

Abstract Submitted
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Batch Sedimentation in Impulsively Heated nearly mono-disperse Viscous Multiphase Fluids¹ AMEYA JOSHI, THOMAS WARD, North Carolina State University — Suspensions of nearly mono-disperse spheres, subjected to impulsive-constant temperature heating from below, are studied in a batch sedimentation process. Experiments are performed on suspensions with a range of concentrations and different temperatures, to analyze the effects of varying temperatures on the rate of settling, shock formation and shock velocities. CCD imaging is used to observe and study the settling phenomenon. The Kynch theory of sedimentation (Trans. of Far. Soc., 1952) explains shock formation in low concentration suspensions and states that particle speed is completely determined by the local density only. We extend this study to include both heating and high concentration suspensions. Higher concentration suspensions (greater than 20%) are characterized by a single shock. Two distinct shocks are observed for all the experiments involving heating from bottom with an exception for the non-heated setup where only one shock is observed. Vortex patterns observed for the heated and the unheated case also show a substantial difference. The distinct vortex patterns produced in the suspension during settling are attributed to heating. The experiments suggest that other models may be more appropriate for high concentration studies.

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