

Dynamic Modeling and Analysis of an Industrial Gas Suspension Absorber for Flue Gas Desulfurization - DTU Orbit (08/11/2017)

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In this work, semidry desulfurization of flue gas using a gas suspension absorber (GSA) is studied. A simple dynamic model which can properly represent the GSA was developed. In order to model the reaction kinetics, an empirical reaction rate expression was introduced. The reaction rate expression parameters were fitted to operational data from a real cement plant. A detailed statistical analysis of the parameter estimation procedure was performed, and the confidence intervals for estimated kinetic parameters were calculated. The model and reaction rate expression prediction ability was tested using another plant data set. It was verified that in spite of the simplicity of the model, very good prediction of industrial behavior was obtained. Furthermore, the dynamic analysis of the system was performed by carrying out open-loop and closed-loop simulations to verify plant dynamics. Therefore, a simple dynamic model with a reaction rate expression that is simple and efficient to use to predict the dynamics of GSA process was proposed in this work.

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Authors: Cignitti, S. (Intern), Mansouri, S. S. (Intern), Sales-Cruz, M. (Ekstern), Jensen, F. (Ekstern), Huusom, J. K. (Intern)

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