

Abstract Submitted
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Submicron flows of polymer solutions HUGUES BODIGUEL, AMANDINE CUENCA, Université of Bordeaux - LOF — We study flow properties of high molecular weight polymer solutions below the micron scale. Fluorescence photobleaching is used as a non-invasive technique to evaluate the velocity of pressure-driven flows in channels from 100 to 4000 nm height. We observe a striking reduction of the effective viscosity of polyacrylamide solutions in the semi-dilute regime. This effect increases with molecular weight and concentration. Using a Rabinovitch-like approach, we correlate the data at different thicknesses to obtain the wall slip velocity and the flow curve at sub-microscale. Those properties are also evaluated using particle imaging velocimetry close to similar surfaces and standard rheometry. Comparing the measurements in bulk and in confined geometries, we conclude that the observed viscosity reduction can not be solely explained by slip-page. We discuss the possible reasons of this effect that are size-dependant filtration and shear-thinning enhancement due to the confinement.

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