

Particle Migration in Shear Thinning Viscoelastic Fluid

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Abstract : Despite growing interest of microparticle manipulation in non-Newtonian fluids, combined effect of viscoelasticity and shear thinning on particle lateral position is not well understood. We performed experiments with rigid microparticles of 15 μm diameter in popular Shear thinning viscoelastic (STVE) liquid polyethylene oxide (PEO) of different molecular weights (MW) and concentrations (c), for Reynolds number (Re) < 1 . Microparticles in an STVE liquid revealed four different migration regimes: original streamline (OS), bimodal (BM), centre migration (CM) and defocusing (DF), depending upon the Re and c and interplay of different forces is also elucidated. Our investigation will be helpful to select proper polymer concentration to achieve desired particle focusing inside microchannel.

Keywords : lateral migration, microparticle, polyethylene oxide, shear thinning, viscoelasticity

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