

Accepted Manuscript

Effects of liquid action mechanisms on hydrodynamics in liquid-containing gas-solid fluidized bed reactor

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

PII: S1385-8947(15)01315-7
DOI: <http://dx.doi.org/10.1016/j.cej.2015.09.058>
Reference: CEJ 14214

To appear in: *Chemical Engineering Journal*

Received Date: 30 April 2015
Revised Date: 15 September 2015
Accepted Date: 17 September 2015

Please cite this article as: Y. Zhou, Q. Shi, Z. Huang, J. Wang, Y. Yang, Effects of liquid action mechanisms on hydrodynamics in liquid-containing gas-solid fluidized bed reactor, *Chemical Engineering Journal* (2015), doi: <http://dx.doi.org/10.1016/j.cej.2015.09.058>

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.



Effects of liquid action mechanisms on hydrodynamics in liquid-containing gas-solid fluidized bed reactor

Yefeng Zhou^{#§}, Qiang Shi[§], Zhengliang Huang[§], Jingdai Wang^{§*}, Yongrong Yang[§]

[#]College of Chemical Engineering, Xiangtan University, Hunan Province, 411105, P. R. China

[§]State Key Laboratory of Chemical Engineering and College of Chemical and Biological Engineering, Zhejiang University, Zhejiang Province, 310027, P. R. China

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

Tel & Fax.: +86-571-87951227.

Abstract

This study mainly investigated the effects of liquid evaporation and liquid bridge actions on hydrodynamics in liquid-containing gas-solid fluidized bed reactor (LGSFBR). A liquid flow-rate increasing process and a gas velocity decreasing process were studied by using temperature, acoustic emission (AE) and pressure fluctuation (PF) measurement techniques. When the liquid was added with lower flow-rates, particle circulation pattern was dominated by gas flow/liquid evaporation action, and thus particles display ascending at the center and descending near the wall (ACDW) with particle motion enhanced, meanwhile bubble sizes increased at the beginning and then decreased to steady values. With increasing liquid flow-rate or decreasing gas velocity, liquid bridge action relative to gas flow action intensity (LRGI) increased, and thus the particle circulation pattern gradually became dominated by the liquid bridge action. Specifically, the downward motion of dynamic particle agglomerations was enhanced while particle motion was weakened, and the gas bubble size was repressed gradually. Several unstable fluidization states would be caused by continuous increases in the liquid bridge action.

Key words: liquid-containing gas-solid fluidized bed reactor (LGSFBR); particle circulation pattern; liquid evaporation and bridge action; agglomerations; temperature profile

Download English Version:

<https://daneshyari.com/en/article/6583273>

Download Persian Version:

<https://daneshyari.com/article/6583273>

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