

Selective Non-Catalytic Reduction (SNCR) Process in a Pilot-Scale Flow Reactor: Experiment and CFD Simulation

강태호, Thanh D. B Nguyen, 임영일*, 김성준¹, 엄원현¹,
유경선¹
환경대학교; ¹광운대학교
(limyi@hknu.ac.kr*)

For controlling the nitrogen oxides (NO_x) emissions from the flue gas, selective non-catalytic reduction (SNCR) using urea solution is carried out in a pilot-scale flow reactor equipped with a 150KW LPG burner. Urea-water solution (4% by weight) is injected into the reactor with atomizing air. The experiments are performed at various temperatures with different normalized stoichiometric ratios (reagent/initial NO ratio, NSR).

A turbulent reacting flow CFD model with the droplet model is built for this pilot-scale SNCR process. The full-scale two-dimension CFD simulation results are validated with the experimental data. The CFD simulation results show a satisfactory agreement with the experimental data of NO_x reduction and ammonia slip as a function of the temperature and the normalized stoichiometric ratio (NSR). However, unsatisfactory CFD results are shown in the N_2O concentration profiles, compared with experimental results.