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Electroosmosis in a potassium chloride aqueous solution in a silica nanochannel with counter-charged surface patches[1] HARVEY ZAMBRANO, MARIE PINTI, A.T. CONLISK, SHAURYA PRAKASH, The Ohio State University, COMPUTATIONAL MICRO- AND NANOFLUIDICS LAB TEAM, MICROSYSTEMS AND NANOSYSTEMS LAB TEAM — Controlling Electroosmotic flow (EOF) in nanochannel is important for several nano and bio-technology applications. In this work, the EOF is studied by conducting Non-Equilibrium MD Simulations (NEMDS) of an electrolyte confined in a silica nanochannel. having dimensions of 34.76 x 2.53 x 7.0 nm. We model a relatively long channel compared to other MD studies in order to investigate in detail the effect of the amorphous walls on the confined aqueous electrolyte. The system was studied as axial electric fields (AEF) were applied and as the surface charge (SC) was modified by implementing counter-charged patches (CP) on the channel walls. From the velocity profiles, a linear response of the system was observed. Smaller velocities were observed for the cases with increasing surface charge on the patches. Our velocities for the reference case with no patches (i.e. bare silica nanochannel) are in agreement with results from previous MD studies. We infer that ionic accumulation on the CP is responsible for the EOF velocity changes for systems with different CP and the same AEF applied. We show that by increasing the SC on a wall, the velocity field decreases monotonically.

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Harvey Zambrano
The Ohio State University

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