Editorial

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This themed issue has as its focus calcium sulfoaluminate cements (CSA). These cements have long evolutionary history but have recently attracted attention because their production emits less carbon dioxide than Portland cement. Of course a successful building material has to meet many criteria but the structural use of CSA cements in China has attracted much attention. The Chinese cements rely mainly on hydration of ye'elemite, ideally $4\text{CaO} \cdot 3\text{Al}_2\text{O}_3 \cdot \text{SO}_3$, for strength gain and thus differ in mineralogy from Portland cement. Despite their structural use in China CSA cements are used elsewhere mainly in special cement formulations, for example as adhesives and in repair materials, but the feeling has been that these cements have a bright future if only certain disadvantages can be overcome.

The papers in the themes issue were presented at the International Workshop on 'Calcium Sulfoaluminate Cements' organised by F. Winnefeld, B. Lothenbach, A. Telesca and M. Marroccoli in 4–6 June 2018 in Murten, Switzerland, which brought together more than 100 participants. This dedicated issue incorporates six papers invited by the Organising Committee. A further three papers will appear in the next issue.

Hanein *et al.* (2019) describe advances in clinkering. Experiment and thermodynamic calculation were combined and the development of an alite–belite–ye'elemite clinker made in a single step is described. Pisch and Pasturel (2019) uses density function theory to determine the enthalpy of ye'elemite. Telesca *et al.* (2019) shows how waste materials can be incorporated in CSA clinkers. Zajac *et al.* (2019) show how the hydration mechanisms contribute to mechanical properties in an optimised belite–ferrite–ye'elemite paste. Cuesta *et al.* (2019) use synchrotron methods as a tool to characterise the

poorly crystalline state of the early-formed hydration products of CSA cements. CSA cements are often used in blends with Portland cement and Bertola *et al.* (2019) reports on the properties of the blended pastes.

It is apparent that basic and applied work on CSA cements is proceeding at a rapid rate: significant advances are occurring in our understanding of these 'green' binders. As editors, it has been our pleasure to coordinate the themed issues. We thank the referees for their timeous action and the contributors for their rapid and comprehensive response.

REFERENCES

- Bertola F, Gastaldi D, Canonico F and Paul G (2019) CSA and slag: towards CSA composite binders. *Advances in Cement Research* **31(3)**: 147–158, <https://doi.org/10.1680/jadcr.18.00105>.
- Cuesta A, Zea-García JD, De la Torre AG, Santacruz I and Aranda MAG (2019) Synchrotron pair distribution function analyses of ye'elemite-based pastes. *Advances in Cement Research* **31(3)**: 138–146, <https://doi.org/10.1680/jadcr.18.00097>.
- Hanein T, Duvallet TY, Jewell RB *et al.* (2019) Alite calcium sulfoaluminate cement: chemistry and thermodynamics. *Advances in Cement Research* **31(3)**: 94–105, <https://doi.org/10.1680/jadcr.18.00118>.
- Pisch A and Pasturel A (2019) On the heat of formation of ye'elemite $\text{Ca}_4\text{Al}_6\text{O}_{12} \cdot \text{SO}_4$ using density functional theory. *Advances in Cement Research* **31(3)**: 106–112, <https://doi.org/10.1680/jadcr.18.00128>.
- Telesca A, Marroccoli M and Winnefeld F (2019) Synthesis and characterisation of calcium sulfoaluminate cements produced by different chemical gypsums. *Advances in Cement Research* **31(3)**: 113–123, <https://doi.org/10.1680/jadcr.18.00122>.
- Zajac M, Skocek J, Stabler C, Bullerjahn F and Ben Haha M (2019) Hydration and performance evolution of belite–ye'elemite–ferrite cement. *Advances in Cement Research* **31(3)**: 124–137, <https://doi.org/10.1680/jadcr.18.00110>.