

Abstract Submitted
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Travelling Wave Electrophoresis Due To Selective Currents At Electrodes¹ WILLIAM BOOTH, BOYD EDWARDS, Utah State University — Abstract Using COMSOL finite element modeling software we simulate a 2D traveling-wave electrophoresis (TWE) device for microfluidic chromatography and electrolyte concentration. A periodic array of four electrodes each produce AC potentials shifted by a quarter-period from one another. This yields an electric wave which travels down the channel. Ions of varying mobilities in solution are carried along with the electric wave or left behind at different rates. We employ a simplified model for asymmetric reactions at the electrodes in order to solve the issue of electric double layer shielding at the electrodes. The selective reactions allow for the formation of diffusion layers of ions which attempt to follow the traveling electric wave. We examine the formation of these diffusion layers and how various system parameters affect motion of various ions through the system. With easy control over the traveling electric wave's frequency and direction one may employ this method for concentrating or separating bands of electrolytes.

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William Booth
Utah State University

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