

VALORISING AN INDUSTRIAL RESIDUE TOWARDS A CALCIUM SULFOALUMINATE CEMENT

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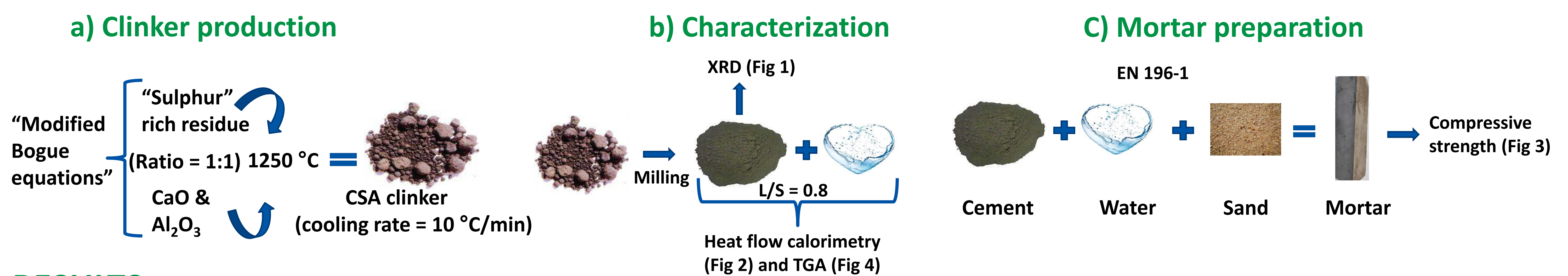
ABSTRACT

In this paper an unexplored industrial residue generated as a slurry during the acid leaching of Zn metal (Jarosite) is studied. Due to the presence of the high sulphur content, this residue might be a suitable candidate in making Calcium sulfoaluminate cement (CSA). The primary objective is to produce therefore a CSA clinker from these industrial residues, by following the necessary thermal treatment in order to transform the unreactive industrial residue into a CSA cement. The reactivity of the clinker was assessed by thermogravimetric analysis (TGA) and heat flow calorimetry. The compressive strength of the 100% CSA mortar was also evaluated and compared with Ordinary portland cement (OPC) reference mortar.

INTRODUCTION



METHODS AND MATERIALS



RESULTS

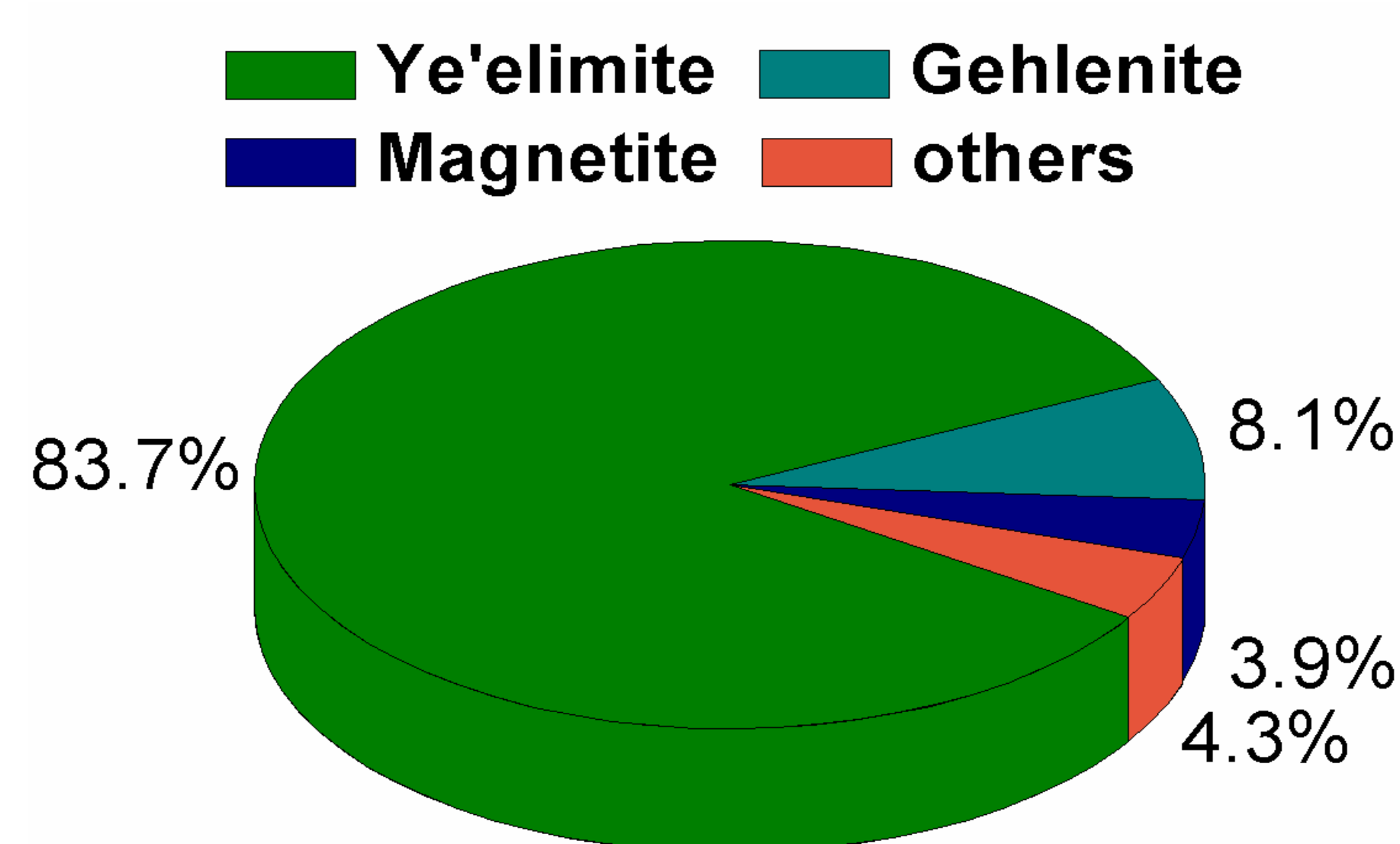


Figure 1: XRD analysis of synthesized CSA clinker

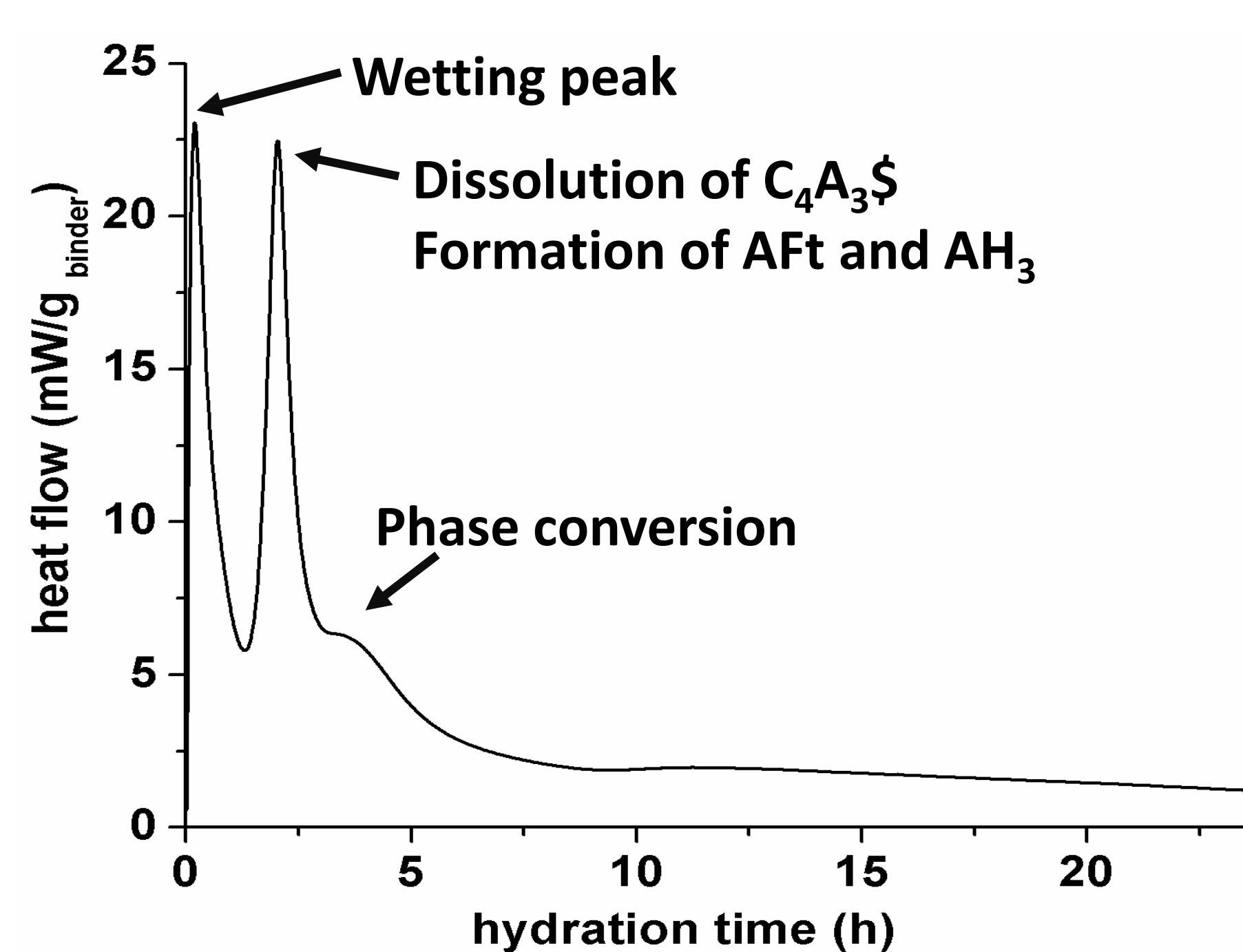


Figure 2: Calorimetry curve of hydrated paste

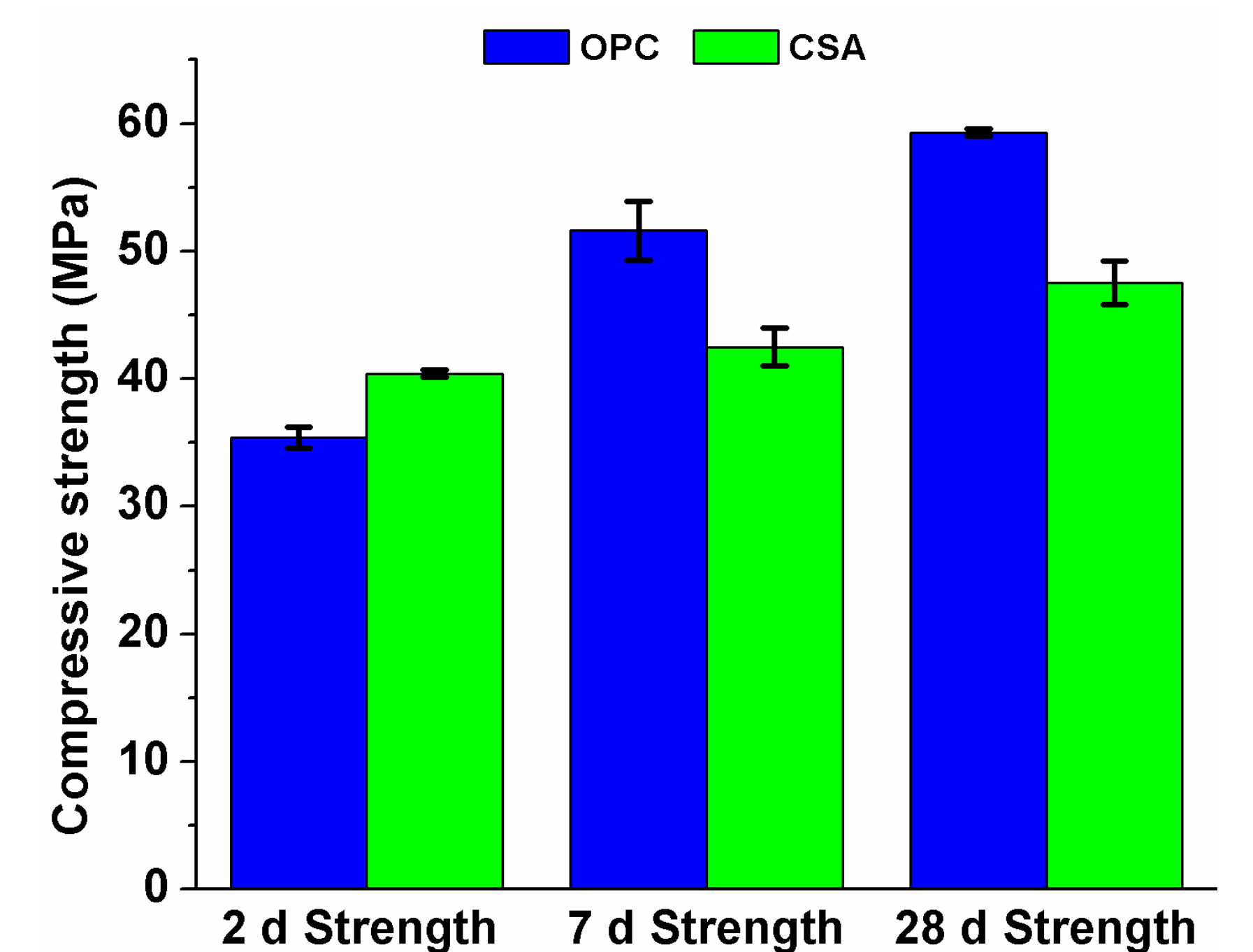


Figure 3: Mechanical properties of mortars

CONCLUSIONS

- ✓ "Sulphur" rich industrial residue was thermally processed at 1250 °C, leading to a ye'elimite-rich, highly reactive CSA cement.
- ✓ TGA analysis on the hydration products of the 28 d CSA cement showed the presence of AFm, AFt and AH₃ phases.
- ✓ C₄A₃S phase reacts with H₂O to form these binder phases such as AFm, AFt and AH₃ which provides good mechanical properties, exceeding 40 MPa

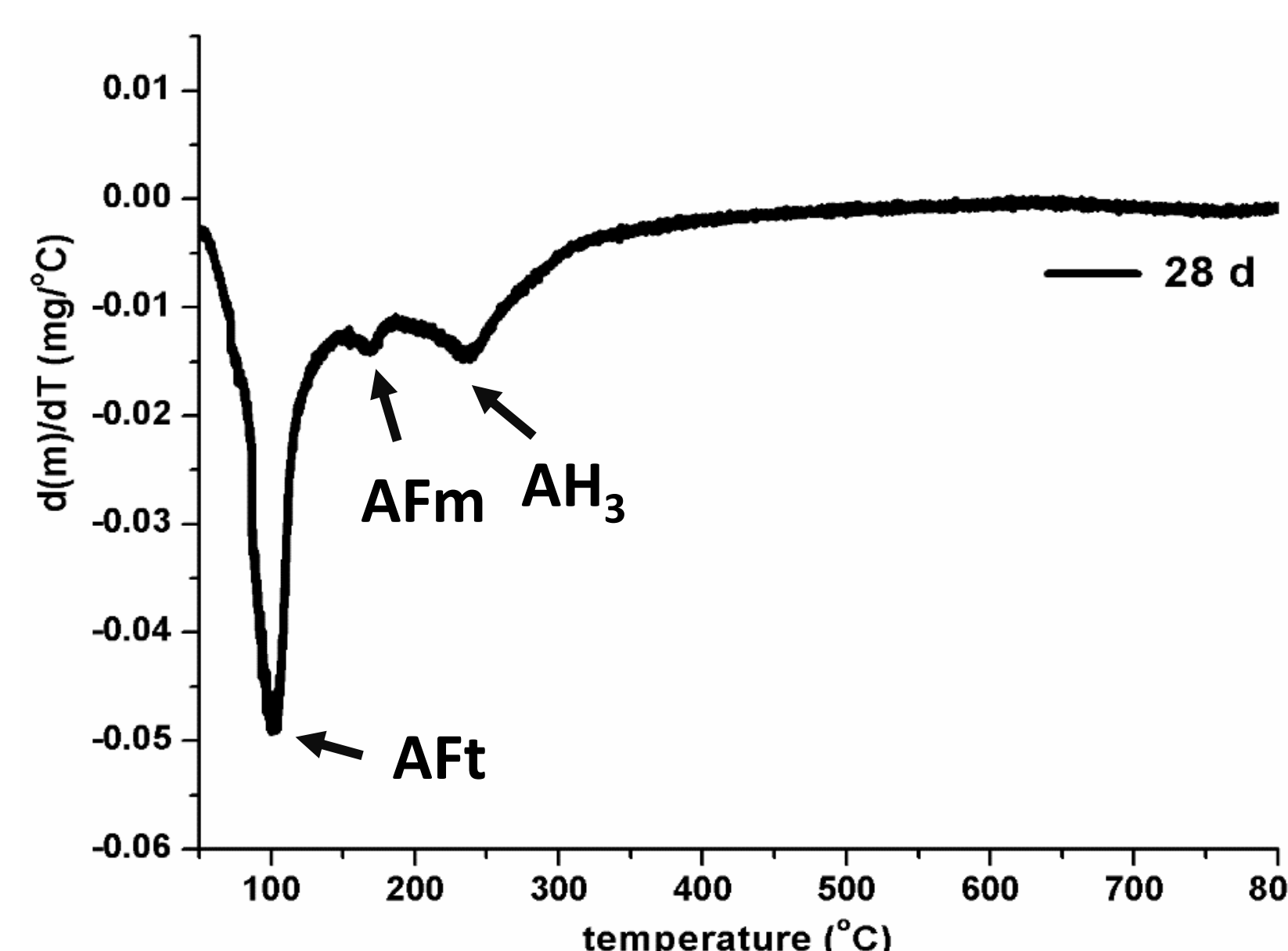


Figure 4: Mass derivative of hydrated paste

