Preconcentration of Proteins on Microchips for Enhanced Detection

Robert S. Foote, Yulia Khandurina, Stephen C. Jacobson, and J. Michael Ramsey
Oak Ridge National Laboratory, Oak Ridge, TN 37830

Microfluidic chips are typically loaded with sample volumes of ≥10 μL for analysis, whereas only ≤1 nL is normally injected into the microchip separation column. Preconcentration of the analyte in the injection volume allows a significant increase in signal strength. A microchip design incorporating a semiporous glass filter was used to electrokinetically concentrate proteins at the head of a separation column prior to injection and electrophoretic analysis. Experiments have shown protein signal enhancements of >100-fold for microchip analysis of both native and SDS-denatured proteins using this technique.