

## Hydration of two calcium sulfates (plaster and anhydrite III)

### INTRODUCTION

- Four forms of calcium sulfate are known : dihydrate  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$  (gypsum), hemihydrate  $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$  (plaster) and two anhydrites  $\text{CaSO}_4$  : natural and insoluble anhydrite and soluble anhydrite III (obtained by heating plaster to  $200^\circ\text{C}$ ).
- Plaster and anhydrite III, which are soluble in water , are used in the building industry, because of their setting properties.
- Mixing calorimetry is a particularly interesting method for the study of short-term and long term heat effects during the setting of calcium sulfates.

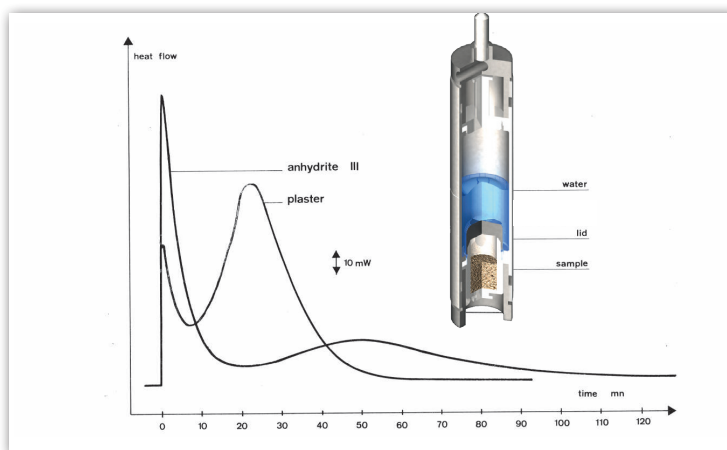
### EXPERIMENT

Samples : 1) Plaster (625 mg) + Water (500 mg)

2) Anhydrite III (625 mg) + Water (500 mg)

Crucible : Reversal mixing cell

Heating mode : Isothermal  $28^\circ\text{C}$



### RESULTS AND CONCLUSION

At initial time, sample and water are separated by a lid in the mixing cell.

The mixing of the two compounds is carried out by reversing the calorimeter.

Two stages can be seen on the recorded thermograms :

. short term dissolution of the sample in water

. longer term setting of the mixture (hydration)

The rate of setting can be characterised by the time (to reach the top of the hydration peak.

Thus setting of plaster ( $t_{1/2} = 25 \text{ min}$ ) is faster than the setting of anhydrite ( $t_{1/2} = 50 \text{ min}$ ).

### INSTRUMENT

#### CALVET

Ambient to  $300^\circ\text{C}$



#### HIGHEST HEAT MEASUREMENT ACCURACY

3D sensor based on thermocouples with Joule effect calibration.

#### ISOTHERMAL OR TEMPERATURE SCANNING MODES

for increased flexibility and replication of real life conditions

#### CONVENIENT INTERCHANGEABLE CRUCIBLES AND CELLS

to perform even the most demanding experiments using one instrument :

- high pressure (1000bar) and high vacuum
- pressure measurement and control
- mixing/stirring experiments.

#### EXTERNAL COUPLING CAPABILITY

designed to increase your research options including manometry, BET instrumentation, gas analyzers, humidity controllers and gas panels