species on the surface of 0.3Pt/CNTs-CIW and 0.3Pt/CNTs-IW according to O1s XPS spectra

Catalysts	O species Area (%)	
	hydroxyls (532.4 eV)	anhydride, esters (533.7 eV)
CNTs	57.8	42.2
0.3Pt/CNTs-CIW	64.3	35.7
0.3Pt/CNTs-IW	58.9	41.1