

Supplemental Information for

Insights into the enhanced hydrogen adsorption on M/La₂O₃ (M=Ni, Co, Fe)

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Supplemental Fig. S1-8.

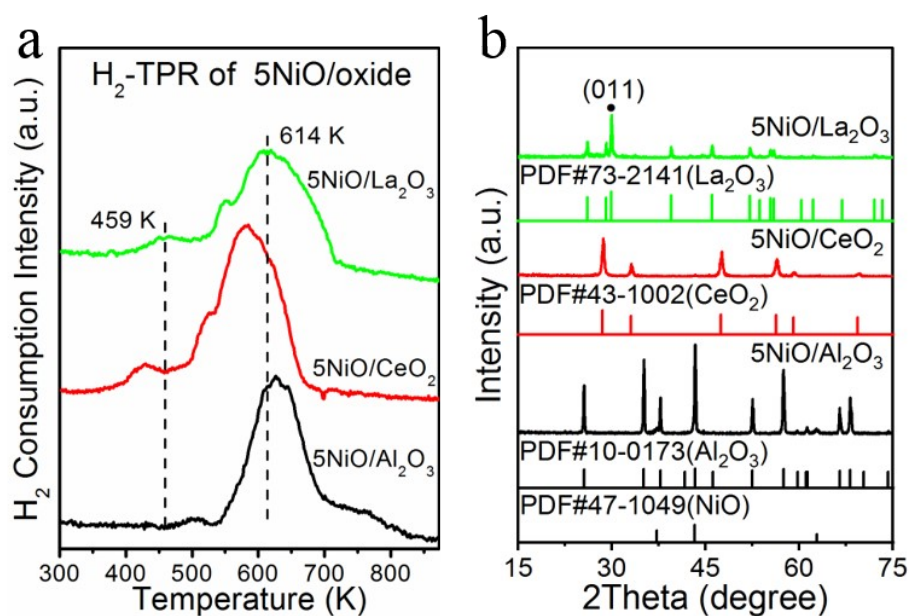


Fig. S1. H₂-TPR (a) and XRD (b) of the 5NiO/La₂O₃, 5NiO/CeO₂ and 5NiO/Al₂O₃.

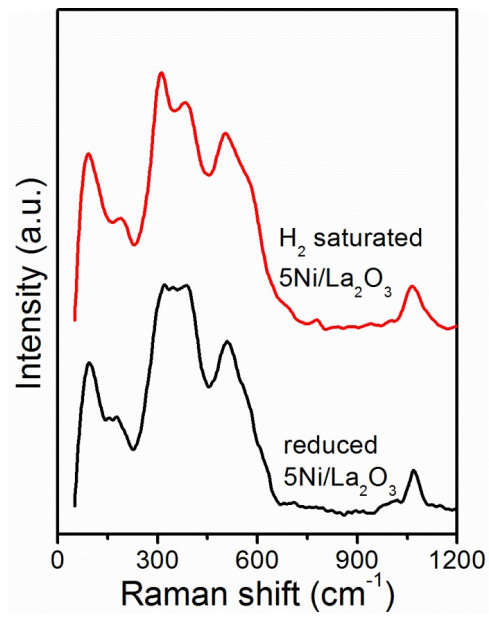


Fig. S2. Ex situ Raman spectra of reduced and H₂ saturated 5Ni/La₂O₃. The peaks at around 308, 690 and 502 cm⁻¹ are assigned to the La-O vibration of La₂O₃.

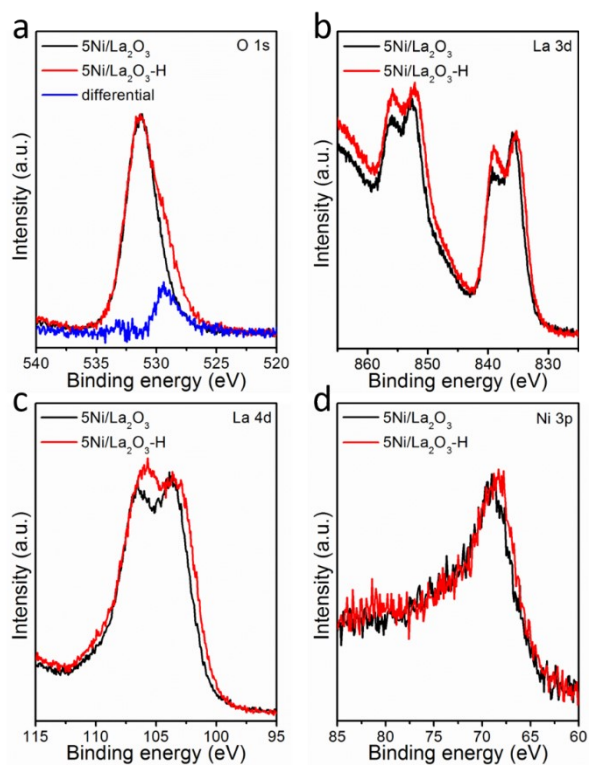


Fig. S3. XPS spectra of reduced 5Ni/La₂O₃ and 5Ni/La₂O₃-H (H₂ saturated). O 1s (a), La 3d (b), La 4d (c) and Ni 3p (d). The O1s spectra were normalized to the La-O peak at 531.6 eV. Differential spectra are shown to illustrate the changes before and after H₂ adsorption.

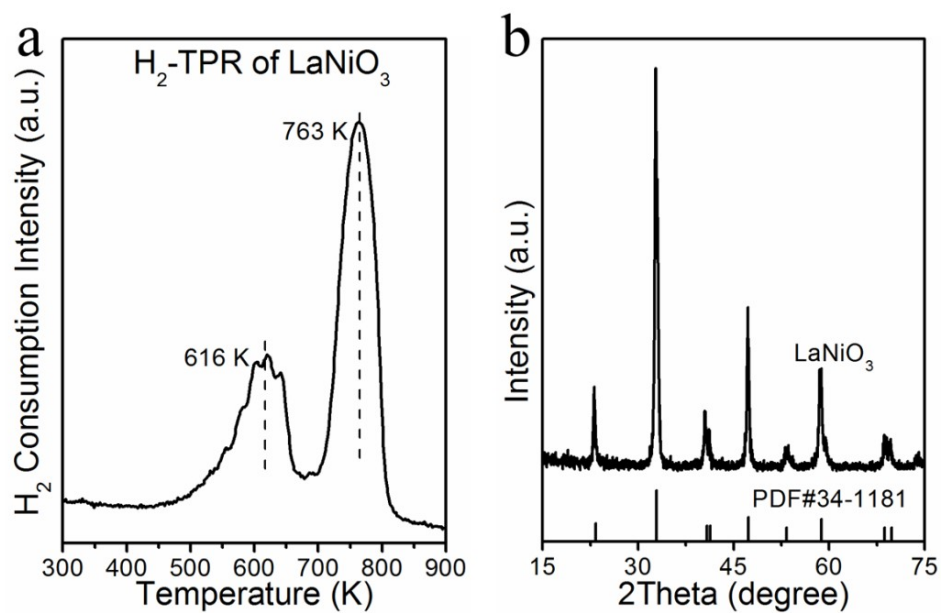


Fig. S4. H₂-TPR (a) and XRD (b) of LaNiO₃.

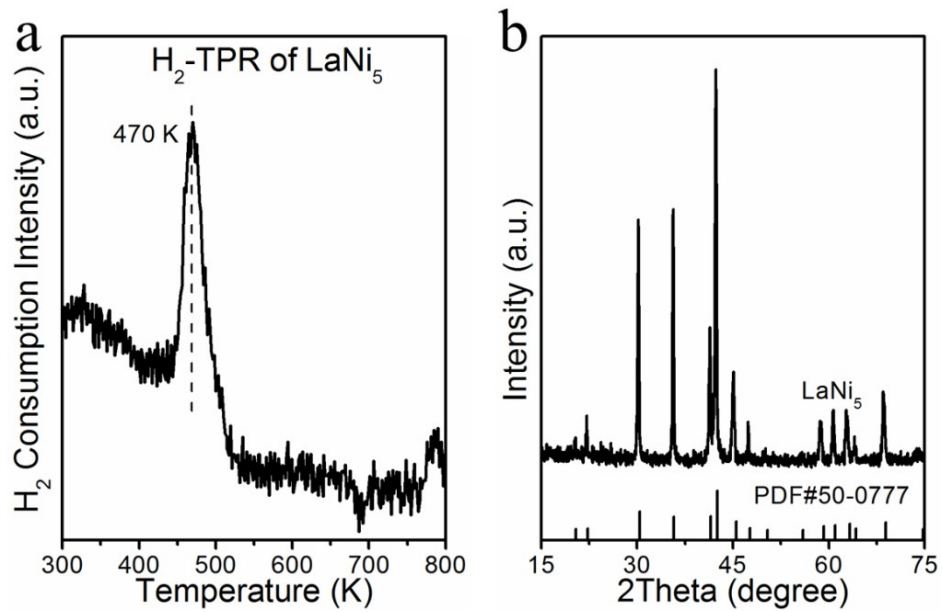


Fig. S5. H₂-TPR (a) and XRD (b) of LaNi₅.

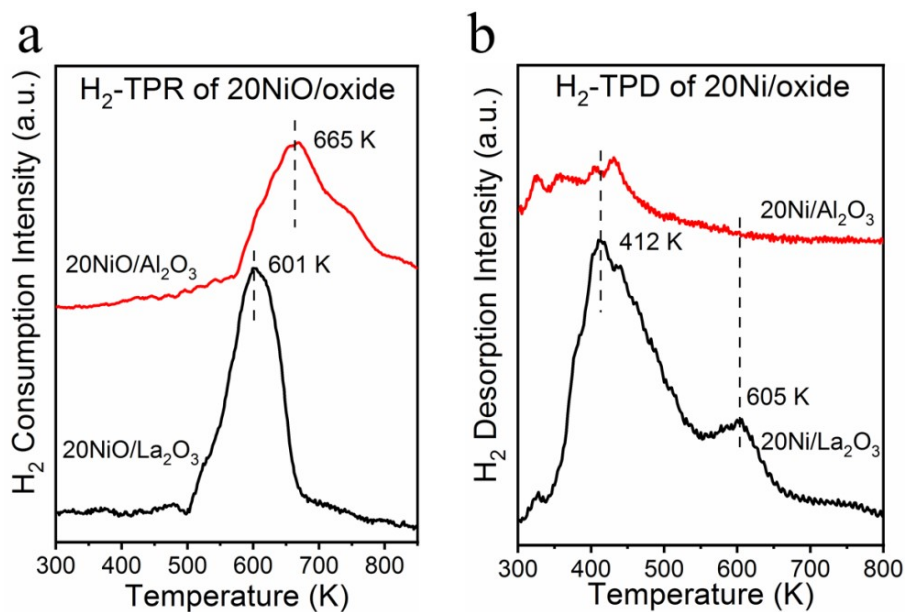


Fig. S6. H₂-TPR (a) of 20NiO/La₂O₃ and 20NiO/Al₂O₃ (20 wt% Ni). H₂-TPD (b) from H₂ saturated of 20Ni/La₂O₃ and 20Ni/Al₂O₃ at atmospheric pressure at 300 K for 15 min in 50% H₂/Ar (100 mL min⁻¹) reduced at 773 K.

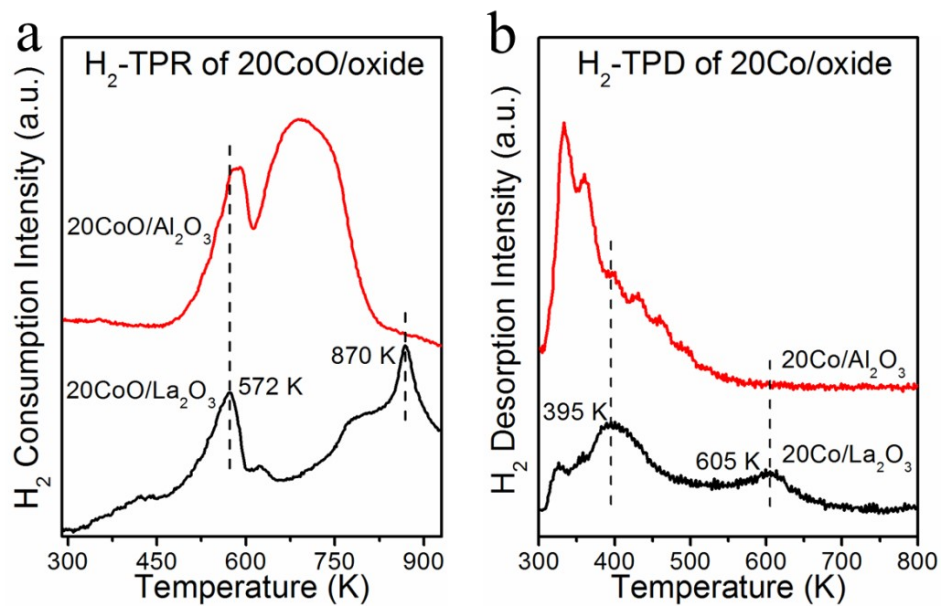


Fig. S7. H₂-TPR (a) of 20CoO/La₂O₃ and 20CoO/Al₂O₃ (20 wt% Co). H₂-TPD (b) from H₂ saturated of 20Co/La₂O₃ and 20Co/Al₂O₃ at atmospheric pressure at 300 K for 15 min in 50% H₂/Ar (100 mL min⁻¹) reduced at 773 K.

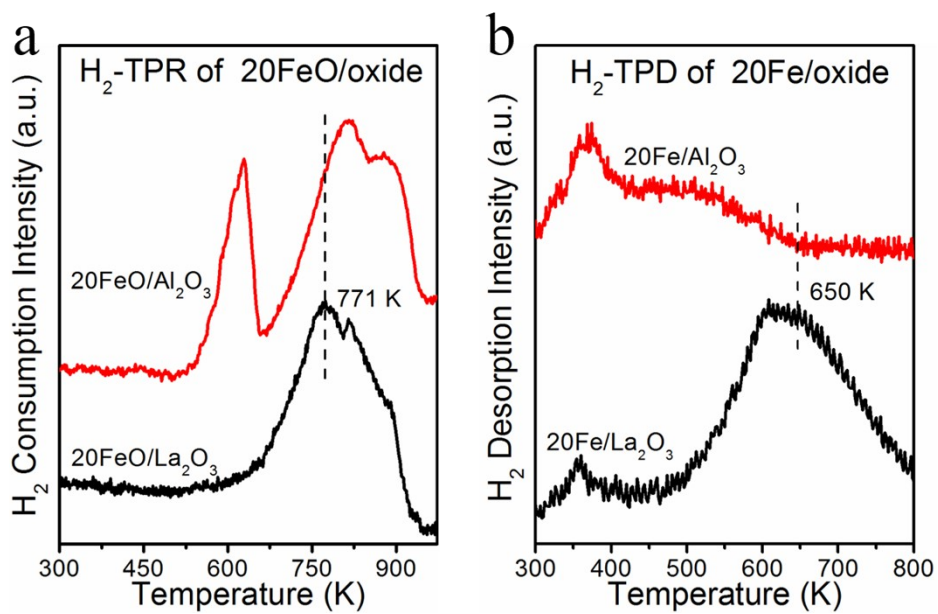


Fig. S8. H₂-TPR (a) of 20FeO/La₂O₃ and 20FeO/Al₂O₃ (20 wt% Fe). H₂-TPD (b) from H₂ saturated of 20Fe/La₂O₃ and 20Fe/Al₂O₃ at atmospheric pressure at 300 K for 15 min in 50% H₂/Ar (100 mL min⁻¹) reduced at 773 K.