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Title:

Reducing energy consumption by alternative processing routes to produce ferrochromium alloys from chromite ore

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ABSTRACT:

The carbothermic reduction of chromite ore to produce high carbon ferrochromium is among the most energy intensive metal extraction processes performed, due not only to the highly endothermic nature of the reduction reactions but also the very high operating temperatures required for the smelting operation to separate the chrome-containing alloy from the discard slag.

KWG Resources and XPS have collaborated over the last 3 years in developing a patented processing alternative to the traditional smelting operation in which all processing takes place in the solid state at temperatures many hundreds of degrees lower than those required for liquid processing. Amongst the attractions of the process are much lower capital costs, as well as reduced operating costs, particularly of energy.

A techno-economic study on the new process identifies a reduction in overall energy consumption of 80% against conventional processing and approximately 40% lower than the current best practice. By utilising more natural gas than coal based energy sources, the KWG process is able to show an overall 50% reduction in greenhouse gas emissions compared with the most energy efficient current practice. The impact of the new process on future processing is therefore regarded as highly significant, with global energy reductions equivalent to the effect of completely eliminating energy demand from a country the size of Italy.

The study concluded that the potential for this process to completely revolutionise the global ferrochrome industry should not be underestimated. Its impact reaches far beyond exploitation of a regional natural resource.