

Formation of ammonia and nitrous oxide as a function of feed composition over commercial three-way catalyst (TWC)

배우빈, 김도영, 변상우, 윤달영¹, 정창호¹, 강성봉[†]
광주과학기술원; ¹현대자동차 촉매연구팀
(sbkang@gist.ac.kr[†])

Three-way catalysts (TWC) have been employed for converting CO, HCs and NO_x simultaneously, however, the emission of byproducts such as poisonous and corrosive ammonia (NH₃) and the greenhouse gas, nitrous oxide (N₂O) is one of the major concerns in aftertreatment system. Moreover, the feed composition (i.e., A/F ratio and reductant species) is the key parameter affecting the TWC performance as well as the byproducts formation. To minimize the NH₃ and N₂O emissions via NO reduction, it is highly desirable to identify the impact of feed composition and its reaction pathway for the NO reduction to the formation of NH₃ and N₂O. In the present study, simple and full mixture feed tests have been systematically performed over the commercial aged Pd/Rh TWCs. The simple feed test has been conducted under the condition containing single reductant (CO, H₂ or HCs: C₃H₆/C₃H₈) or NO together with 10% H₂O as a function of A/F ratio, where full mixture contains all reactants mentioned. This study will provide an optimal feed condition for minimized NH₃ and N₂O emissions as well as a role of each reactants, CO, H₂ and HCs in TWC reactions.