

Analysis of residence time in continuous Taylor–Couette flow reactor

석승환, 박견주, 정재민, 김도현[†]

KAIST

(dohyun.kim@kaist.ac.kr[†])

Taylor–Couette reactor was simulated to control flow pattern in the gap between concentric cylinders during the rotation of the inner cylinder. When flow condition is above the critical Taylor number, flow regimes are changed from azimuthal flow to unique periodic vortex. In this study, we simulated transition of flow regime in both batch type and continuous type by using commercial software. From the flow simulation, we confirmed transition of the flow pattern depending on Taylor number. The simulation results were compared with experimental visualization. Flow regimes of different Taylor numbers agreed well with experimental results. For the application of continuous Taylor–Couette flow to the chemical reaction, residence time is one of the key factors for the chemical conversion. Residence time was analyzed in continuous Taylor–Couette flow by numerical simulation of particle trajectory.