Abstract Submitted
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An Experiment Study about Forces and Shapes of Liquid bridges for Micron-particles. HUANG ZHANG, SHUIQING LI, Department of Thermal Engineering, Tsinghua University, Beijing, China, DEPARTMENT OF THERMAL ENGINEERING, TSINGHUA UNIVERSITY, BEIJING, CHINA TEAM — Wet micro-particles are often encountered in the electrostatic precipitator and fiber filtration system. The liquid bridges formed between wet granules are leading to change the flow or packing behavior of micro-particles. Firstly, the magnitude of liquid bridge force between a micron-particle and a plate is measured by atomic force microscope (AFM). The AFM tip is adopted as the sphere tip instead of the sharp one. As the humidity increases, the shape of liquid bridge between this particle and the plate is observed by confocal laser scanning microscopy (CLSM). Secondly, a suspension containing micro-particles are painting on a plate to form particles layers. As humidity increases, AFM is used to measure the forces between the sphere tip and the micro-particles in the layers. At the same time, the shape of liquid bridges is observed to see whether the bridges are formed as pendular, funicular and capillary ones by CLSM. Finally, it is found out that liquid bridges are hardly existed below a critical humidity, and the force between particles also grows slowly. Beyond this critical humidity, a sudden increase of the liquid bridge force is exhibited. Liquid forces are also compared between different shapes of liquid bridges.

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