

Electrophoresis of Contact Charged Water Droplets in a Dielectric Fluid – Charging and Merging

오현창, 강인석*
포항공과대학교 화학공학과
(iskang@postech.ac.kr*)

When a water droplet is placed between two parallel DC applied electrodes in a dielectric fluid, an oscillatory motion is observed. It is because of contact charging phenomena occurring when the water droplet touches the adjacent electrode. Water droplet acquires charge from the electrode and finally it starts to move by Columbic force. Using this phenomenon, charging and controlling can be achieved simultaneously because electrodes not only make an electric field but also charge the drop. Therefore this whole process could be classified as smart electrophoresis. Recently, it has been studied in many points of view; amount of charging, charge distribution on the surface, however, double drop merging condition remains unacquainted. In this work, droplet merging conditions are investigated. As a result, merging probability diagram is established for field strength and size difference. As the electric field becomes stronger, merging probability decreases and as the relative size difference of two droplets becomes larger, merging probability also decreases.