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Dense suspensions in rotating-rod flows: normal stresses and particle migration. (English)

Zbl 1241.76008

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Summary: Normal stress differences are measured in dense suspensions of neutrally buoyant non-Brownian spheres dispersed in a Newtonian fluid. Rotating-rod rheometry is used to characterize the suspension normal stresses which are responsible for a rod-dipping phenomenon. These normal stress differences are seen to strongly increase above a volume fraction of approximately 22 %. During the course of the experiments, a new time-dependent behaviour is also observed: the dip is filled with increasing times. This time evolution is found to be related to particle migration from regions of high shear rate to regions of low shear rate. The behaviour is compared with the predictions of a suspension balance model in which the particle migration flux is related to the normal stresses of the suspension.

MSC:

76-05 Experimental work for problems pertaining to fluid mechanics
76T20 Suspensions

Cited in **1** Review
Cited in **35** Documents

Keywords:

particle/fluid flow; rheology; suspensions

Full Text: [DOI](#)

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