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How to predict polydisperse hard-sphere mixture behavior using maximally equivalent tridisperse systems[1] VITALIY OGARKO, STEFAN LUDING, University of Twente — Polydisperse hard sphere mixtures have equilibrium properties which essentially depend on the number density and a reduced number K of moments of the size distribution function. Such systems are equivalent to other systems with different size distributions if the K moments are matched. In particular, a small number s of components, such that $2s - 1 = K$ is sufficient to mimic systems with continuous size distributions. For most of the fluid phase $K = 3$ moments ($s = 2$ components) are enough to define an equivalent system, while in the glassy states one needs $K = 5$ moments ($s = 3$ components) to achieve good agreement between the polydisperse and its maximally-equivalent tridisperse system. With $K = 5$ matched moments they are also close in number- and volume-fractions of rattlers. Finally, also the jamming density of maximally-equivalent jammed packings is very close, where the tiny differences can be explained by the distribution of rattlers.

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