

The development of a microfluidic chip by the electrophoresis of a charged droplet

유병선, 임도진, 강인석*
포항공과대학교
(iskang@postech.ac.kr*)

This work is a basic research for making microfluidic chip using the electrophoresis of a charged droplet (ECD). We have suggested the ECD as a novel microdroplet manipulation method. To show the feasibility of this method as a microfluidic chip application, we have designed an ECD chip system.

When an aqueous droplet suspended in a dielectric liquid contacts with electrified electrode, the droplet acquires charge. This charged droplet undergoes electrophoretic motion under strong electric field (1–3 kV/cm), which can be used as a droplet manipulation method. Because the actuation principle of ECD is simple, it is possible to make chip simply without complex and expensive chip fabrication like lithography. The ECD chip has been made of pin header which is cheap and commonly used in conventional electronics circuit designs. We have made a chip of 10 X 10 pin array. Each Pin is connected to a control circuit which can manage the power supply for applying electric field. We have demonstrated the movement of a water droplet by contacting electrified pin electrodes in this ECD chip. We hope the current work can be a basis for the development of ECD microfluidic chip.