Numerical analysis of air flow ratio effect on the regenerator efficiency

차범준, 조형태, 손성렬[1], 김석준[1], 문 일*
연세대학교; [1]SK Innovation
(ilmoon@yonsei.ac.kr*)

In this work, a regeneration process in fluid catalytic cracking (FCC) regenerator was simulated by computational particle fluid dynamics (CPFD) numerical method. The discrete particle momentum is solved by multiphase particle-in-cell (MP-PIC) description which is based on Lagrangian method. The fluid behavior is analyzed by Eulerian method, and these discrete phases are implicitly coupled with coupling equation. Coke burning reactions in the regenerator were considered as several stoichiometric equations to demonstrate regeneration process. Computational simulations for various air flow inlet velocity were investigated to verify regeneration tendency and temperature distribution in the regenerator. The results reveal that adjustment of air flow velocity gives significantly better temperature distribution, and hence dramatically decrease ratio of the over-heated catalyst caused by afterburning phenomena.