

154e Sources of Temperature Non-Uniformity in Sds-Page

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Ion mobility in an electric field is highly temperature dependent. Therefore, local temperature non-uniformities in electrophoresis produce local changes in ion migration velocities, which diminish the predictability and reproducibility of the separation. The most well-known indication of temperature non-uniformities is the infamous “smile effect” often observed in SDS-PAGE, which is used as an indicator of local migration velocities. Sources of temperature non-uniformity are explored so that their influences on ion migration can be better understood and controlled. Three sources of temperature non-uniformity and their effects on the performance of SDS-PAGE are presented: (1) the cooling of gels (either by convection or conduction), (2) edge effects produced at the spacers, and (3) the temperature change across the stacking front in a discontinuous buffer system. The extent of these non-uniformities and their impact on ion migration are explored. Then, recommendations are made to minimize the non-uniformities in practice.