

Integrating Thermochemistry into the Plant with Ex Mente ProcessSolution

*Johan H. Zietsman, Jacques Muller
Ex Mente, Centurion, South Africa.*

ABSTRACT

The work described in this paper aims to improve the performance of metallurgical process units by integrating process tools, that utilize some of the computational thermochemistry products developed by GTT-Technologies, into the plant infrastructure.

This was done by first creating a robust framework, named Ex Mente ProcessSolution or *EMPROCESSSOLUTION*[™], within which industrial process applications can be developed.

Subsequently a process application, named Ex Mente ProcessAnalyser or *EMPROCESSAnalyser*[™], was created by using some of the GTT-Technologies thermochemistry products.

The process application was created with two concepts in mind. The first concept was interactive process tools, and the second concept was automated process tools. The purpose of the interactive process tools was to give plant engineers and operational personnel access to practical process tools that are directly relevant to their operation, and that are easy to use. These tools include phase diagrams and other property diagrams, material property calculators (e.g. to calculate properties such as viscosity, liquidus temperature, refractory wear capacity, etc.), and process models (e.g. mass and energy balances, dynamic process models, predictive models, etc.).

The second concept, automated process tools, aims to create process tools that run automatically in the background to respond to changes that influence the process to ensure that the process keeps performing well. These tools can include process models for estimating process states, recipe calculators for calculating feed set-points and various other types that utilize computational thermochemistry and process knowledge to improve the performance of the plant.

The EMPROCESSAnalyser[™] process application aims to achieve the following:

- improve process insight by giving personnel access to relevant process tools;
- improve continuity by embedding important process knowledge into the plant;
- improve consistency by giving all personnel access to the same set of tools, and by automating important process calculations;
- improve product yield, reduce raw materials and energy consumption, and improve productivity by optimizing process recipes.