catalysts

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Supplementary Materials

Regulating Lattice Oxygen on the Surfaces of Porous Single-Crystalline NiO for Stabilized and Enhanced CO Oxidation

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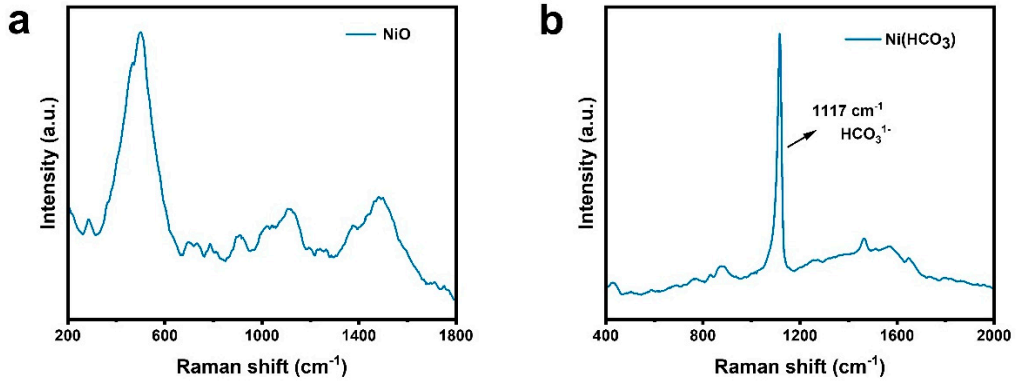

Figure S1. (**a**) Raman spectra of PSCs NiO. (**b**) Raman spectra of Ni $(HCO_3)_2$ precursor.

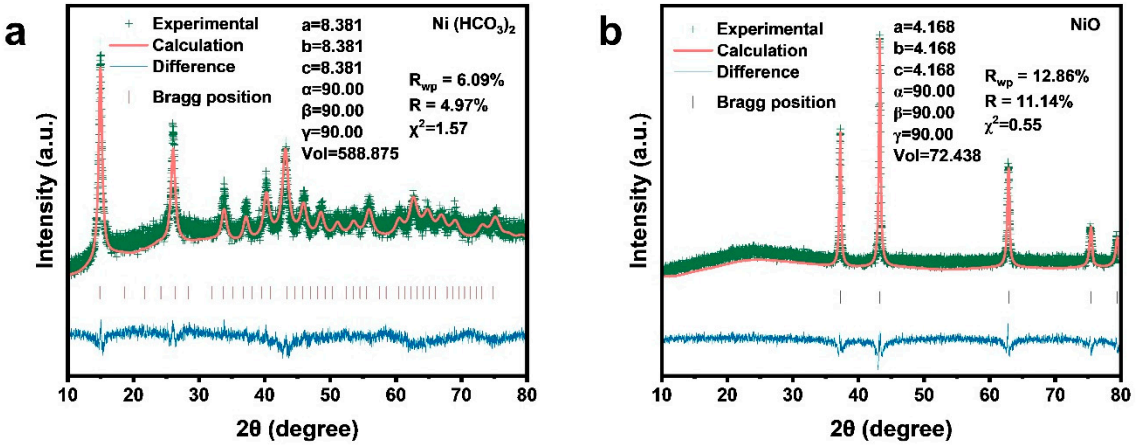

Figure S2. XRD rietveld refinement patterns of (**a**) Ni $(HCO_3)_2$. (**b**) NiO.

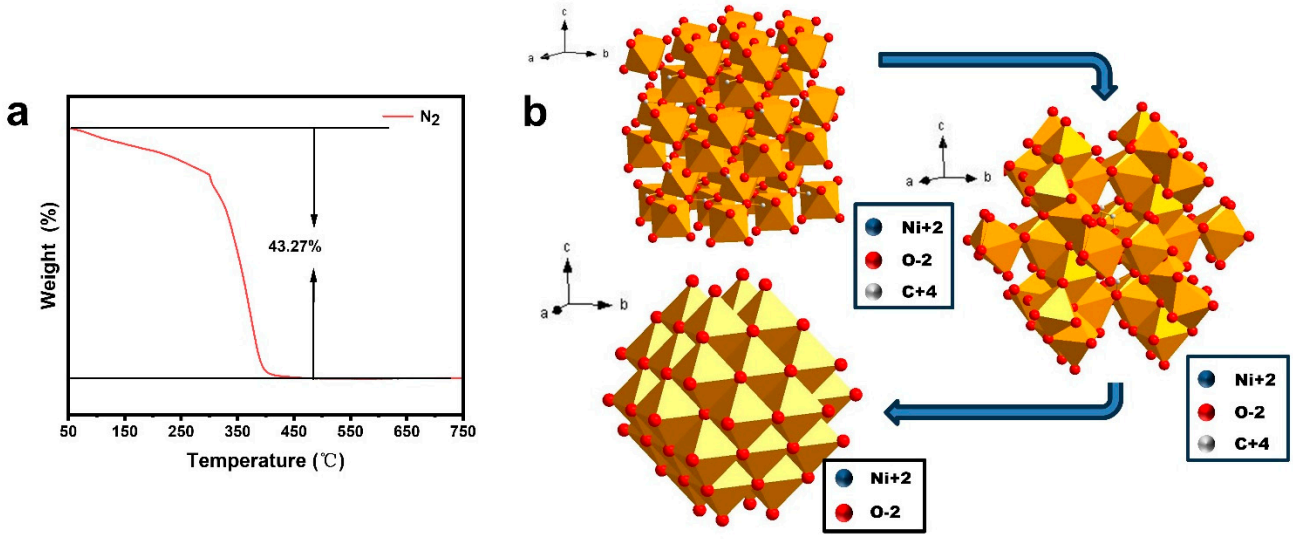

Figure S3. (**a**) Thermogravimetric curves of the transformation of Ni $(HCO_3)_2$ precursor to NiO. (**b**) Schematic of the crystal structure model for the transformation of Ni $(HCO_3)_2$ to NiO.

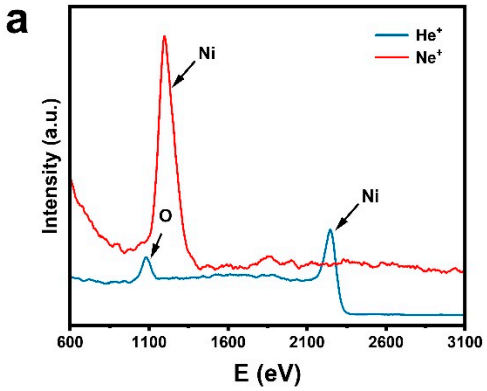

Figure S4. (**a**) HS-LEIS spectra of PSCs NiO.

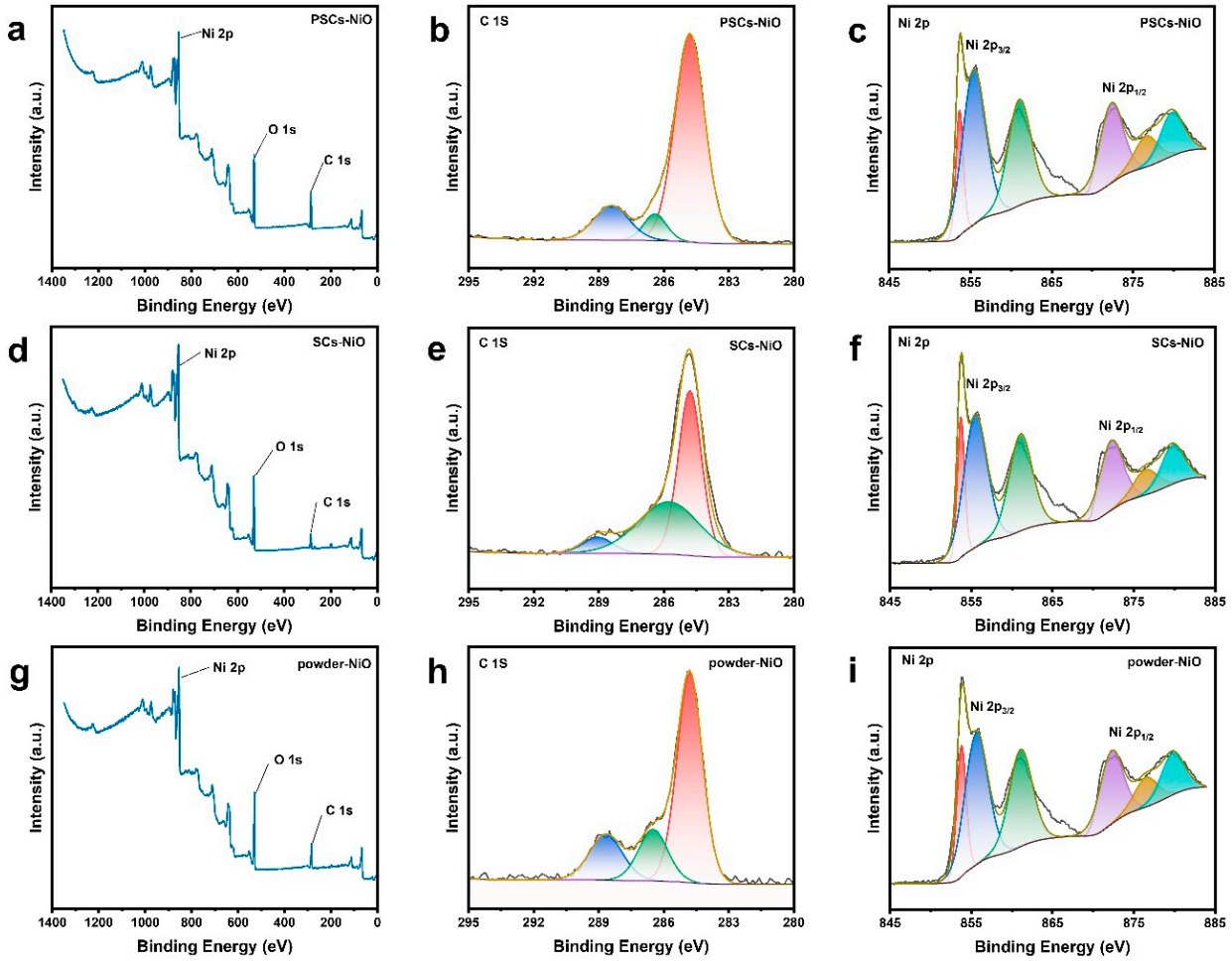

Figure S5. The integral XPS spectrum (**a**, **d**, **g**); XPS spectra of the C 1s (**b**, **e**, **h**); XPS spectra of the Ni 2p peaks of PSCs NiO, SCs NiO and powder NiO (**c**, **f**, **i**). (**a–c**) PSCs NiO. (**d–f**) SCs NiO. (**g–i**) powder NiO.

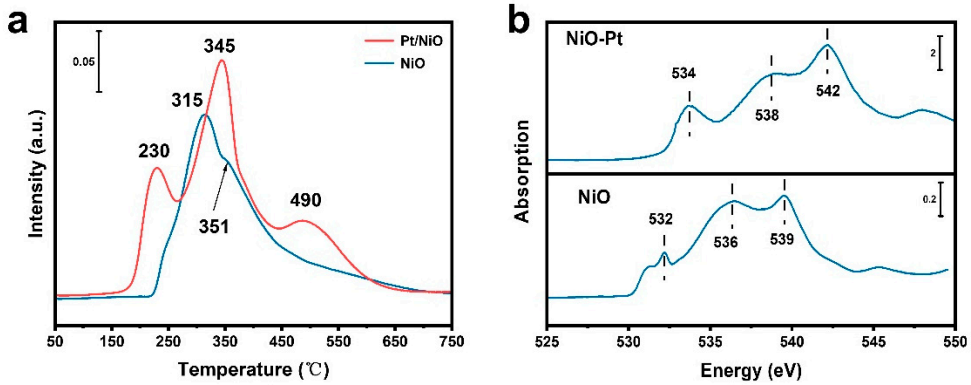

Figure S6. (**a**) H_2-TPR profiles of NiO and Pt/NiO. (**b**) EXAFS of NiO and Pt/NiO oxygen atoms in the lattice.

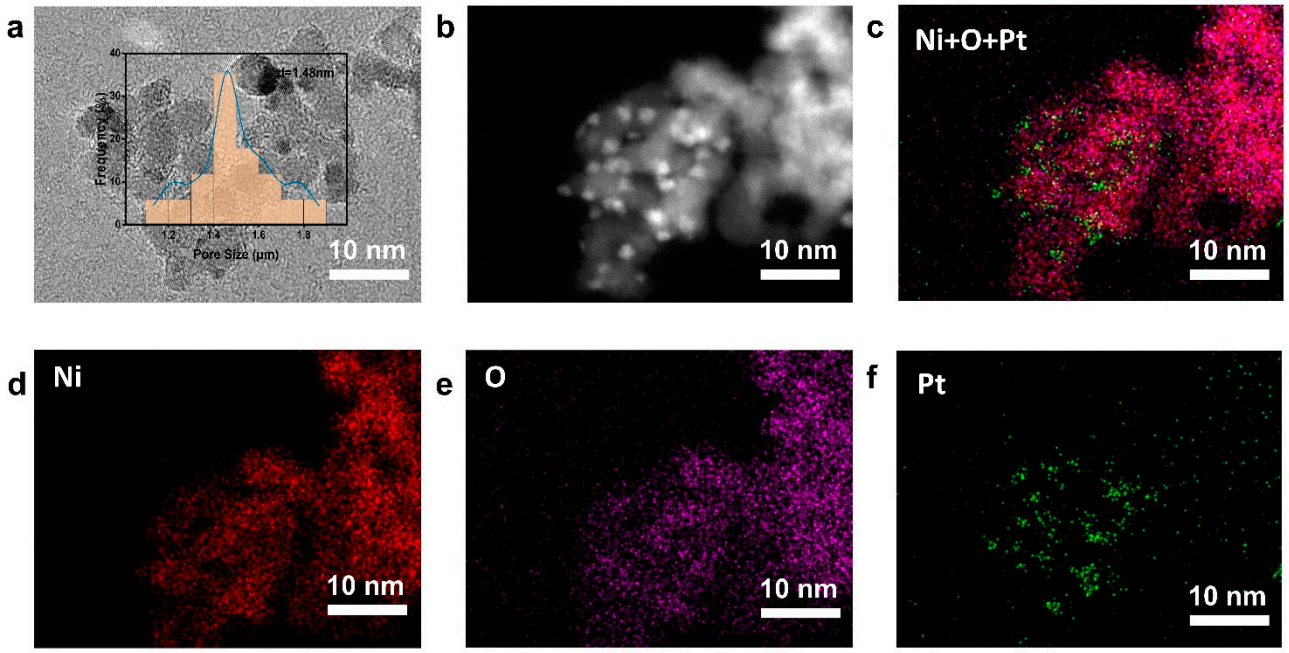

Figure S7. (**a**) Cs-HAADF-STEM images of PSCs NiO with 2.07 wt% Pt, and (**b**–**f**) the mapping of PSCs NiO with 2.07 wt% Pt.

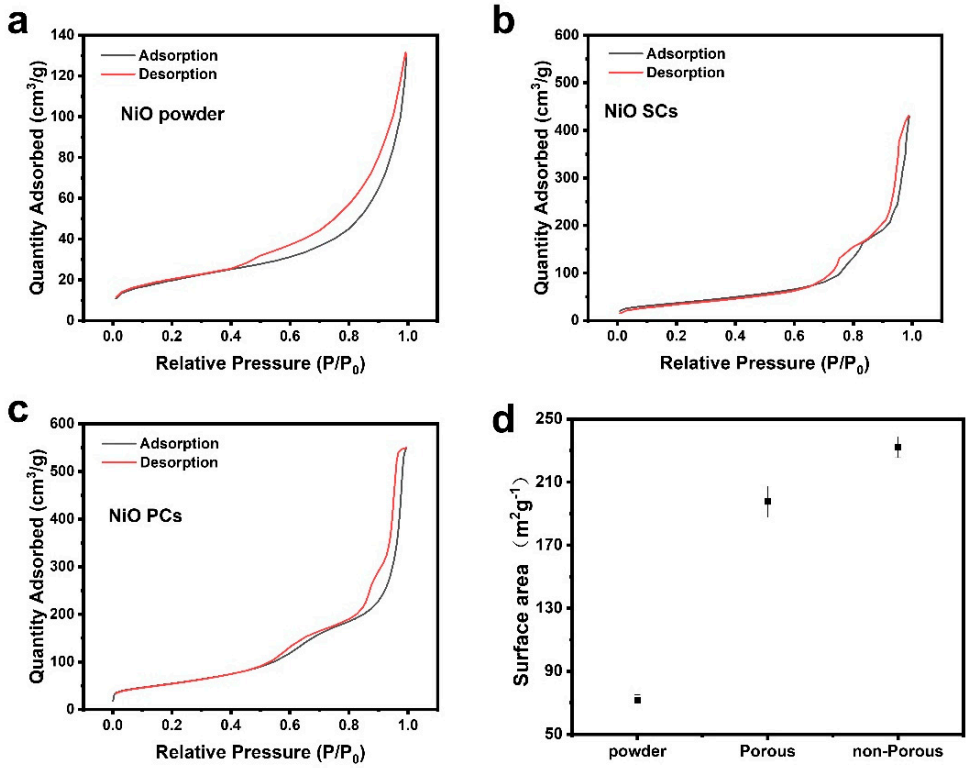

Figure S8. (**a**–**c**) N_2 adsorption desorption isotherms of (**a**) NiO powder, (**b**) NiO SCs, (**c**) NiO PSCs. (**d**) BET-specific surface areas of powder NiO, SCs NiO, and PSCs NiO.

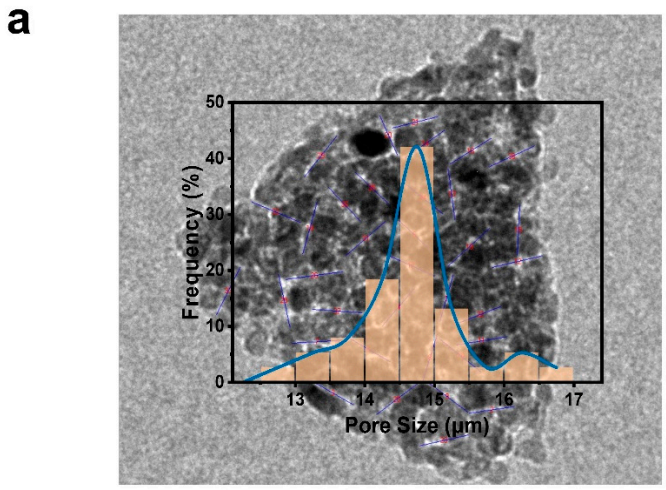

Figure S9. (**a**) Pore size statistics of TEM images from PSC NiO.

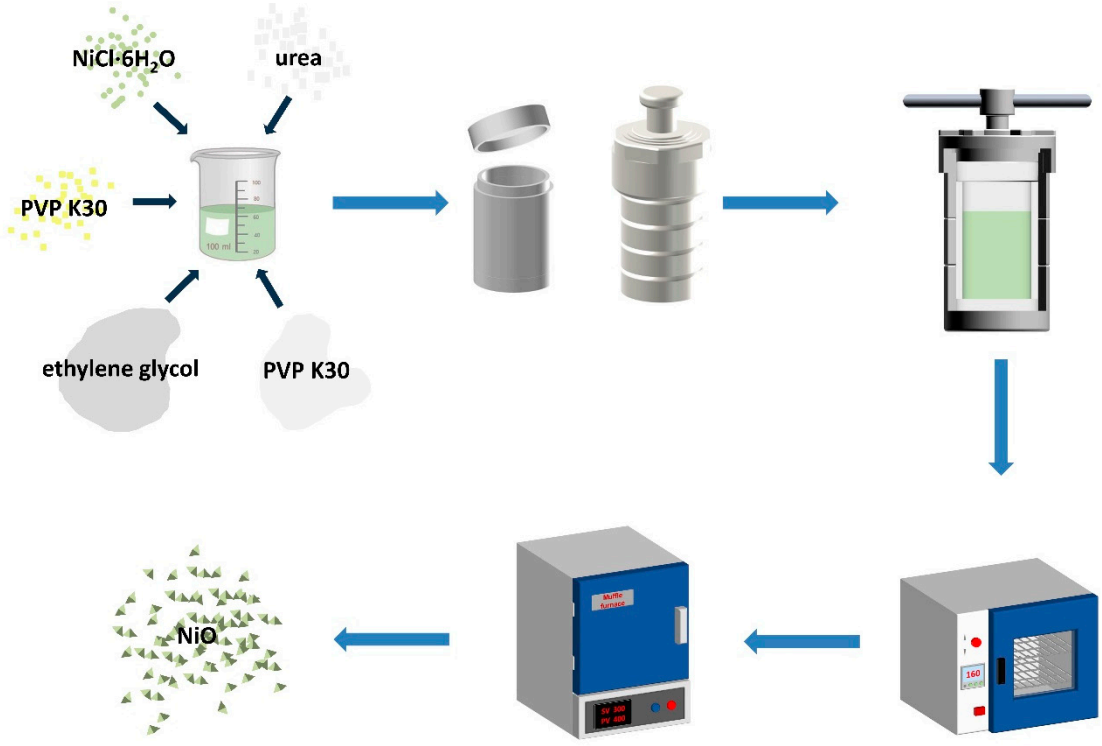

Figure S10. Preparation of PSCs NiO precursors by hydrothermal method.

Table S1. Comparison of catalysts for the complete oxidation of CO.

Catalyst	CO concentration (ppm)	O_2 content (%)	GHSV[a] or WHSV[b]	Reaction temperature (℃)	Reference
0.93%Pd/TiO_2	10000	20	30000	T_{100}=80	[1]
1%Pt/TiO_2	9000	24	22500	T_{100}=120	[2]
4%Pt/SiO_2	40000	10	15000	T_{100}=180	[3]
1%Pt/TiO2-Co	10000	20	30000	T_{100}=70	[4]
Au/NiO	10000	20	100000	T_{100}=200	[5]
0.12%Au/NiO	10000	20	21000	T_{100}=250	[6]
La/NiO	10000	20	60000	T_{100}=300	[7]
Co/NiO	16000	20	30000	T_{100}=120	[8]
Ag/NiO	20000	20	12000	T_{100}=100	[9]
2.07%Pt/NiO	10000	20	30000	T_{100}=65	This work

[a] GHSV means gaseous hourly space velocity (h^{-1}).

[b] WHSV means weight hourly space velocity (mL g^{-1} h^{-1} or g s mL^{-1}).

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