High Efficiency Separations on Microchip Devices

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A variety of electrokinetically driven separation techniques including capillary electrophoresis, micellar electrokinetic chromatography, open channel electrochromatography, and gel electrophoresis has been successfully demonstrated on microfabricated fluidic devices (microchips). The dexterity with which materials can be manipulated and the ability to machine structures with interconnecting channels with essentially zero dead volume contribute to the high performance of these devices and enable coupling of multiple separation techniques. The separative performance of microchips measured per unit length is similar to or exceeds that found with conventional capillary separations. However, the absolute efficiency is lower primarily due to shorter separation lengths. As the separations performed on microchips become more challenging, higher absolute separation efficiencies are needed. Device design and experimental results for high efficiency and multidimensional separations on microchips will be discussed.

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