Autothermal reforming of n-dodecane for LNT technology

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Among the NOx reduction technologies currently available for controlling emissions from diesel engine, Lean NOx Trap (LNT) technology seems to be quite promising. However, the major drawbacks of LNT may be the poisoning of the catalyst by SO2 contained in engine exhaust stream from diesel engine without the periodic lean-rich cyclic operation. To resolve this problem, an extra reductant such as H2, CO and HC should be frequently introduced into the catalytic system for its regeneration. H2 and CO are commonly recognized as the most effective reductant for regenerating LNT catalyst. In the present study, auto thermal reforming of n-dodecane as a diesel simulant over Ni catalysts was carried out under diesel engine exhaust condition. Ce-Zr Oxide(CZO)/Al2O3 prepared by the co-precipitation method is used as a support of Ni catalysts. The effect of the content of Ni and CZO on the formation of H2 and CO was investigated in a fixed bed flow reactor system. 5wt.%Ni/35wt.% CZO/Al2O3 shows the highest reforming activity compared to commercial DFC (Diesel Fuel Cracking) catalysts. The amount of H2 and CO produced by the present catalytic system generally meet the criteria set for a commercial reforming catalyst to regenerate LNT catalyst.