

A fast screening method based upon combinatorial chemistry for developing perovskite-based NO oxidation catalyst

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Platinum has been used in both DOC and LNT catalysts for oxidizing NO to NO₂, owing to its superior NO oxidation activity. However, the perovskite (ABO₃) has been attracting growing attention from the auto industry as an inexpensive alternative catalyst for NO oxidation to replace the pricey Pt metal. Developing an active and new catalyst is always very time-consuming and costly. In the present study, a fast screening method has been developed for discovering a perovskite-based NO oxidation catalysts based upon the colorimetric assay. A consecutive dual-bed reactor consisting of a perovskite-based NO oxidation catalyst in the front bed and a NO_x storage catalyst (K/Al₂O₃) in the rear bed has been assembled into 10x10 parallel reactor system for examining the NO oxidation activity of perovskite catalysts. The oxidation of NO to NO₂ proceeds in the front bed, followed by the adsorption of NO_x in the rear bed. The amount of NO_x adsorbed on the NO_x storage catalyst well correlated with the NO oxidation activity directly measured using the conventional fixed-bed reactor.