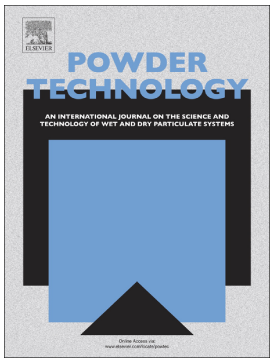

Balance and stability between particle collection and re-entrainment in a wide temperature-range electrostatic precipitator

Chenghang Zheng, Chengsi Liang, Shaojun Liu, Zhengda Yang, Zhiyang Shen, Yishan Guo, Yongxin Zhang, Xiang Gao

PII: S0032-5910(18)30783-6
DOI: doi:10.1016/j.powtec.2018.09.056
Reference: PTEC 13730

To appear in: *Powder Technology*

Received date: 6 June 2018
Revised date: 27 August 2018
Accepted date: 20 September 2018

Please cite this article as: Chenghang Zheng, Chengsi Liang, Shaojun Liu, Zhengda Yang, Zhiyang Shen, Yishan Guo, Yongxin Zhang, Xiang Gao , Balance and stability between particle collection and re-entrainment in a wide temperature-range electrostatic precipitator. Ptec (2018), doi:10.1016/j.powtec.2018.09.056

Balance and stability between particle collection and re-entrainment in a wide temperature-range electrostatic precipitator

Chenghang Zheng, Chengsi Liang, Shaojun Liu, Zhengda Yang, Zhiyang Shen, Yishan Guo, Yongxin Zhang, Xiang Gao*

State Key Lab of Clean Energy Utilization, State Environmental Protection Center for Coal-Fired Air Pollution Control, Zhejiang University, Hangzhou 310027, China

*Corresponding author: xgao1@zju.edu.cn

Abstract

In an electrostatic precipitator, particles migrate to the collecting plates through electrostatic force. Simultaneously, the effect of gravity and hydrodynamic drag force will cause these particles to vacate the plates. Emission concentration and removal efficiency gradually stabilize after the particles pass through multiple electric fields, and this stability value determines the high limit of electrostatic precipitation capacity. In this study, the balance between particle electrostatic trapping and air re-entrainment was investigated through a closed-loop electrostatic precipitator system, and the behavior of the particles deposited into the collecting plates was qualitatively analyzed. The particle emission concentration was reduced significantly when residence time was within 40 s. The particle concentration reached its limit and remained relatively stable after remaining stable for 100 s in the electric field. The applied voltage, velocity of flow, and temperature are the influencing factors considered in this study, here it was found that the decreased flow velocity,