

## Accepted Manuscript

Extremum Characteristics of Energy Consumption in Fluidization Analyzed by Using EMMS

Mengjie Du, Shanwei Hu, Jianhua Chen, Xinhua Liu, Wei Ge

PII: S1385-8947(18)30267-5  
DOI: <https://doi.org/10.1016/j.cej.2018.02.065>  
Reference: CEJ 18544

To appear in: *Chemical Engineering Journal*

Received Date: 17 December 2017  
Revised Date: 11 February 2018  
Accepted Date: 12 February 2018

Please cite this article as: M. Du, S. Hu, J. Chen, X. Liu, W. Ge, Extremum Characteristics of Energy Consumption in Fluidization Analyzed by Using EMMS, *Chemical Engineering Journal* (2018), doi: <https://doi.org/10.1016/j.cej.2018.02.065>



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.

## Extremum Characteristics of Energy Consumption in Fluidization

### Analyzed by Using EMMS

Mengjie Du<sup>1,2</sup>, Shanwei Hu<sup>1</sup>, Jianhua Chen<sup>1,\*</sup>, Xinhua Liu<sup>1,\*</sup>, Wei Ge<sup>1,2</sup>

<sup>1</sup>*State Key Laboratory of Multiphase Complex Systems, Institute of Process Engineering,*

*Chinese Academy of Sciences, Beijing 100190, China*

<sup>2</sup>*School of Chemistry and Chemical Engineering, University of Chinese Academy of Sciences,*

*Beijing 100049, China*

*\*Corresponding authors, E-mail: jhchen@ipe.ac.cn, xhliu@ipe.ac.cn*

### Abstract

This paper investigates the landscape of extremum characteristics for different energy consumption terms in gas-solid fluidization based on the Energy Minimization Multi-Scale (EMMS) model. The influence of typical cluster correlations on the extremum characteristics is also investigated to consolidate the study results. The energy consumption terms are resolved into three types, i.e. suspension (“s”), transport (“t”) of the particles and pure dissipation (“d”) caused by their collisions and acceleration. Three regimes which are particle dominant (PD), fluid dominant (FD), and particle-fluid compromising (PFC) respectively subject to the extrema of  $\varepsilon = \min$ ,  $W_{st} = \min$  and  $N_{st} = \min$ , are investigated. Then the same procedure is extended to individual and combined terms (i.e. “s”, “t”, “d”, “s + t”, “t + d”, “d + s”) of energy consumption with respect to unit mass of particles (“ $N$ ”) and to unit volume of bed (“ $W$ ”). The study of extremum characteristics reveals an enclosure structure which features an upper voidage regime corresponding to minimum energy dissipation rate (MinED), a lower voidage regime to maximum energy dissipation rate (MaxED) and a so-called mesoregime in between. The landscape of extremum characteristics reveals that the stability condition must be constructed according to clear

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات