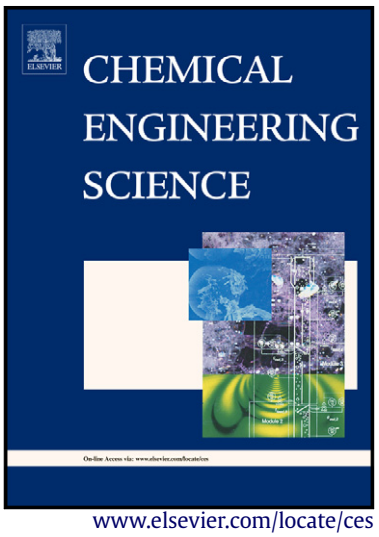

www.elsevier.com/locate/ces

Study on mass transfer of Droplets in narrow space

Huyuan Hu, Jianchao Lee, Ming Wang, Na Xu, Han Chen, Qiannan Duan, Liping Wang

PII: S0009-2509(15)00346-2
DOI: http://dx.doi.org/10.1016/j.ces.2015.05.022
Reference: CES12357

To appear in: *Chemical Engineering Science*

Received date: 9 October 2014
Revised date: 12 March 2015
Accepted date: 13 May 2015

Cite this article as: Huyuan Hu, Jianchao Lee, Ming Wang, Na Xu, Han Chen, Qiannan Duan, Liping Wang, Study on mass transfer of Droplets in narrow space, *Chemical Engineering Science,* http://dx.doi.org/10.1016/j.ces.2015.05.022

Study on Mass Transfer of Droplets in Narrow Space

Huyuan Hu, Jianchao Lee*, Ming Wang, Na Xu, Han Chen, Qiannan Duan, Liping Wang

(Department of Environmental Science, Shaanxi Normal University, Xi'an, 710062 China)

*Correspondence author, E-mail: jianchaolee@snnu.edu.cn

Abstract

Combinatorial or high-throughput experimentation are improving numerous scientific domains intensely, such as biological chemistry, material science, catalysis. In the past research, most of researchers focus on the novel configuration and microfabrication rather than the transfer mechanism in the microcosm. In this study, we proposed a mass transfer model among droplets in a narrow space. In the derivation, the molecular mass flow rate (J_M) formula was used to calculate droplet mass transfer rate, which was controlled by the concentration gradient of the surface vapor pressure (P_S) near the droplets. Especially, in the simplification of the expression of the simulating results, all droplets were divided into groups following their radii subtly. In order to assess the accuracy and predictive capability of the proposed model, we carried out some designed experiments to investigate distribution and size changes of the droplets at different temperatures and times. After capturing and analyzing the images of the droplets gathering on a hydrophobic glass slide in an airtight narrow space, we verified the