

Simulated moving bed adsorptive reactor

C P LEÃO, L S PAIS, M SANTOS, and A E RODRIGUES
Faculty of Engineering, University of Porto, Portugal

SYNOPSIS

The Simulated Moving Bed (SMB) technology is a mature one with above 100 applications in chemical industry (UOP Sorbex processes). Now it is finding applications in fine chemistry and pharmaceuticals (chiral separations). In this work, separation is coupled with reaction. The test system is enzymatic inversion of sucrose coupled with glucose/fructose separation using a Ca^{2+} resin as adsorbent. Modeling, simulation and operation of a pilot plant is addressed.

NOTATION

A	column area, m^2
c_{ij}	liquid phase concentration of component i in section j , mole m^{-3}
Da_j	Damköhler number, dimensionless
D_{Lj}	axial dispersion coefficient in section j , $\text{m}^2 \text{s}^{-1}$
d_p	particle diameter, m
k	mass transfer coefficient, s^{-1}
L_j	length of section j in the TMB, m
n_j	number of columns in the section j in the SMB
P	purity
Pe	Péclet number, dimensionless
Q_l	liquid flow rate, $\text{m}^3 \text{s}^{-1}$
Q_s	solid flow rate, $\text{m}^3 \text{s}^{-1}$
q_{ij}	average adsorbed phase concentration of component i in section j , mole m^{-3}