

Abstract Submitted
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Shear-induced fluid tracer diffusion in a semi-dilute suspension of spheres TAKUJI ISHIKAWA, TAKAMI YAMAGUCHI, Tohoku University — We calculated tracer diffusion in a sheared suspension of non-Brownian rigid spheres and propose a new numerical method based on a boundary element method and Stokesian dynamics method. We present details of the numerical method and examine the accuracy of the method. The limitation of semi-diluteness is due to the accuracy of tracer velocity calculation. The results show that the diffusivity of fluid tracers is greater than that of suspended spheres in the semi-dilute regime. The diffusivity of velocity gradient direction is about threefold greater than that in the vorticity direction. Simple scaling demonstrates that the diffusivity of fluid tracers increases with the square of the volume fraction of spheres in the semi-dilute regime, which is confirmed numerically.

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