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Band Dispersion During Isoelectric Focusing in a Microchip PRASHANTA DUTTA, JAESOOL SHIM, CORNELIUS F. IVORY, Washington State University — Ampholyte based isoelectric focusing (IEF) is simulated for a two-dimensional horse shoe microchannel. Mobility correction for proteins and ampholytes are considered in the model because the mobility of both large molecules (proteins) and small molecules (ampholytes) varies with ionic strength in the IEF process. Four model proteins are allowed to focus in the presence of 25 biprotic carrier ampholytes in a horse shoe microchannel. Normalized variances of protein bands are calculated from numerical results using moment method. We particularly show dispersion behavior of proteins in IEF and discuss the differences between linear electrophoretic transports and nonlinear IEF in a horse shoe microchannel. Our numerical results show that protein spreading is induced by a turn during gradient formation stage, but the dispersed bands are rearranged and straighten as double peaks of a protein start to focus at the focal point. The rearrangement of spreading band is very unique compared to other linear electrokinetic phenomena (electroosmotic flow and capillary zone electrophoresis) and is independent of channel position and channel shape. Hence, one can perform the IEF to separate proteins in complex geometry without incorporating hyperturns.

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