

Optimal design of reactor–recycle system in a column with side–reactor configuration for selectivity engineering

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For multiple reaction system, column with side–reactor configuration is proven to be an innovative solution to overcome the high energy demand of conventional reactor–distillation sequence when there is a temperature mismatch. The intent of this study is to study these competing effects by minimizing the total annual cost as an objective function. Two important industrial chemical production processes (Ethylbenzene, EB), and (Methoxy–Methylheptane, MMH) that produces desired and undesired products are taken to illustrate the simulation results. An important outcome is that SRC configuration can be effectively utilized to enhance the selectivity towards the desired product with minimum energy requirement compared to a conventional reactor–column sequence.

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