

Abstract Submitted  
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**Unsteady Transport of Bio-molecular Species in Nanochannels<sup>1</sup>**

ANKAN KUMAR, PRASHANTH RAMESH, The Ohio State University, CHRISTA BAKER, University of Pennsylvania, A.T. CONLISK, The Ohio State University — Unsteady simulation of species transport in Electroosmotic Flow (EOF) has been carried out for a three component system in a nanochannel. The third species is present in very small concentration compared to the main buffer which essentially causes the bulk velocity. The flux of any species is caused by Fick's diffusion, electrophoresis and bulk convection. The mutual balance between these driving forces determines the direction of the movement of the species as well as its transit time. For EOF in a channel with negatively charged walls, a negatively charged species may move in a direction opposite to the direction of bulk fluid flow. A positive species is transported in the direction of fluid flow and there is a significant decrease in transit time as compared to an uncharged or negatively charged species. The diffusion coefficient of large biomolecules is significantly reduced inside nanochannels. The unsteady transport problem then has multiple diffusive time scales. Results for concentration and species flux are presented for both charged and uncharged species.

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