REDUCTION OF NO_X BY PLASMA-FACILITATED CATALYSIS: AN UPDATE ON THE PNNL-CATERPILLAR CRADA ON HEAVY-DUTY EMISSIONS REDUCTION

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NO_x reduction exceeding 90 percent has been demonstrated for a simulated exhaust stream in a bench-scale reactor system consisting of a plasma treatment stage followed by catalytic reduction to N_2. A variety of selective catalytic reduction (SCR) agents were tested with γ-alumina based catalysts. Hydrocarbons with alcohol functionality were most active for the reduction of NO_x. A model fuel, isocetane, and saturated, short-chain hydrocarbons showed the lowest activity. In addition, the presence of silver as a precious metal dopant on γ-alumina significantly increased the activity of the catalyst. Silver-doped γ-alumina also showed no degradation in activity with the presence of SO2 in the exhaust. This is consistent with literature reports that silver sulfate is also catalytically active for SCR of NO_x. It will also be shown that γ-alumina catalysts developed under the CRADA using sol-gel processing are superior to commercially available materials.