

Abstract Submitted
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Kinetics and Cross-Stream Migration of Polymer Solutions in Nanoscale Channel Undergoing Shear Flow¹ JAIME A. MILLAN, SIDY DANIOKO, MOHAMED LARADJI, University of Memphis — Polymer solutions confined to nanoscale slit pores are investigated in detail via generalized dissipative particle dynamics. We focus both on Poiseuille and planar Couette flows. In both cases, we investigated the effect of Schmidt number through the modification of both random and dissipative forces. The trend of the cross-stream migration of the polymer chains depends strongly on the value Schmidt number of the solution. In particular, we found a migration towards the walls for relatively low Schmidt number. However, polymer migration toward the channel centerline is observed for relatively high Schmidt number, in agreement with experimental observations and simulations based on other numerical approaches. The polymer chains kinetics is characterized by tumbling with well-defined characteristic time scale that decreases with increasing shear rate. The power spectra of both polymer stretch and tilt are in agreement with recent experiments.

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