

过程系统工程

基于NSGA- II 的模拟移动床色谱分离过程多目标操作优化

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摘要

多目标优化策略被应用于模拟移动床过程的操作优化中, 采用一种基于Pareto最优解的多目标优化算法——NSGA-II 算法, 以分离联苯酚对映体的模拟移动床色谱分离过程作为研究对象, 利用模拟移动床TMB数学模型, 以分离性能指标作为目标函数进行了多目标操作优化设计。优化结果表明, NSGA-II 算法得到的非劣解在目标空间分布均匀, 算法收敛性和鲁棒性好。基于NSGA-II 算法的面向分离性能多目标优化设计方法为模拟移动床分离过程的工艺设计和操作指导提供了有效的工具。

关键词

[模拟移动床](#) [NSGA-II](#) [操作优化](#) [数学模型](#)

分类号

Multi-objective optimization of simulated moving bed chromatography separation based on NSGA- II algorithm

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Abstract

The concept and method of multi-objective optimization are applied to the simulated moving bed (SMB) chromatography separation based on multi-objective evolutionary algorithm—non-dominated sorting in genetic algorithms—NSGA- II algorithm. The moving bed chromatography separation was simulated using true moving bed (TMB) modeling strategy. Subsequently, using the separation performance parameters as the objective function, two-objective optimization problems were solved to determine the optimal operation conditions. The results showed that the non-inferior solution sets obtained by NSGA- II were distributed uniformly and this algorithm had good convergence and robustness. The multi-objective optimization of the optimal operation conditions of the simulated moving bed facilitated the design and operation of a simulated moving bed.

Key words

[simulated moving bed](#) [NSGA-II](#) [optimization](#) [mathematical model](#)

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