# DYNAMOMETER EVALUATION OF PLASMA-CATALYST SYSTEM FOR DIESEL $NO_X$ REDUCTION

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## ABSTRACT

A three-stage plasma-catalyst system was developed and tested on an engine dynamometer. Previous laboratory testing suggested high $NO_x$ efficiency could be obtained. With hexene reductant added to the exhaust, we observed over 90-percent $NO_x$ reduction. However, with diesel or Fischer-Tropsch reductant, the catalyst efficiency rapidly dropped off. Heating the catalyst in air removed brown deposit from the surface and restored conversion efficiency.

Following the engine tests, the used catalysts were evaluated. BET surface area decreased, and temperature-programmed desorption revealed significant storage. This storage appears to be partly unburned diesel fuel that can be removed by heating to around 250-300°C, and partly hydrocarbons bonded to the surface that remain in place until 450-500°C.

Laboratory testing with propene reductant demonstrated that the catalyst regains efficiency slowly even when operating temperature does not exceed 300°C. This suggests that control strategies may be able to regenerate the catalyst by occasional moderate heating.