

Flow fraction of power-law fluids in slit-like microfluidic channels for hydrodynamic focusing

정소현, 전명석†
한국과학기술연구원
(mschun@kist.re.kr†)

The understanding of power-law fluids is necessary due to its potential applications, including the biological, chemical, and pharmaceutical processes. The objective of this study is to analyze the flow fraction of power-law type non-Newtonian fluid in slit-like microfluidic channels. It is implemented to the design framework for flow-based particle sorting using microfluidic chips based on the hydrodynamic filtration (HDF) principle. Our chip is designed from complete analysis of laminar flow for flow fraction and complicated networks of main and multi-branched channels for cell particles sorted in three different subpopulations. The behavior of flow fraction for hydrodynamic focusing, defined as a ratio between the main and side flows, is examined with variations of power-law index as well as channel dimension. Our design analysis would control the optimum flow in microfluidic devices to achieve the highly efficient particle sorting.