Prediction of minimum fluidization velocity in pulsed gas-solid fluidized bed

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Abstract

Abstract: Fluidized bed technology plays a vital role in petrochemistry and coal separation. To enhance fluidization stability, the flow is periodically introduced into the gas-solid fluidized bed to form a pulsed gas-solid fluidized bed. As the main fluidization parameter, the minimum fluidization velocity (umf) can reflect the change of the critical state of particles in the pulsed gas-solid fluidized bed, directly affecting the study of two-phase distribution in the bed. Due to lack of theoretical study on umf in pulsed gas-solid fluidized bed, the work proposed a novel method to predict umf comibined with soft sphere model. Meanwhile, the spring-damping and the resonance force models were established under the action of pulsating airflow. A theoretical model of umf was then derived for pulsed gas-solid fluidized bed based on experimental stress analysis of particles. The novel correlation is basically agreement with almost available data in the literatures and present work.

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