Leachate Characteristics of Coal Ash Residues from a Laboratory-Scale Brine Gasification Simulation Process

Mooketsi O.I, Matjie R.H. and Ginster M.

Water & Environmental Technology, Sasol Technology (Pty) Ltd; R&D,
P.O Box 1, Sasolburg, 1947, South Africa

KEYWORDS: DIN 38414-T4, salt stabilization, sintering

ABSTRACT

Sasol, a global player in the production of fuels and chemicals uses coal, steam and oxygen for syngas production. Inevitably, large amounts of waste products such as brines and ash are generated via the demineralization and gasification processes, respectively. Sasol Technology R&D is currently investigating the concept of brine (inorganic salts) encapsulation via gasification. The process will involve injection of brine into a gasifier, during which the inorganic salts would react with the coal mineral matter under thermal conditions to form stable compounds, potentially resulting in an environmentally safe brine disposal option. Laboratory-scale experiments investigated brine addition at 3.5% (m/m) and 29% (m/m) to coarse gasification coal ash (with and without CaO addition). These samples were sintered at 700 °C for 30 or 60 mins. Selected ash residues from laboratory-scale brine gasification simulations were subjected to water leaching tests to determine the leachate properties, the extent of salt stabilisation achieved as well as the influence that CaO addition had on inorganic salts encapsulation. The results of the study indicated that some of the ionic species in the brine were stabilized successfully and that the addition of CaO improved stabilization.

Submitted for consideration in the World of Coal Ash 2007 Conference, held May 7-10, 2007.