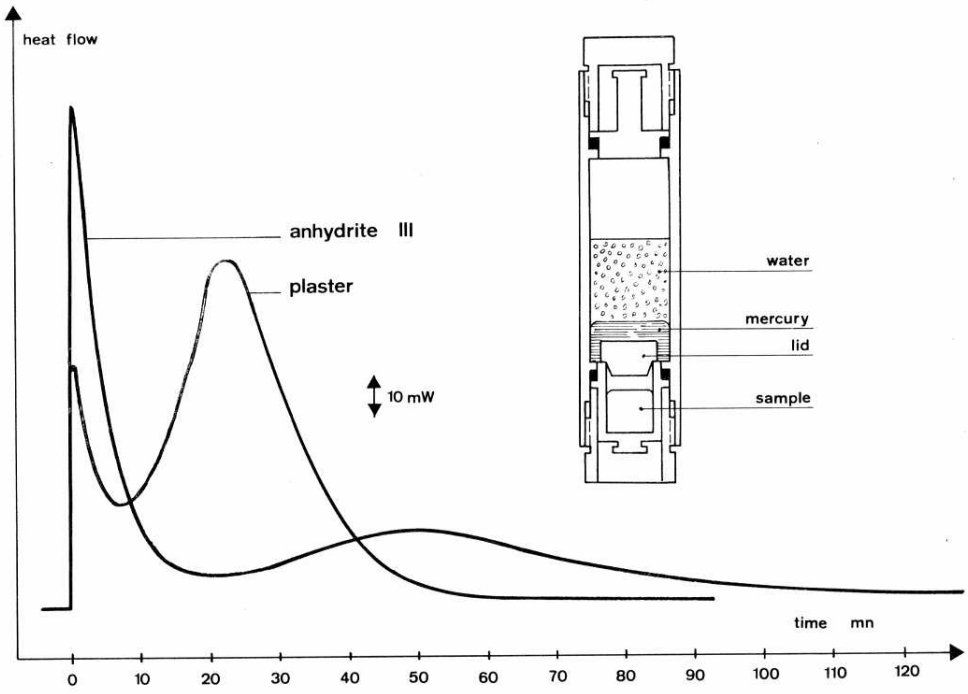
Hydration of two calcium sulfates (plaster and anhydrite III)

Introduction:

Four forms of calcium sulfate are known : dihydrate $CaSO_4$, $2H_2O$ (gypsum), hemihydrate $CaSO_4$, ½ H_2O (plaster) and two anhydrites CaSO4 : natural and insoluble anhydrite and soluble anhydrite III (obtained by heating plaster to 200°C) .

Plaster and anhydrite III, which are soluble in water , are used in the building industry, because of their setting properties.

Calorimetry is an interesting method for studying the setting of calcium sulfates.



Experimental:

Samples : 1) Plaster (625 mg)
2) Anhydride III (625 mg)
3) Water (500 mg)

Crucible : Reversing mixing cell

Heating mode : Isothermal 28°C

Instrument:
C80
Ambient up to 300°C

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 are seen on the recorded thermograms :

. dissolution of the sample in water

. setting of the mixture (hydration)

The setting can be characterised by the half crystallization time (at the top of the hydration peak).

In this case the setting of plaster (t1/2 = 25 min) is faster than that of anhydrite (t1/2 = 50 min).