Impact of the operating temperature to gas-phase reactions in the mixing region of a hydrocarbon reformer

김선영*, 배중면
KAIST
(chrysy@kaist.ac.kr*)

Gas-phase reactions in the mixing region of a hydrocarbon reformer have a critical role in ensuring reformats quality. Undesired gas-phase reactions can cause deleterious deposit formation on the downstream reforming catalyst. These reactions are governed by the mixing of reactants and the operating temperature. Therefore, the coupled transport and kinetics model was developed to describe the physical and chemical phenomena in the mixing region, and the mixing chamber for a hydrocarbon reformer was designed to provide sufficiently homogeneous mixture of reactants in the previous work. This work investigated the impact of the operating temperature to gas-phase reactions using numerical simulations. The simulation results showed strong dependency of the characteristics of gas-phase reactions on the operating temperature. Ethylene production, a well-known deposit precursor, from gas-phase reactions steeply increases as the temperature increases. It suggests that temperature should be delicately controlled to avoid undesired reactions in the mixing region of a hydrocarbon reformer.