Editorial

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This issue of *Advances in Cement Research* contains seven papers that span a broad range of topics within the field of cement science; from Portland cement to alkali-activated systems, composite cements and polymer-modified cements. The papers are concerned with early-age performance through to long-term durability, while covering both applied fields and fundamental studies.

The first paper, by Shekhovtsova *et al.* (2016), investigates the temperature rise and early-age performance of alkali-activated fly ash geopolymeric systems; continuing the work of this group in the field of heat-cured alkali-activated systems (Shekhovtsova *et al.*, 2015). They show that the exothermic alkali activation of fly ash geopolymers can affect curing temperatures, especially at high alkali contents or in large samples. This may have implications for precast geopolymer quality control.

The second paper (Santacruz *et al.*, 2016) is a fundamental study into the structure of strätlingite. The work shows that the hydration conditions in which strätlingite forms may affect its microstructure; mostly related to the occurrence of dehydration during hydration or sample preparation. Loss of water during certain high-temperature curing regimes is reflected in subtle changes in X-ray diffraction (XRD) patterns, a point of note for those wishing to perform quantitative XRD analysis on systems where strätlingite may be a key phase, such as belite calcium sulfoaluminate cements.

The third paper (Zeng *et al.*, 2016) is another fundamental study, this time concerned with accurate determination of the pore structure of cement matrices. The authors have used a combination of mercury intrusion porosimetry (MIP) and nitrogen adsorption to follow changes in the pore structure of cement pastes with age. A combination of the two techniques gave information on the specific surface area, pore volume and pore size distribution. As the authors say ‘the hydrates filling process can be best captured by total MIP pore volume and the SSA values are more related to calcium–silicate–hydrate growth’.

The next paper (Tasci and Yilmaz, 2016) shifts the focus from later-age properties to early-age performance. The authors have looked at the interparticle interactions between cement particles and pozzolans, performing chemical, physical, mineralogical and electrokinetic analyses of samples. This was coupled with determination of free surface energy components by Van Oss, Chaudry and Good equations.

The two final papers look at more applied aspects of cement science, but considering very different timescales. The first of these (Liu *et al.*, 2016) investigates the early-age properties of polymer-modified cements, specifically the effects of asphalt emulsions on cement hydration. In addition to studying asphalt emulsion–cement mixes, the authors also investigated how the individual components affected cement hydration. Overall, hydration was slowed, due primarily to the presence of a cationic lignin–amine emulsifier. The other phases present, non-ionic emulsifier and hydrochloric acid, reduced maximum heat evolution.

The second paper, by Geng *et al.* (2016) considers the chloride resistance of unsaturated concrete. By the inclusion of the osmotic effect they propose a more accurate model for looking at the diffusion of chlorides in unsaturated concrete during electrochemical chloride removal. They have shown that ‘during the process of electrochemical chloride removal, the water consumption due to the electrochemical reactions taking place at the cathode can generate an inward flow of water from external solution into the specimen. The inward water flow has a negative effect on the chloride removal’.

Finally, the paper by Klaus *et al.* (2016) covers the result of adding alumina fillers with a high specific surface area on calcium aluminate cement hydration kinetics.

The breadth of topics covered in the seven papers of this issue reflects the editorial policy of *Advances in Cement Research*; celebrating the eclectic nature of cement science. I hope that you enjoy reading the papers as much as I did.

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