

催化、动力学与反应器

催化剂失活时甲醇反应器的优化

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摘要

以拟均相一维模型为基础, 考察了两种考虑催化剂失活时甲醇合成反应器的优化策略。这两种优化策略的共同之处是在反应初期保持日产率平稳, 后期使日产率最大。第一种优化方案在调节操作压力的同时调节反应温度和空速至最优值, 而在另一种方案中空速始终保持不变, 先调节操作压力至设计上限后再使反应温度处于最优值。研究表明, 后一种简化方案尽管优化得到的平均时空产率略有降低, 但由于运行中只需调节一个操作变量(先压力后温度), 因而易于工业实施。

关键词

[甲醇合成](#) [模拟](#) [优化](#) [失活](#) [拟均相模型](#)

分类号

Optimization of methanol reactor with decreasing catalyst activity

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Abstract

Two optimization strategies for methanol synthesis were proposed to deal with the decreasing activity of the catalysts and were compared by simulation using a plug-flow model. In both strategies the methanol productivity remained constant in the early months by minimizing the operating pressure and was maximized for the remaining months. In the first strategy, the coolant temperature and space velocity were adjusted simultaneously with time on stream to the optimal values. In the second strategy, space velocity was kept constant all the time, while operating pressure was increased until it reached the upper bound and then coolant temperature was optimized. The results showed that the second strategy yielded a slightly smaller methanol productivity. However, since pressure and coolant temperature were adjusted independently, this simpler strategy was more acceptable by the industry.

Key words

[methanol synthesis](#) [simulation](#) [optimization](#) [deactivation](#) [plug-flow model](#)

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