Localized Electrokinetic Transport in Microfluidic Channels

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A common method for moving materials through the channels of microfabricated fluidic devices (microchips) 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. The ability to control the electric potential at any point within a microfabricated fluidic network enhances the operability of the device. We have investigated several techniques for forming intrachannel electrical connections to effect electrokinetic manipulations. These connections allow small ion transport for electrical conduction but minimize or inhibit bulk fluid transport. Electroosmotically induced pumping and sample enrichment have been demonstrated using intrachannel connections.

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