

CORE-BASED HYPERBRANCHED POLYETHYLENEIMINE COATING IN CAPILLARY ELECTROPHORESIS

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ABSTRACT

In capillary electrophoresis (CE), chemical and dynamic modification of a fused-silica surface can be used to control the electroosmotic flow (EOF), to minimize the interaction of analytes with the capillary surface and to modify the selectivity. Polyvalent, core-based hyperbranched polyethyleneimine (CHPEI) polymer utilized as either a static or dynamic coating in this study. A CHPEI-coated capillary was simply constructed in a rinsing fashion or by adding a small amount of CHPEI in a running buffer.

In CHPEI-coated capillaries, several parameters were studied as follows: (1) EOF as a function of buffer pH; (2) effect of coating media (NaCl solution) concentration; (3) effect of buffer concentration; and (4) stability and reproducibility of the coating. Since CHPEI25-coated capillary provides greater EOF stability, CHPEI25 was chosen for further studies. The performance of CHPEI25 dynamic-, static-, and hybrid-coated capillaries was investigated in the separations of phenols, basic amino acids, B vitamins, aniline and its derivatives.

The separation performance of CHPEI25 dynamic-coated capillaries were also compared to that of commercial eCAPTM capillary from Beckman Coulter. It is evident that CHPEI25 dynamic-coated capillary provides significantly improved peak resolution under identical separation conditions compared to that in eCAPTM.