

Rigorous Investigation for Partial Feed Operation for Four-zone SMB

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Simulated moving bed (SMB) chromatography has become a widely used separation method because of continuous and effective separation process for valuable materials.

Zang and Wankat (2002) suggested a partial-feed concept to improve the SMB performance. The partial-feed operation means that the feed is injected during part of a switching period. They showed that this partial-feed operation significantly improves the efficiency of a four-zone SMB with one column per zone in case of a large selectivity (≈ 2.43) system.

In this study, the "partial-feed" is applied to five binary systems, which have different selectivities, feed time and feed length to investigate the effect of these factors on the "partial-feed" SMB. In addition, the "partial-feed" operation is rigorously investigated for the four-zone SMB with one or two columns per zone in view point of six performance parameters (purity, recovery et al.). Especially, Simulation experiments were performed under linear isotherm condition and all the behaviors of the performance parameters are explained based on the cyclic steady-state column profiles.