The Center-cut SMB Chromatography Composing of Seven Zones for Ternary System

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SMB chromatography is an appropriate method for producing a target product with high purity and yield in a continuous way. SMB chromatography has been developed for fine chemical, petrochemical and pharmaceutical industries. As traditional SMB process is originally designed to separate binary mixtures, many studies have been carried out to overcome this limitation. In this study, a novel SMB, named "Center-cut SMB", was designed to separate a mid-affinity component in ternary mixtures. This process consists of seven zones, ports and one by-pass stream comparing to the traditional SMB with four zones. The validity of this process was verified by simulation using Aspen Chromatography™. The new process was equipped with an enriching chamber that concentrates components from by-pass-out port to maintain the mass balance of each components. The mid-affinity component was produced with 95.3% purity, 15.5% yield and 2.5% enrichment without chamber, and 97.3% purity, 91.1% yield and 14.6% enrichment with chamber. It is verified that the enriching chamber is important for higher performance of the Center-cut SMB.