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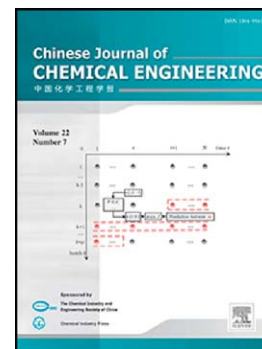
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Numerical simulation of micromixing effect on the reactive flow in a co-rotating twin screw extruder^{*}

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Abstract To control the multicomponent reactions in extrusion, reactive-mixing flow in a co-rotating twin screw extruder was numerically studied in the present paper. Effects of initial species distribution, rotating speed and flow rate on a competitive-parallel reaction were investigated and the relationship between mixing and reactions were discussed from the view of chemical reaction engineering. The simulation results show the studied operational parameters, which determine residence time distribution, earliness of mixing and segregation degree of reactive-mixing flows, affect the local species concentration and reaction time and hence have significant influences on the reaction extent. Orthogonal test was adopted to clarify the significance of operational parameters. The analysis shows initial species distribution and flow rate are the most important factors in the control of reaction extent, and effect of rotating speed is conditional depending on the micro-mixing status of the fluid.

Keywords Multicomponent reaction, Mixing, Numerical simulation, Extrusion

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