Dynamic modeling and simulation of a fluidized catalytic cracking process. Part II: Property estimation and simulation.

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Abstract

A dynamic simulator was developed which implements the detailed dynamic model for an FCC process and the model solver presented in Part I of this paper. The simulator incorporates the correlation equations developed in this study for the thermodynamic properties and transport parameters contained in our model. First, the simulator was validated by comparing the overall steady-state behavior of the system with those in the literature. Then, base case steady-state profiles were obtained for major process variables in the reactor riser and regenerator of an industrial scale FCC unit. Next, the issue of multiple steady states in FCC operations was addressed and confirmed by investigating the sensitivity of our model to initial conditions. Finally, the dynamic responses to step changes in three major process inputs were presented and discussed with an emphasis on the interaction between the reactor and regenerator dynamics.

Keywords

Fluid catalytic cracking; Dynamic simulator; Property estimation; Multiple steady states; Sensitivity

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