Reactivity of waste glasses in alkaline solutions and Portland cement

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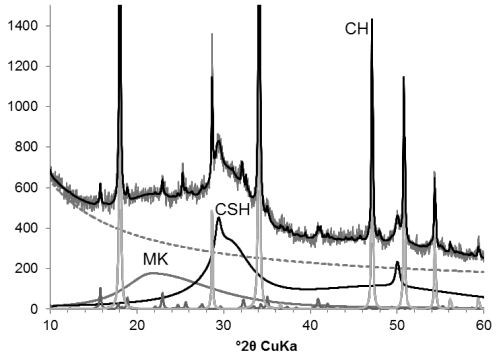
Measuring and predicting the intrinsic glass reactivity in the alkaline cement pore solution is key to increasing the incorporation of waste materials in blended cements [1]. Direct measurements of the reactivity or the degree of reaction of a SCM in a hydrating cement paste are a complicated task. An overview of novel approaches to assess the reactivity of potentially interesting waste sources will be presented (e.g. Fig. 1).

Figure 1: XRD deconvolution of a hydrated metakaolin blended cement



This contribution presents novel insights into the reactivity of a range of waste glasses by dissolution experiments at high dilution [2] and varying pH and establishes links to the hydration of the same SCMs in blended cements [3]. A model is presented that incorporates a strong dependence of the glass reactivity on fineness and pore solution composition and can be used to actively enhance the reactivity of waste glasses in cement.

[1] Scrivener & Nonat (2011) *Cem. Concr. Res.* **41**, 651-665. [2] Snellings (2013) *J. Am. Ceram. Soc.* **96**, 2467-2475. [3] Snellings *et al* (2014) *Waste Biomass Valor.* (in press).