Characterization of NH_3 and N_2O formations through individual reductants (H_2, CO and HCs) over commercial three-way catalyst (TWC)

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

In the complex reaction network of three-way catalysts (TWC) system, the formations of NH_3 and N_2O are attributed by feed gas composition and individual reductants such as H_2, CO and HCs. Converting 1000 ppm of NO through full feed conditions, the maximum NH_3 formation (800 ppm) was observed under rich condition ($0.97 \leq \lambda < 1.00$) with high temperatures (over 350 ℃). We also examined the maximum N_2O formation (210 ppm) under the stoichiometric condition at low temperature range (250-350 ℃). To characterize the effects of individual reductants on NH_3 and N_2O formations, simple feed tests consisting of a single reductant (H_2, CO or HCs) with NO, CO_2 and H_2O were conducted. The NH_3 formation is promoted by H_2 in the feed gas and additionally formed H_2 through water gas shift reaction and steam reforming reactions via H_2-NO reaction. In contrast to NH_3, N_2O is closely dependent on CO and/or HCs in the feed gas composition via the formation of surface NCO- species, which was identified by Diffuse Reflectance Infrared Spectroscopy (DRIFTS).