

Abstract Submitted
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Nonlinear waves in electromigration dispersion¹ SANDIP GHOSAL, ZHEN CHEN, Northwestern University — Electromigration dispersion occurs in CE when sample concentrations are sufficiently high. The signal is known to exhibit features such as sharp concentration “shocks” that are reminiscent of nonlinear waves. We consider a simplified 3 ion model consisting only of strong electrolytes that are equi-diffusive. The sample concentration is then shown to obey a one dimensional advection diffusion equation with a concentration dependent advection velocity which reduces to Burgers’ equation if the sample loading is not too high. Thus, the time dependent problem is exactly solvable with arbitrary initial conditions and in the case of small diffusivity concentration shocks are formed. Analytical formulas are derived for the shape, width, and migration velocity of the sample peak and it is shown that axial dispersion at long times may be characterized by an effective diffusivity that is exactly calculated.

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