

Solvent-Gradient Operation in Reversed-Phase Simulated Moving Bed Unit to Separate Ortho-Xylene and Para-Xylene

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In a batch chromatography, the solvent-gradient operations give significant improvements in term of the enrichment of solute, the separation time and the solvent consumption as compared with the isocratic operations. This work studied about solvent-gradient operation in reversed-phase simulated moving bed unit to separate ortho-xylene and para-xylene. In solvent-gradient mode, a different mobile phase composition leads to a different retention behavior of solutes, i.e. different adsorption isotherms. Frontal analysis experiments for ortho-xylene and para-xylene are carried out with reversed-phase column to measure adsorption parameters at several different mobile phase compositions, such as 45%, 60%, 75% and 90% acetonitrile. Thereby, the parameters in retention model for solvent-gradient operation in the case of reversed-phase chromatography are estimated and applied to the design of SMB system. The "Triangle theory" proposed by Mobidelli is modified to design the operating conditions for solvent-gradient simulated moving bed chromatography.