

N₂O Emissions from Vehicles Equipped with Three-Way Catalysts in a Cold Climate

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Nitrous oxide (N₂O) contributes to the greenhouse effect approximately three hundred times more than does CO₂, and automobile emissions account for approximately 40% of the N₂O generated from human sources. N₂O is characteristically emitted by vehicles with three-way catalysts, and it has been made clear that in addition to the deterioration of the catalyst, the main factor in these emissions is the temperature at which the catalytic reaction occurs. On the other hand, when the ambient air temperature changes, the behavior of the catalyst temperature also changes, and it is thought that this also influences the amount of N₂O emissions

This paper reports on vehicle driving tests that were conducted in a cold climate in order to gain an understanding of the influence of ambient temperature changes on N₂O emissions from vehicles with three-way catalysts. This paper also reports the results of an analysis of the influence of ambient temperature changes on the amount of N₂O emissions. The analysis is based on results that elucidate in detail the temperature behavior of the exhaust system and the catalyst, and on the generation and decomposition characteristics of N₂O relative to the catalyst temperature.