

Abstract Submitted
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Jamming, Self-Filtration and Cake Growth in Concentrated Particle Suspensions YOUJING GUO, Chemical Engineering, Tongji University, Shanghai, SHOUBO LI, DONGLEI YANG, YONGLI MI, Department of Chemistry, Tongji University, Shanghai, XIAORONG WANG, Institute for Advanced Study, Tongji University, Shanghai, P. R. China — We study the flows of concentrated particle suspensions driven through a circular orifice. Above a critical concentration, a jammed structure (i.e., quasi-solid sphere) often forms in the flow and at the entrance of the geometrical constriction. Once occurred this jammed structure grows fast as time t passes and produces a reduction in the solid concentration downstream. Our analysis shows that a combination of the particle jamming, the self-filtration, and the cake-formation with the flow passing through the pores of the jammed solid is responsible for the occurrence of such phenomena. Based on this mechanism, we establish a mathematical model to show how the jammed structure is propagated. Our results suggest that the size D of the jammed structure in this case is proportional to a $1/3$ power of the time t . Experiments also support this conclusion.

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