

Discrete Particle Simulation of Size Segregation of Particle Mixtures in a Gas Fluidized Bed

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Abstract

This paper presents a study of the mixing/segregation behaviour of particle mixtures in a gas fluidized bed by use of the discrete particle simulation. Spherical particles with diameters 2 mm (jetsam) and 1 mm (flotsam) are used as solid mixtures with different proportions of volume fractions. The particles are initially packed uniformly in a rectangular bed and then fluidized by gas uniformly injected at the bottom of the bed. The gas injection velocities vary to cover fixed, partially and fully fluidised bed conditions. Segregation/mixing behaviour is discussed in terms of flow patterns, solid concentration profile and mixing kinetics. The results show that segregation, as a transient fluidization process, is strongly affected by gas injection velocities for a given particle mixture. With the increase of the volume fraction of flotsam, size segregation appears at lower velocities. Concentration profiles and mixing index is calculated from simulation.