Supporting Information

for

Lanthanide oxides supported Ni nanoparticles for the selective hydrogenation of cinnamaldehyde

Huiyue Xin[1,#], Mengnan Li[1,#], Li Chen[1], Chen Zhao[1,2], Peng Wu[1,2], Xiaohong Li[1,2]*

[1]Shanghai Key Laboratory of Green Chemistry and Chemical Processes, School of Chemistry and Molecular Engineering, East China Normal University, 3663 North Zhongshan Rd., Shanghai 200062, China.

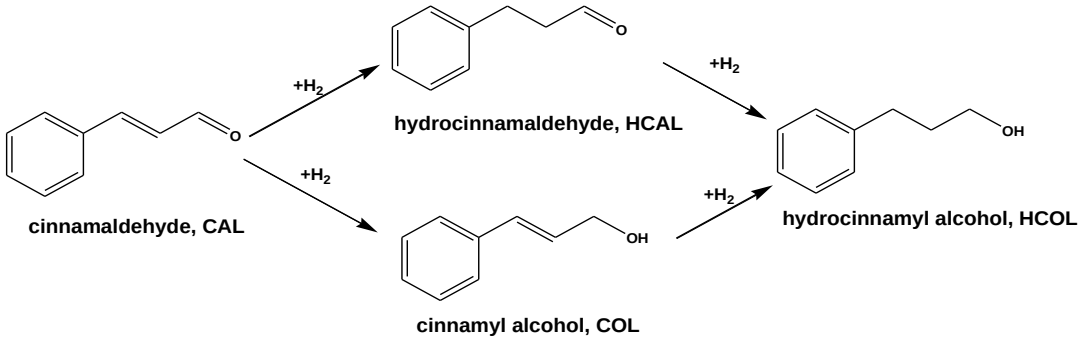
[2]Institute of Ecochongming, Shanghai 202162, China

[#] These authors contributed equally to this work.

Corresponding author: Xiaohong Li

Tel: 0086-21-62238590

E-mail: xhli@chem.ecnu.edu.cn



Scheme S1 Reaction routes of CAL hydrogenation.

Table S1 Physicochemical properties of NiO-LaO_x composites precursor with different calcination temperature.

Sample	S_{BET} [a] ($m^2 \cdot g^{-1}$)	V_p [a] ($cm^3 \cdot g^{-1}$)
NiO-LaO_x-600	7.7	3
NiO-LaO_x-700	5.7	0
NiO-LaO_x-900	2.2	2
NiO-LaO_x-800*[b]	2.0	0

[a] The BET specific surface area and pore volume were calculated per g of sample;

[b] NiO-LaO_x-800* was prepared without using glucose as template.

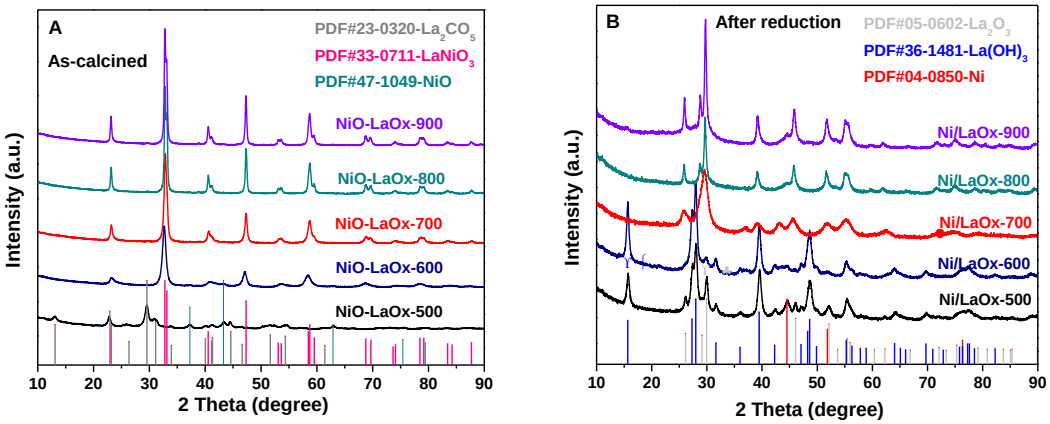


Fig. S1 XRD patterns of (A) as-calcined and (B) reduced Ni/La_2O_3 catalysts after calcination at different temperatures.

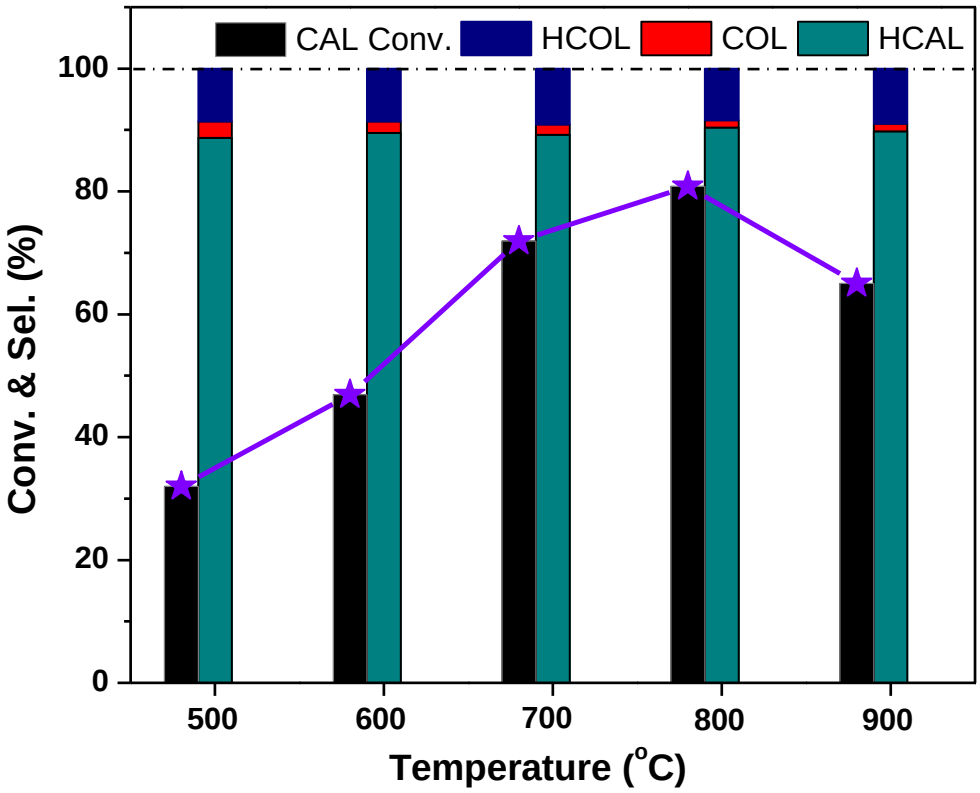


Fig. S2 Liquid-phase selective hydrogenation of CAL over the Ni/La_2O_3 catalysts after calcination at different temperatures.

Reaction conditions: 25 mg of catalyst; 7.5 mmol of CAL; 2.0 MPa of H_2; 9 mL of isopropyl alcohol + 1 mL of H_2O; 1200 rpm; 90 °C; 15 min.

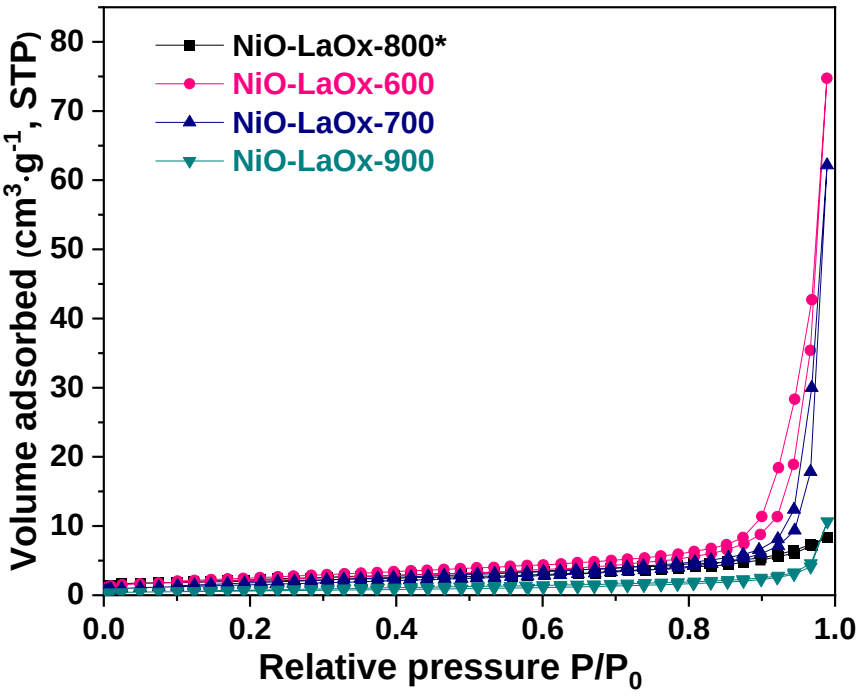


Fig. S3 N_2-physisorption isotherms of NiO-LaO_x composite precursors with different calcination temperatures.

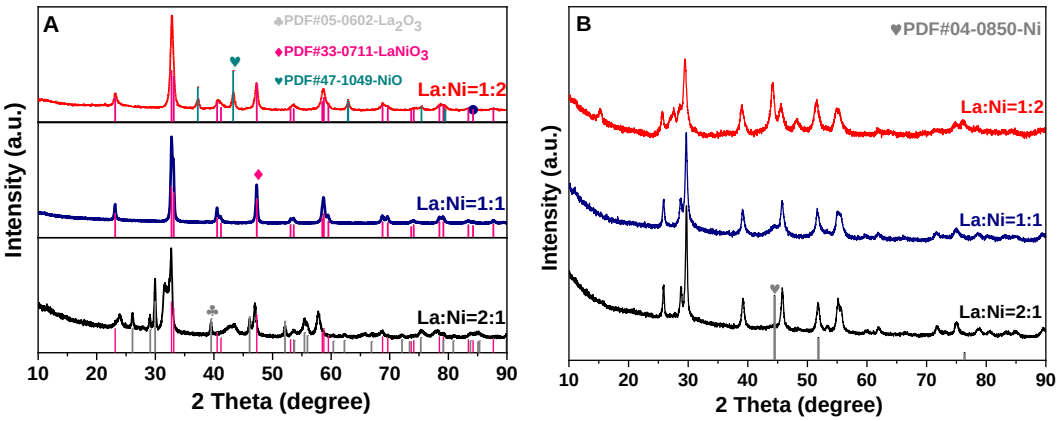


Fig. S4 XRD patterns of (A) as-calcined and (B) reduced Ni/La_2O_3 catalysts with different La/Ni molar ratios.

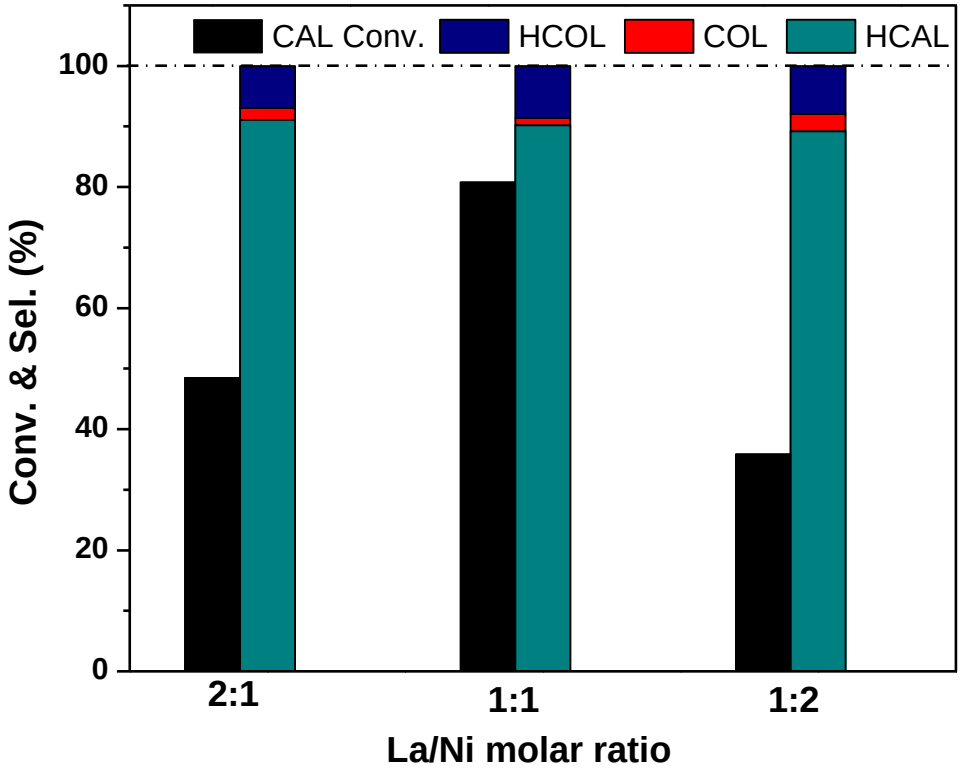


Fig. S5 Liquid-phase selective hydrogenation of CAL over the Ni/La_2O_3 catalysts with different La/Ni molar ratios. Reaction conditions: 25 mg of catalyst; 7.5 mmol of CAL; 2.0 MPa of H_2; 9 mL of isopropyl alcohol + 1 mL of H_2O; 1200 rpm; 90 °C; 15 min.

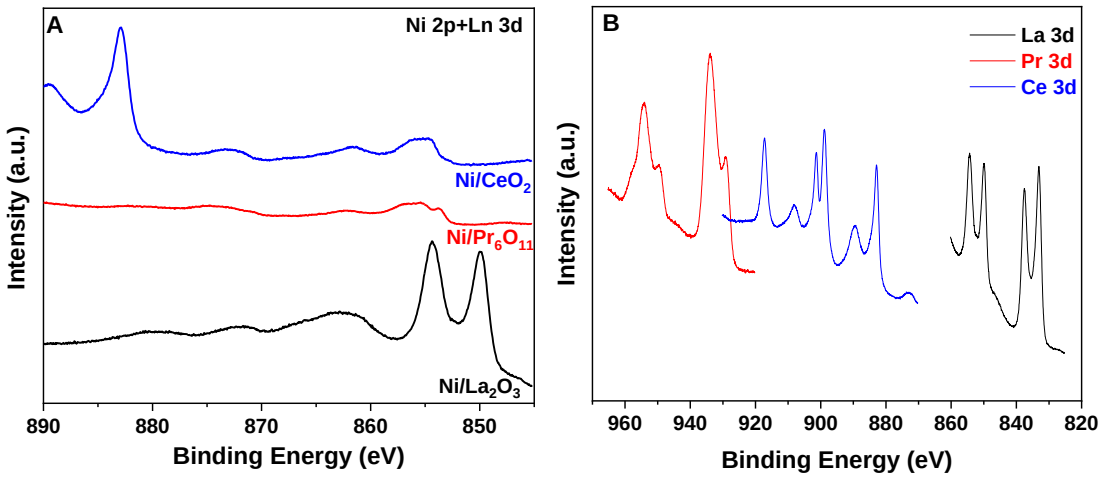


Fig. S6. XPS spectra of (A) Ni2p, (B) La3d, Pr3d and Ce3d for Ni/LnO_x catalysts after in-situ pre-reduction in hydrogen at 500 °C for 2 h.

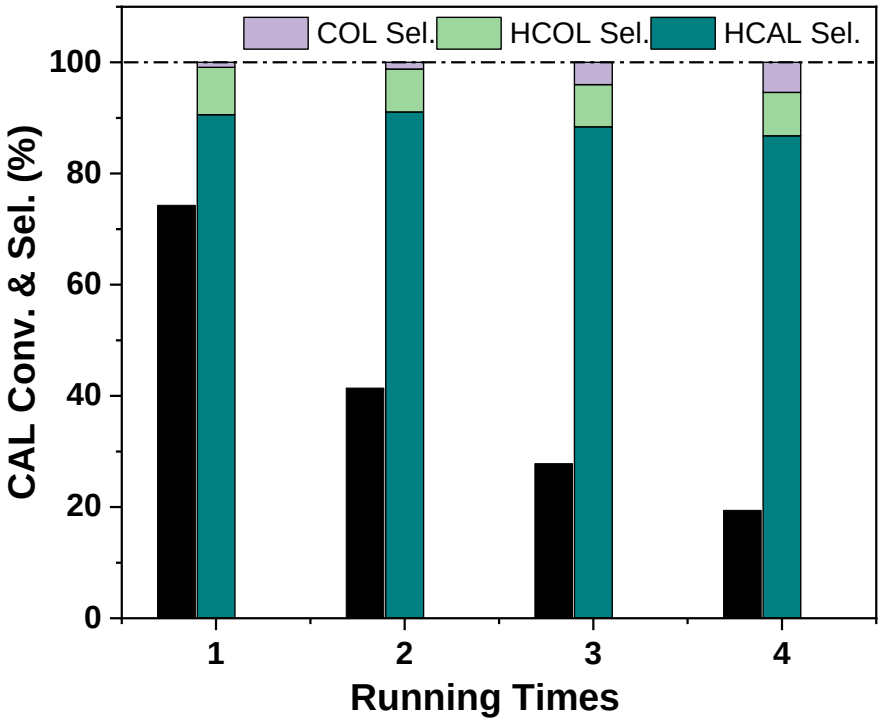


Fig. S7 Reusability of the Ni/La_2O_3 catalyst for the selective hydrogenation of CAL to HCAL in a mixed solvent. Reaction conditions: 25 mg catalyst; 7.5 mmol CAL; 9 mL isopropyl alcohol + 1 mL water; 1200 rpm; 90 °C; 15 min.

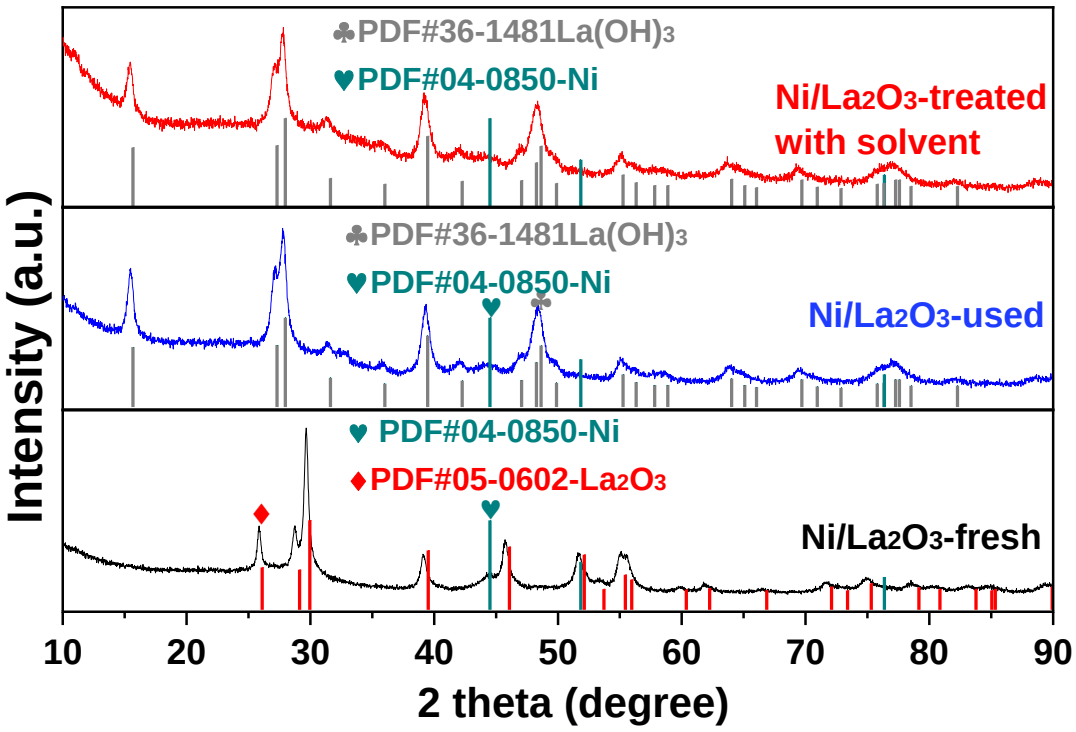


Fig. S8 XRD patterns of the used Ni/La_2O_3 catalyst in the mixed solvent (9 mL isopropanol + 1 mL water) and the Ni/La_2O_3 catalyst treated with water.