

Thermodynamic Model for the Waelz Kiln

BRUNO HENRIQUE REIS¹, NESTOR CEZAR HECK²

¹ *Metallurgical Engineering, PPGE3M, UFRGS, Porto Alegre, Brazil.*

² *Center for Computational Thermodynamics, UFRGS, Porto Alegre, Brazil*

ABSTRACT

The electric arc furnace dust (EAFD) is a by-product of the steel industry due to its high content of Zn. Thus, technologies have been developed aiming for its use, and the Waelz Kiln is the most widespread of them today.

However, counting on a very large rotary kiln that houses an infinity of physio-chemical phenomena, its operation is difficult to predict ab initio. For this reason, this work uses an advanced tool of computational thermodynamics, designed to process modelling, called SimuSage in order to model its behavior.

To create the model, a thermodynamic database coming from the FactSage software and the Lazarus platform were also used. Based on operational data and results from de literature, it was possible to perform simulations on adiabatic mode and compare its results with the industrial practice.

A high sensibility of the model was found related to the amount of input air considered in the system, but also good approximation of results regarding the chemical composition of products, Waelz Oxide and Waelz Slag.