

The importance of thermodynamics for business intelligence tools

Sander Arnout

InsPyro, Leuven, Belgium

Business intelligence tools translate data into information, and can be especially valuable in metallurgical plants. Indeed, a continuous stream of process data is often available, without conclusive information being led to all relevant personnel. Besides analyzing past behavior, real intelligence also requires the ability to make decisions, based on the prediction of expected performance. This can be achieved by integrating data management with process and flow sheet modelling. The use of models ensures a closed mass and energy balance, as well as explicit and calibratable assumptions. Furthermore, virtual instruments can be created, even in places where measurements are cumbersome or impossible. Thermodynamics have an important role in these process models, because of their predictive response to changes, even outside the normal operating window. This gives the process owner a large additional flexibility. The possibility to pre-assess materials before treating them, and to see the effect of settings changes before applying them, is important to keep the process in stable conditions and is therefore also a matter of safety. As a results, chemical equilibria, melting behavior, etc. are highly important to select optimal process settings, as well as to determine potential margins when treating new materials.