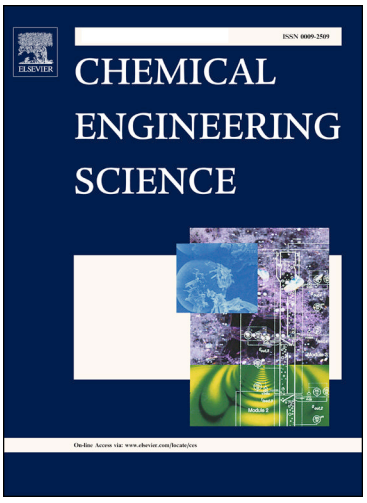

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PII: S0009-2509(18)30174-X
DOI: https://doi.org/10.1016/j.ces.2018.03.040
Reference: CES 14114

To appear in: *Chemical Engineering Science*

Received Date: 6 December 2017
Revised Date: 12 February 2018
Accepted Date: 23 March 2018

Please cite this article as: T. Yang, S. Geng, C. Yang, Q. Huang, Hydrodynamics and mass transfer in an internal airlift slurry reactor for process intensification, *Chemical Engineering Science* (2018), doi: https://doi.org/10.1016/j.ces.2018.03.040

Hydrodynamics and mass transfer in an internal airlift slurry reactor for process intensification

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Abstract

By combining the prominent advantage of directional fluid flow in an internal airlift loop reactor with the cheap cost of liquid-solid separation in a hydrocyclone, a new slurry reactor for process intensification integrating solid catalytic reactions with liquid-solid separation for clear liquid products is proposed and designed to cut down the capital and operating costs. The reactor can be operated properly when the superficial gas velocity is above 0.0108 m/s, and the solid particles of aluminum oxide are all retained in the slurry reactor if the particle diameter is larger than 57.9 μm. The influences of superficial gas velocity and top clearance on the performance of hydrodynamics and mass transfer in the gas-liquid two-phase and the gas-liquid-solid three-phase systems are measured and discussed systematically, and some data base

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