

The Segregative Behaviours of Non-Spherical Particles in Vibrated Granular Systems

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Abstract

Seregative processes in vibrated granular beds are well known to be sensitive to a variety of particle properties, including size, density, elasticity and shape. Of these parameters, the rôle of particle shape is perhaps the least well-understood. This is likely due in part to the ill-defined concept of ‘shape’, but also to the fact that non-spherical objects are significantly more difficult to model computationally, meaning that the vast majority of literature and theory in the field of granular physics concerns systems of purely-spherical particles. In this presentation, we discuss binary granulates comprising particles of various differing geometries, comparing their dynamical and segregative behaviours to those of bidisperse-by-size and bidisperse-by-density systems composed entirely of spherical grains. We show that not only can particle shape influence these behaviours, but can – under certain circumstances – become the dominant driving force behind segregation, even in systems where particles also possess significant disparities in mass and size.