

Abstract Submitted
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Influence of adhesion on random loose packings of binary micro-particle mixtures¹ WENWEI LIU, SHENG CHEN, SHUIQING LI, Tsinghua Univ, KEY LABORATORY FOR THERMAL SCIENCE AND POWER ENGINEERING OF MINISTRY OF EDUCATION TEAM — Binary adhesive packings of microspheres with certain size ratios are investigated via a 3D discrete-element method specially developed with adhesive contact mechanics. We found a novel phenomenon that the packing fraction of the binary adhesive mixtures decreases monotonically with the increase of the amount of small components. It was further divulged that this behavior results from the competition between a geometrical filling effect and an adhesion effect. The positive geometrical filling effect only depends on the size ratio, while a dimensionless adhesion parameter Ad is employed to characterize the negative adhesion effect, which comes to its maximum at $Ad \approx 10$. Structural properties, including contact network, partial coordination number, radial distribution function and angular distribution function, are analyzed in order to give a better understanding of such adhesive binary packings.

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