CFD Simulation of Selective Non-Catalytic Reduction (SNCR) by Urea Solution in NonSan Municipal Incinerator

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The Selective Non-Catalytic Reduction (SNCR) process has been applied popularly in stationary sources to reduce the nitrogen oxides (NO_x) emissions. SNCR is considered as one of the advanced and viable post-combustion NO_x control technologies due to its simplicity and low maintenance costs. The efficiency of SNCR NO_x reduction depends much on the velocities of the flue gas, on the reaction temperature and on the mixing ability of the reagent. Furthermore, in order to apply it to a real case, it is necessary to identify the reagent injecting position because of the highly-sensitive NO_x reduction efficiency on temperature.

In this work, the three-dimensional CFD simulation is performed to calculate the NO_x efficiency of the SNCR process installed at the secondary combustor of a municipal incinerator. A turbulent-reacting CFD model with the droplet model is constructed so that the droplet trajectory can be calculated in the CFD model. The reduced chemical kinetics with seven global steps is used to predict the NO reduction, NH_3 slip and N_2O evolution.