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Numerical Simulation on Gas-Solid Two-Phase Turbulent Flow in FCC Riser Reactors (I) Turbulent Gas-Solid Flow-Reaction Model

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摘要 Gas-solid two-phase turbulent flows, mass transfer, heat transfer and catalytic cracking reactions are known to exert interrelated influences in commercial fluid catalytic cracking(FCC) riser reactors. In the present paper, a three-dimensional turbulent gas-solid two-phase flow-reaction model for FCC riser reactors was developed. The model took into account the gas-solid two-phase turbulent flows, inter-phase heat transfer, mass transfer, catalytic cracking reactions and their interrelated influence. The k-V-kp two-phase turbulence model was employed and modified for the two-phase turbulent flow patterns with relatively high particle concentration. Boundary conditions for the flow-reaction model were given. Related numerical algorithm was formed and a numerical code was drawn up. Numerical modeling for commercial FCC riser reactors could be carried out with the presented model.

关键词 [riser reactor](#) [turbulent flow](#) [gas-solid flow](#) [flow-reaction model](#) [numerical algorithm](#)

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Abstract Gas-solid two-phase turbulent flows, mass transfer, heat transfer and catalytic cracking reactions are known to exert interrelated influences in commercial fluid catalytic cracking(FCC) riser reactors. In the present paper, a three-dimensional turbulent gas-solid two-phase flow-reaction model for FCC riser reactors was developed. The model took into account the gas-solid two-phase turbulent flows, inter-phase heat transfer, mass transfer, catalytic cracking reactions and their interrelated influence. The k-V-kp two-phase turbulence model was employed and modified for the two-phase turbulent flow patterns with relatively high particle concentration. Boundary conditions for the flow-reaction model were given. Related numerical algorithm was formed and a numerical code was drawn up. Numerical modeling for commercial FCC riser reactors could be carried out with the presented model.

Key words [riser reactor](#); [turbulent flow](#); [gas-solid flow](#); [flow-reaction model](#); [numerical algorithm](#)

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