

Modified Configuration Using Two-pumps for Simulated Moving Bed Chromatography

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Simulated moving bed (SMB) chromatography can achieve high productivity and high purities with reduced solvent consumption. However, only a few studies have been reported regarding the energy-saving of SMB process. We proposed a new configuration of SMB using two pumps rather than the conventional 4 or 5 pumps system for better efficiency in process operation and energy-saving. In a SMB system, pump occupies the most of the energy consumption, and secondly the instrument cost depending on the scale of the process. The conventional SMB process is composed of 4 pumps or 5 pumps to deliver the determined flows in columns for suitable separation. The basic concept of 2-pumps SMB process is manipulating the direction of flows using valves during the assigned period with pumps for controlling the flow rate of only the feed and zone 1. By this novel way of combining pumps and valves, the 2-pumps SMB process can maintain the desired volumetric flow ratio in the system to separate target products. As model solutes, L-ribose and L-arabinose have been used to test the SMB configuration using 2-pumps. Comparing to the conventional SMB process, 2-pump SMB process in modeling and experiments showed comparable performance in terms of purity and yield.