

Unsteady mass transfer around an ellipsoidal droplet accompanied by interfacial extraction reaction of succinic acid

전상준, 홍원희*

KAIST

(whhong@kaist.ac.kr*)

Unsteady mass transfer in a single droplet system consisting of 1-octanol containing tri-octylamine(TOA)(continuous phase)/aqueous succinic acid(SA) solution(dispersed phase) was investigated while chemical reaction between SA and TOA occurs at the droplet interface. The basic physicochemical properties such as viscosity, density, and distribution coefficient were experimentally determined. These parameters are used for numerical simulation of hydrodynamic and mass transfer behavior of this system. The shape of droplet was observed to become oblate ellipsoid and kept the same shape without shape oscillation. The mean concentration of succinic acid inside droplet was measured varying the contact time with continuous phase. The concentration profile shows almost linearly decreasing trend, which is very similar with the case of physical mass transfer without reaction except that it decreases faster with increasing TOA concentration. Sherwood number calculated using this mean concentration is compared with numerical calculation results.