

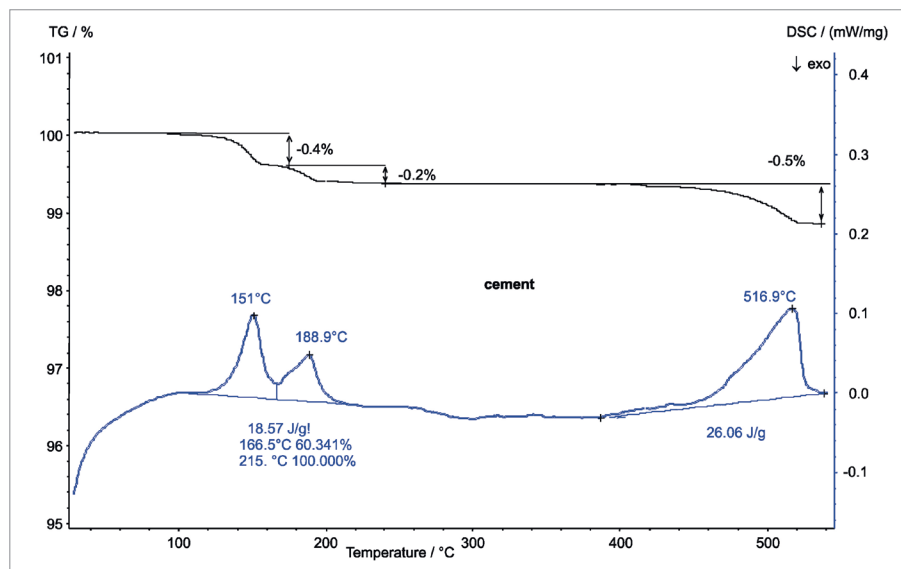
APPLICATION SHEET

INORGANICS – BUILDING MATERIALS

CEMENT / GYPSUM

Portland cement is the most common type of cement. It consists of a mixture of oxides of calcium, silicon and aluminium. The main phases are tricalcium silicate (C3S), dicalcium silicate (C2S), tricalcium aluminate (C3A) and a ferrite phase C4AF. Portland cement is produced by

heating of limestone with clay and/or sand up to about 1480°C. To the resulting clinker, 4-5% gypsum is mixed and then grinded and milled to a fine grain size. The additives gypsum, anhydrite etc. influence the setting time of the cement.



Instrument

STA 449 C Jupiter®

Test Conditions

Temperature range	RT... 550°C
Heating/cooling rates	10 K/min
Atmosphere	Air at 50 ml/min
Sample mass	39,5 mg
Crucible	Al with 50 µm hole
Sensor	TG-DSC type S

Results

The separation and quantification of calcium sulfate dihydrate (DH) and hemihydrate (HH) in cement samples is only possible when a certain water vapor pressure over the sample can be created. A possibility is to use closed aluminum crucibles with a small pinhole of about 40 µm to 50 µm. From the TG curve, the DH amount can be calculated to 2.5% and the HH amount to 1.8%. The TG step (0.5%) starting at about 420°C is due to the decomposition of $\text{Ca}(\text{OH})_2$ (content approx. 2.2%).