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Segregation and mixing in bidisperse liquid-fluidized suspension. ANGELIQUE DEBOEUF, Universite Paris6 and Laboratoire FAST, UMR 7608, GEORGES GAUTHIER, Universite Paris Sud and Laboratoire FAST, UMR 7608, JEROME MARTIN, CNRS and Laboratoire FAST, UMR 7608, DOMINIQUE SALIN, Universite Paris6 and Laboratoire FAST, UMR 7608 — We study experimentally the fluidization of a bidisperse suspension of macroscopic particles (150-160 microns and 180-200 microns glass beads), at low Reynolds number. With the help of an acoustic scanner, the measurement of the sound propagation (velocity and attenuation) at an appropriate frequency (3MHz), is continuously recorded along the bed. Those measurements are linked to the concentrations of the particles, and provide the composition, in time, of the suspension along the vertical axis. In our system, one may expect a segregation process induced by the different settling velocities, which should result in a stationary segregated state: a monodisperse suspension of small particles fluidized on top of a monodisperse suspension of large particles, with a transition zone enlarged by the mixing of particles due to hydrodydamic dispersion. However, no stationary state has been observed in our experimental system. In the investigated range of low injection rates, our fluidized bidisperse suspension exhibits oscillations between segregated and homogeneous states.

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