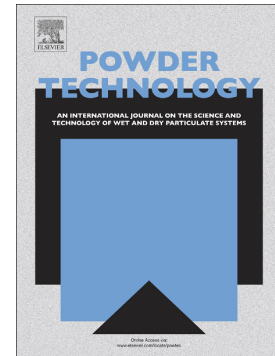


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**HYDROPHOBIC/HYDROPHILIC STATIC POWDER BEDS:
COMPETING HORIZONTAL SPREADING AND VERTICAL
IMBIBITION MECHANISMS OF A SINGLE DROPLET**

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ABSTRACT

There are two competing mechanisms of a single liquid droplet impacting on static powder beds, (see Figure 1). The d_h spreading describes the length the liquid droplet travels horizontally across the powder bed, whereas the d_v imbibition is the length the liquid droplet travels vertically into the powder bed.

In this work, results are presented from an experimental study of single liquid droplets of varying viscosities impacting static hydrophilic and hydrophobic powder beds. By using a high-speed video camera, the dynamics of the droplet spreading behaviour on static powder bed compacts was captured. The resultant nuclei were then analysed. Results show that the measured maximum d_h spreading diameter is less than the diameter of the resultant nuclei. This indicates that the d_h spreading of the liquid droplet continues to spread after complete imbibition in a late-diffusive intra-spreading process. This process refers to liquid movement driven by capillary forces in the powder beds and showed a higher degree of dependency on the liquid binder viscosity. The d_v imbibition length was found to be dependent on the

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