Optimization of Flushing Flow Rates in the 8- Zone Para-Xylene Simulated Moving Bed

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A commercial scale of para-xylene (PX) 8-zone simulated moving bed (SMB) applies three flushing sequences to prevent purity deterioration caused by SMB transfer lines (or bed-lines) from rotary valve to beds. However, a portion of PX loss through flushing application is inevitable. Hence, the flushing flow rates must be properly adjusted to maximize PX recovery. In this study, effects of the flushing flow rates on commercial scale SMB performances were investigated by sensitivity analysis. The commercial scale SMB consists of 24 adsorbent beds with 5.81 m3/min capacity. An explicit time-space conservation element and solution element (CESE) was used to solve the Linear Driving Force (LDF) adsorptive bed model, while the concentration dynamics inside dead volume were solved by the method of characteristic (MOC). The optimum flushing flow rates were proposed to obtain maximum PX recovery within the desired purity.