

## Accepted Manuscript

Particle agglomeration and control of gas-solid fluidized bed reactor with liquid bridge and solid bridge coupling actions

Yefeng Zhou, Qiang Shi, Zhengliang Huang, Jingdai Wang, Yongrong Yang

PII: S1385-8947(17)31264-0  
DOI: <http://dx.doi.org/10.1016/j.cej.2017.07.117>  
Reference: CEJ 17383

To appear in: *Chemical Engineering Journal*

Received Date: 23 January 2017  
Revised Date: 12 July 2017  
Accepted Date: 17 July 2017

Please cite this article as: Y. Zhou, Q. Shi, Z. Huang, J. Wang, Y. Yang, Particle agglomeration and control of gas-solid fluidized bed reactor with liquid bridge and solid bridge coupling actions, *Chemical Engineering Journal* (2017), doi: <http://dx.doi.org/10.1016/j.cej.2017.07.117>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



# Particle agglomeration and control of gas-solid fluidized bed reactor with liquid bridge and solid bridge coupling actions

Yefeng Zhou<sup>§#</sup>, Qiang Shi<sup>§</sup>, Zhengliang Huang<sup>§\*</sup>, Jingdai Wang<sup>§\*</sup>, Yongrong Yang<sup>§</sup>

<sup>§</sup> State Key Laboratory of Chemical Engineering and College of Chemical and Biological Engineering, Zhejiang University, Hangzhou 310027, P. R. China

<sup>#</sup> College of Chemical Engineering, Xiangtan University, Hunan Province, 411105, P. R. China

\*Corresponding Author: Zhengliang Huang E-mail address: huangzhengl@zju.edu.cn

\*Corresponding Author: Jingdai Wang E-mail address: wangjd@zju.edu.cn

Tel & Fax: +86-571-87951227

## Abstract

Fluidized beds reactors with liquid bridge and solid bridge coupling actions have been widely used in industry and thus studies of particle agglomerations under such fluidization conditions are of great significance. This work proposed an experimental apparatus combining electro-magnetic induction heating system with fluidized bed to simulate the real conditions for particle reaction heat release and heat transfer in industrial polymerization fluidized bed reactors. The effects of liquid content on agglomeration behavior of wax/graphite composite particles under different fluidization gas temperatures, gas velocities and heating powers have been studied. Through a force balance analysis of particles with liquid bridge and solid bridge coupling actions, relative solid bridge force was taken as a key parameter to demonstrate the effects of solid bridge force and other forces on agglomerations. Results showed that as the relative solid bridge force varied in different ranges, the agglomeration mass presented three different variation trends with liquid increases, namely monotonic increasing, non-monotonic changing and monotonic decreasing, due to different dominating agglomerating mechanisms (liquid evaporation and liquid bridge) during fluidization. According to the results of this study, the proposed criterion based on relative solid bridge force can be used to guide the regulation and control of particle agglomerations in fluidization with liquid bridge and solid bridge coupling actions.

## Key words

liquid bridge and solid bridge forces; fluidized beds; electro-magnetic induction heating; relative solid bridge force; meso-scale agglomeration; agglomerating mechanism

Download English Version:

<https://daneshyari.com/en/article/4762927>

Download Persian Version:

<https://daneshyari.com/article/4762927>

[Daneshyari.com](https://daneshyari.com)