Thermal stability of Rh based TWC catalysts

허일정, 윤달영, 김평순, 이기환, 조병권, 남인식*, 정진우[1],
유승범[1]
포항공과대학교; [1]현대자동차
(isnam@postech.ac.kr*)

Three-way catalyst (TWC) has been widely employed to remove toxic gases, CO, HCs and NOx emitted from gasoline engines. Noble metals (NMs: Pt, Pd and Rh) play crucial role for TWC reaction as active reaction sites on the surface of TWC. Rh is known to be active component for NOx reduction, while Pt and Pd are employed for primarily removing CO and HCs. Since TWC typically operates at high exhaust gas temperatures, the catalyst is prone to deactivation due to sintering of NMs as well as the thermal degradation of other catalyst components. In addition, Rh supported on alumina can be transformed to Rh aluminate under oxidizing condition at high temperature, resulting in the further loss of its NOx reduction activity. In this work, the effect of thermal aging on the alteration of the physicochemical properties and activities of Rh/metal oxides has been investigated to understand the deactivation of the Rh catalysts. Based upon the findings in the present study, we have designed an advanced TWC system including Rh and Pd, exhibiting improved catalytic activity and stability.