

ELECTROKINETIC FLUID MANIPULATIONS IN MICROFABRICATED CHANNELS

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On microfabricated fluidic devices (microchips), a common method for moving materials through the channel manifold is electrokinetic transport, i.e., electrophoretic migration of ions and electroosmotic flow of bulk fluid. Electrokinetic transport is simple to implement and only requires electrical connections between the voltage source and microchip. Active control of the applied potentials enables picoliter to nanoliter volumes to be mixed or dispensed with high precision. As applications on these microchips become more varied, we are exploring ways to employ electrokinetic transport in alternative fluid handling scenarios. For example, we are using electrokinetic transport to move fluids through submicron channels, to generate hydraulic pressures, and to intersperse immiscible fluids. The design, fabrication, and testing of devices for such experiments will be discussed.

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