separations

Article

Prediction of Bleeding via Simulation of Hydrodynamics in Centrifugal Partition Chromatography

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Supplementary Information S1: Mesh Independence Study in Two Chambers

Table S1. Overview of the variables altered in the mesh independence study for a two-chamber flow area.

l_{max} $[mm]$	$n_{cells,z}$ $[-]$	n_{cells} $[10^4]$
0.30	35	6
0.20	35	13
0.15	35	22
0.10	35	49
0.09	35	59
0.08	35	76

Since the geometry in the z-plane was not changed, the results of the mesh independence study discussed in Section 3.3 can be adopted in the z-direction. The mesh for the two-chamber flow area was therefore studied exclusively in the x, y-plane. Here, $n_{cells,z}$ was chosen based on the results of the first study. The double-cell flow area was divided into five compartments, allowing the study of hydrodynamics in the chambers and ducts separately. Analogously, the flow area was divided into a block-structured mesh. The main advantage is that the complete CPC rotor can be reconstructed from the resulting mesh.

All simulations were made with 35 divisions in the z-direction, and the mesh in the x, y-plane was varied between 0.3 mm and 0.08 mm (Table 4). Analogously to the first study, the phase fraction was used to characterize the mesh quality. The parameter was averaged across all compartments so that the network was examined in its entirety. The mesh- and time-dependent phase fraction is shown in Figure 9. In the mesh independence study, the optimum mesh was determined with a mesh size of 0.1 mm and 35 divisions in the z-direction. With these dimensions, the mesh consists of 490,245 cells.

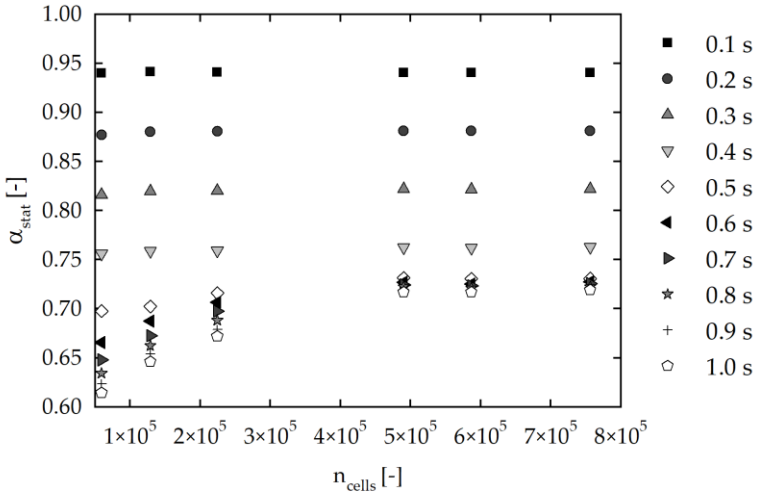

Figure S1. Results of the mesh independence study for the two-chamber flow area. The control variable α is stable from a maximum mesh size of 0.1 mm and 35 divisions in the z-direction.