

Abstract Submitted
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Random loose packing of rough spheres¹ GREG FARRELL,
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— We report experiments in which random loose packings of spheres are created by sequential deposition of monodisperse ($3.18\pm 0.05\text{mm}$) PMMA beads of high sphericity in a fluid. The deposition speed is controlled by varying the relative densities of the spheres and the fluid, as well as by varying fluid viscosity. As in the work of Onoda and Liniger, we find that the volume fraction of the sediment asymptotically approaches a lower limit as we approach neutral buoyancy. However, we find that deposition in increasingly viscous fluids has the same effect. We also study the effect on the packing of controlled chemical roughening of the surface of the spheres. The volume fractions attained can be significantly lower than the often-quoted volume fraction of 0.555 for random loose packing. Thus there is no unique volume fraction for the random loose packing of spheres; the measured volume fraction, even in the limit of slow deposition dynamics is determined by particle surface properties.

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