Abstract Submitted
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Segregation modeling of binary suspensions STANY GALLIER, MATHIEU PLAUD, ArianeGroup — This study proposes a continuum model able to describe particle segregation in bidisperse non-colloidal suspensions. It is based on the Morris-Boulay suspension balance model [Morris and Boulay, J. Rheol., 1999] which has been here extended to two classes of particles with different sizes. Doing so gives rise to new quantities (basically, normal or shear viscosity by particle class) that are not available experimentally. Indeed, only the overall suspension normal and shear viscosity are reported and it is not known how they split with respect to particle size class. We therefore consider particle-resolved Stokes simulations of binary suspensions to address this point. Parametric simulations are conducted for different size ratio, total volume fraction and large/small fraction ratio. We show that both shear and normal viscosities are approximately proportional to volume fraction ratio. This allows to provide a simple closure for the model. It is then incorporated in a flow solver and successfully compared to available experiments of segregation in channel flows.

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