

Abstract Submitted
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A theory for density-driven segregation in flowing ternary granular mixtures VISHNU SAHU, SHIVANI AGRAWAL, ANURAG TRIPATHI, Department of Chemical Engineering , Indian Institute of Technology Kanpur 208016, India — We consider the case of ternary granular mixture of spherical particles of same size and different density, in a dense gravity-driven flow over a rough inclined plane. A continuum model for predicting steady state concentration profiles is presented using the segregation forces acting on the particles. The buoyancy force acting on the particle is given by Archimedes principle with an effective volume associated with the particle while the drag force is given by a modified Stokes law. The flow and segregation process are intercoupled and require the concentration profiles to be computed using an iterative method. The theoretical predictions from the momentum balance equations along with a mixture rheological model and current density segregation model are compared with DEM simulations. The steady state concentration profiles predicted are in good agreement with the DEM simulations results for a variety of compositions over a range of different inclination angles for different density ratios.

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