

THERMODYNAMIC MODELLING OF THE SLAG BEHAVIOUR IN AN ENTRAINED FLOW GASIFIER

J. van Dyk* and T Eastland

jvandyk@gti.energy, +27825500473

The AFT of carbon sources (coal, biomass, waste, etc.) is one of the parameters currently widely used controlling gasifier stability, ash fusibility and melting characteristics, as well as to predict the melting behavior of the ash in coal conversion processes. The AFT of a coal source gives an indication of the extent to which ash agglomeration and ash clinkering are likely to occur within the gasifier. It has been demonstrated that ash flow temperature can be correlated with FACT™ EQUILIB calculations.

FACT™ is currently being applied as a unique inorganic simulation tool in predicting and optimization of gasification processes, and specifically to R-Gas® and other entrained flow gasification technologies, for slag viscosity predictions and slag profile quantification.

As R-Gas® is not a refractory lined gasifier or a temperature limit operational controlled gasifier like the Shell and Siemens process, the aim of this study / investigation will be to (try) and use the FACT™ EQUILIB output data to link to a droplet energy or factor correlating with the droplet energy and surface tension.

This idea is novel and unique and under investigation by also the software developing party GTT, with the limitation that they do not have the operational or pilot data that GTI has available to conduct a study like this. As mentioned by GTT, this is a very important topic or databases development need. For the GTI and R-GAS® technology this will directly give a control handle on the slag outlet and tapping, and with “difficult” coal types like Indian coal, a better tool to control and predict.