

Supporting Information

Exsolution of Fe, Co, and Ni supported catalysts from LaBO₃ (B = Fe, Co, Ni) perovskites for ammonia synthesis

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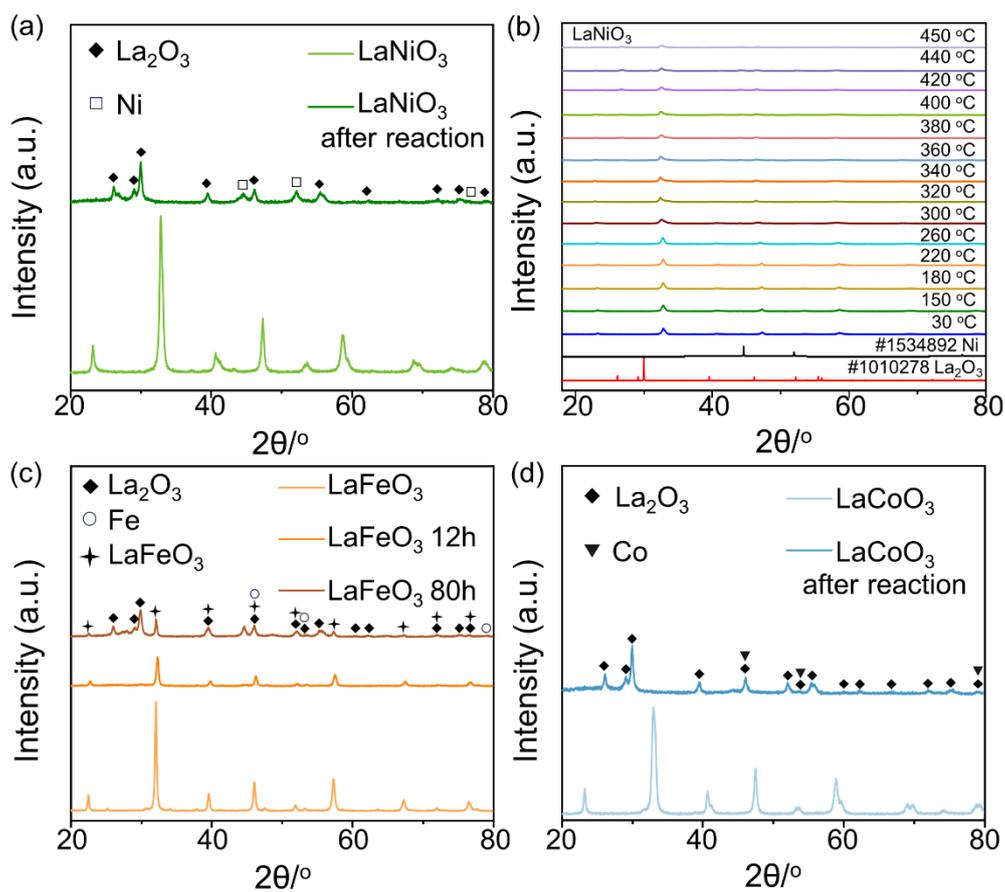


Figure S1. Comparison of X-ray diffraction patterns after ammonia synthesis reaction. (a) LaNiO_3 before and after reaction (b) In situ XRD at 30 to 450 °C under a hydrogen-nitrogen mixture, $\text{N}_2/\text{H}_2 = 1:3$ (c) LaFeO_3 before and after reaction (d) LaCoO_3 before and after reaction.

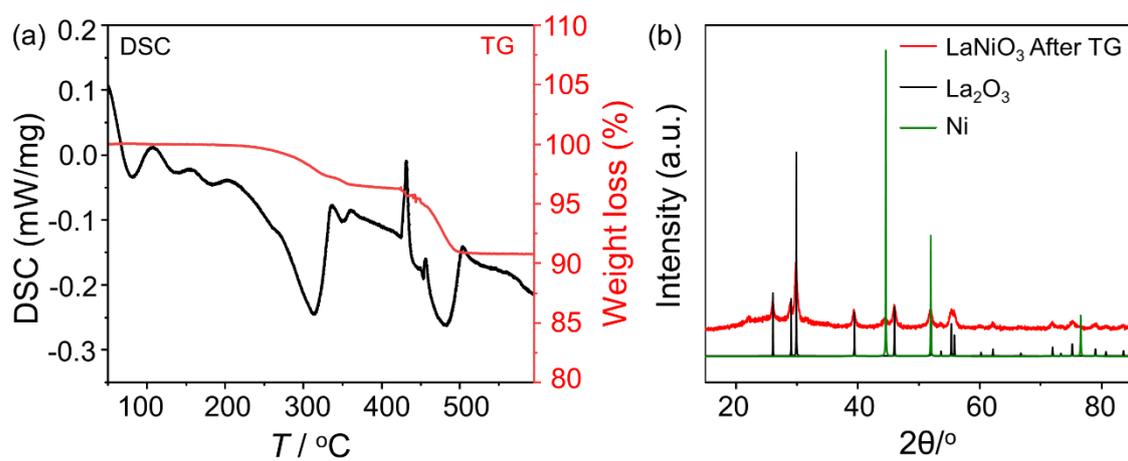


Figure S2. (a) TG-DSC curves of LaNiO₃ in hydrogen-nitrogen mixtures (H₂ 75% / N₂ 25%) (b) XRD before and after TG reaction.

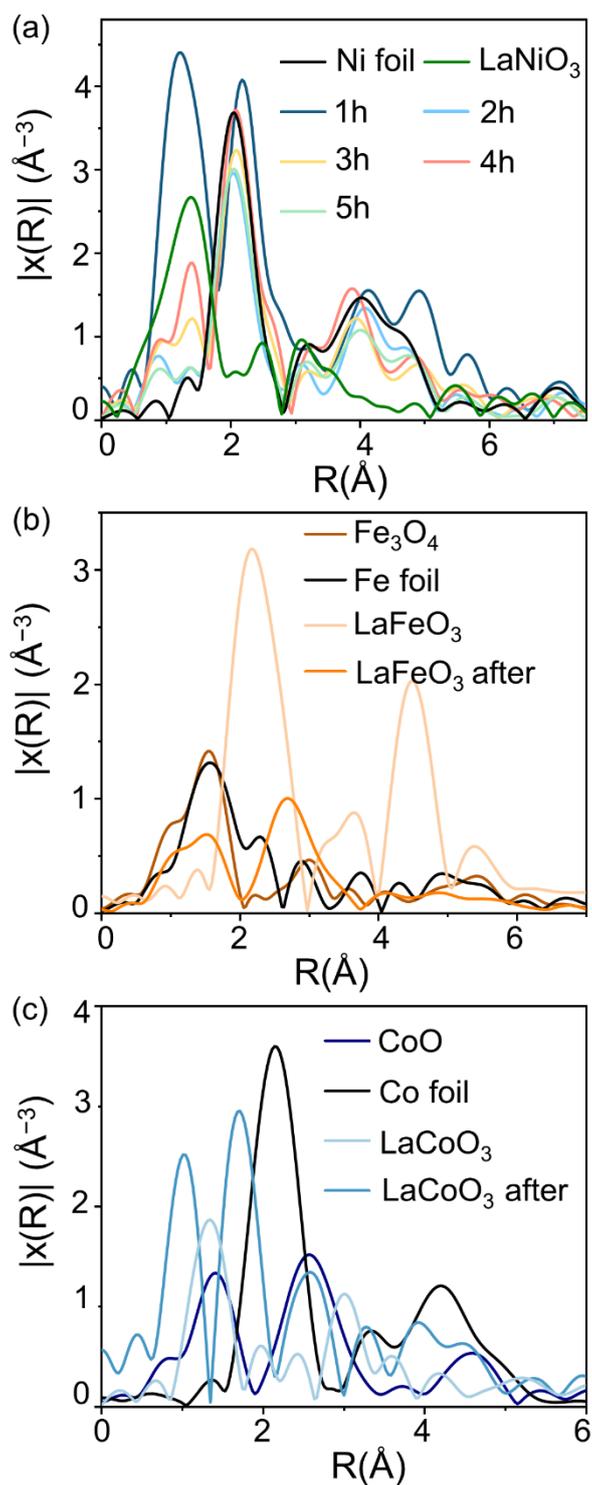


Figure S3. (a)-(c). R-space environment changes of LaBO_3 (B= Ni/Fe/Co) collected before and after the ammonia synthesis reaction at Ni K-edge , Fe K-edge , Co K-edge , respectively. Among them, CoO and Fe_3O_4 are commercially available pharmaceuticals.

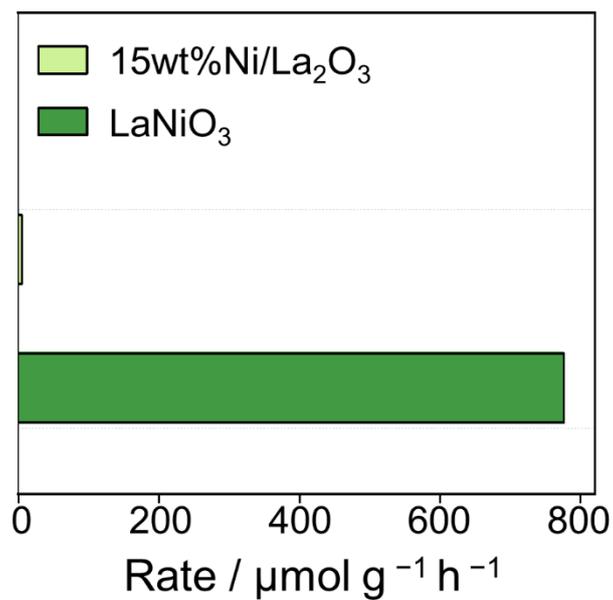


Figure S4. Comparison of ammonia synthesis performance of 15wt% Ni/La₂O₃ synthesized by impregnation method and LaNiO₃ in situ formation catalysts.

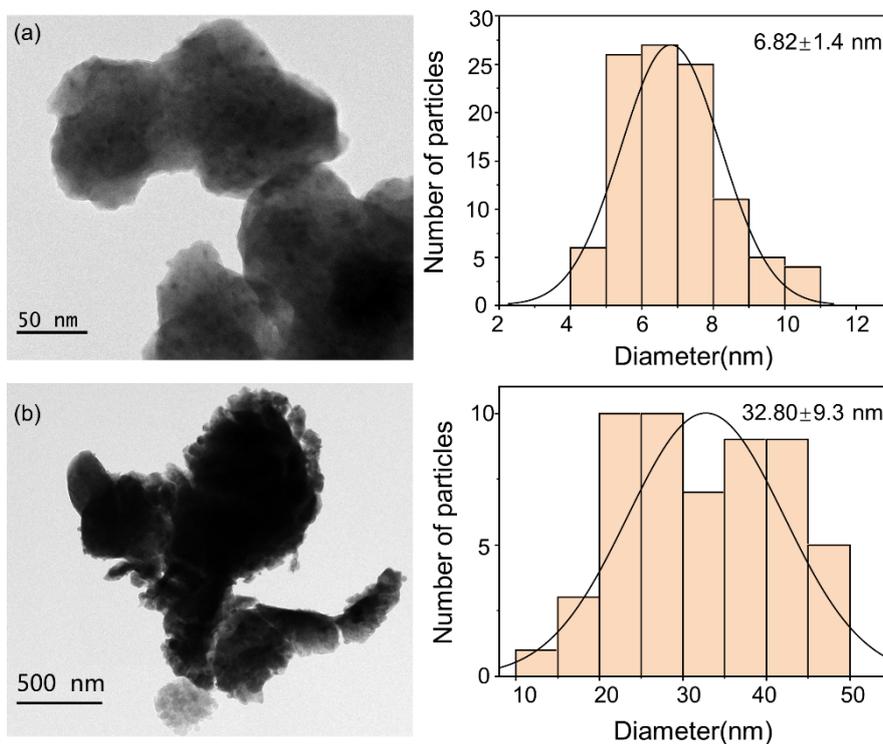


Figure S5. TEM image and particle size analysis based on the image. (a) LaNiO₃ (reaction temperature: 500 °C). (b) 15wt%Ni/La₂O₃ (reaction temperature: 500 °C).