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Title: Catalytic reduction of NO by CO over B-site partially substituted $\text{LaM}_{0.25}\text{Co}_{0.75}\text{O}_3$ (M = Cu, Mn, Fe) perovskite oxide catalysts: The correlation between physicochemical properties and catalytic performance

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Catalytic reduction of NO by CO over B-site partially substituted $\text{LaM}_{0.25}\text{Co}_{0.75}\text{O}_3$ (M = Cu, Mn, Fe) perovskite oxide catalysts: The correlation between physicochemical properties and catalytic performance

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Highlights

- The impact of B-site partial substitution and the reaction mechanism of $\text{LaM}_{0.25}\text{Co}_{0.75}\text{O}_3$ (M = Cu, Mn, Fe) perovskites are first presented in NO reduction by CO
- Partial substitution of copper obviously reduces the impact of the restriction for CO adsorption by NO preferential adsorption on LaCoO_3 catalyst
- With partial substitution of foreign cations, perovskite structure of LaCoO_3 is maintained effectively with enhanced catalytic performance
- Reduction property and content of oxygen defect sites in partially substituted catalysts are the key factors for catalytic performance

Abstract

The current work mainly focuses on exploring the impact of B-site partial substitution on the physico-chemical property and the catalytic performance of $\text{LaM}_{0.25}\text{Co}_{0.75}\text{O}_3$ (M = Cu, Mn, Fe) perovskites for the catalytic reduction of NO by CO. Measurements are applied to characterize the gained catalysts, including XRD, N_2 -physisorption (BET), H_2 -TPR, O_2 -TPD, ICP-AES, XPS and *In situ* DRIFTS. The results are listed below: (1) with partial substitution of foreign cations, the perovskite structure of LaCoO_3 is maintained effectively with improved catalytic performance; (2) the reduction property and content of oxygen defect sites of partial substituted catalysts are the key factors for the improved catalytic performance; (3) the partial substitution of copper obviously reduces the impact of the restriction for CO adsorption by NO preferential adsorption on LaCoO_3 catalyst; (4) the partial substitution of copper distinctly promotes the reducing capacity and adsorption of gaseous O_2 for LaCoO_3 . Besides, taking $\text{LaCu}_{0.25}\text{Co}_{0.75}\text{O}_3$ catalyst as an example, a reliable catalytic model is tentatively put forward to thoroughly exploring the reaction

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