

Agglomeration and compaction of hydrophobic fine powder

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Agglomeration and compaction of hydrophobic powder using solution is an important technology. It is known that the most important aspect of these techniques is closely related with the particle wettability, but the mechanisms are not well-understood. In this study, the fundamentals of early stages of agglomeration and compaction were investigated. Drop of surfactant mixtures were deposited onto hydrophobic coal fines (angular shape, 20~ 120 μm). The wettability of coal fine was manipulated through the surface tension of the liquid, which was varied by the different types of hydroxyl functional group (-OH) compound and water ratio. On coal fine powder the droplet either penetrated into the porous bed (at low surface tensions and contact angles), or sit on the top and evaporates (at higher surface tension and contact angles). The compaction degree was measure by monitoring of the changes of initial volume of powder. The changes in bulk density were compared after compaction.