1-D kinetic model predicting deNOx performance of OHC/SCR over Ag/Al_2O_3 catalyst

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The selective catalyst reduction of NOx by urea or NH_3 (urea-SCR) has been widely employed to control emissions from stationary and mobile sources. Modern aftertreatments have required direct use of unburned or reformed fuel, specifically oxygenated HC (OHC), as a reductant for the catalytic reduction of NOx. In this study, we developed the 1-D numerical kinetic model predicting the catalytic performance of the OHC/SCR over Ag supported on alumina catalysts. The L-H based elementary reactions were postulated with the surface intermediates such as $-CH_3CHO$, $-NH_3$, and -NCO. The model has predicted the conversions of NO and ethanol as well as the formations of ammonia and nitrous oxide as a function of the C1/NOx ratio and the reactor space velocity. Moreover, the numerical model is capable of simulating the promotional effect of hydrogen in the feed on the conversions of both NO and C_2H_5OH. Moreover, we validated the kinetic model particularly for the ethanol oxidation activity comparing the reactor data with a wide range of hydrogen concentration and Ag loading of the catalyst.