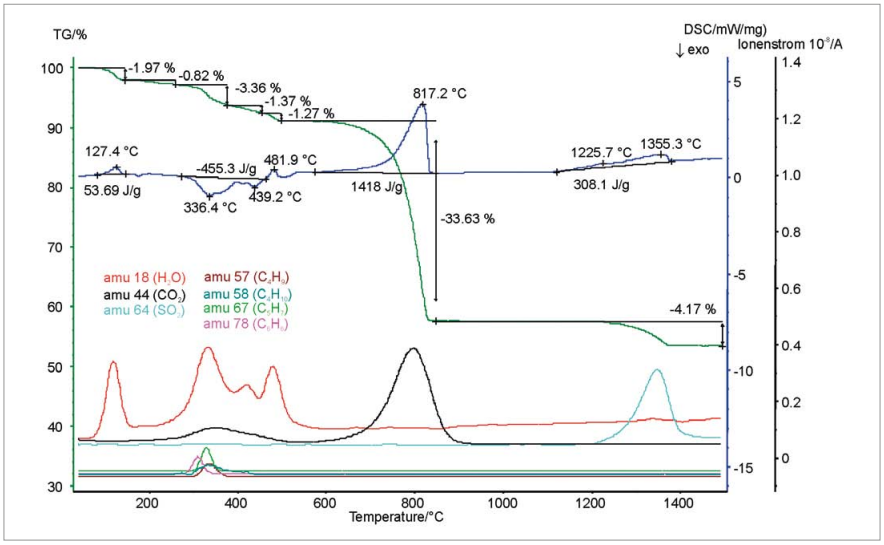
APPLICATION**SHEET**

CERAMICS – BUILDING MATERIALS

CEMENT RAW MATERIAL

Building materials such as bricks or cement are classical application fields for thermal analysis coupled to mass spectroscopy. Cement raw materials are mostly complex mixtures of ceramic components like gypsum and calcium carbonate. Organic components, however, can also be present. Thermal analysis together with mass spectroscopy enables on the one hand to investigate and to quantify the different components of the raw material and also features a tool for the simulation of the manufacturing process of the later building material on the other.



Instrument

STA 449 C *Jupiter®* – *QMS 403 Aëolos®*

Test Conditions

Temperature range	RT … 1500°C
Heating/cooling rates	10 K/min
Atmosphere	Synth. air at 70 ml/min
Sample mass	16.06 mg
Crucible	Pt with pierced lid
Sensor	TG-DSC type S

Results

Using Simultaneous thermogravimetry (TG), Differential Scanning Calorimetry (DSC) and mass spectroscopy (MS), a cement raw material was studied. Upon heating to 1500°C, several mass-loss steps as well as endothermal and exothermal effects were observed. The mass spectrometer signals allow for identification of the evolved gases and thus of the components of the cement raw material. H_2O was released most probably from gypsum at low temperatures and from $Ca(OH)_2$ at ~480°C. In the temperature range between ~300°C - 400°C, organic components were partially decomposed and burned which can be concluded from the mass spectrometer signals as well as from the exothermal DSC peaks. At ~800°C, the evolvement of CO_2 indicates the decomposition of $CaCO_3$ while SO_2 indicates the decomposition of $CaSO_4$ at highest measuring temperatures.

NGB · AS · 014-2006 · EN · 06/13 · Technical specifications are subject to change.

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