

## **Assessing new resources for low-carbon cements: from model systems to reality**

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Portland cement, the glue in concrete, is a key economic commodity that provides affordable and comfortable housing and infrastructure to mankind. At a massive rate of consumption of about 4 Gt per year, the production of Portland cement is responsible for about 8% of CO<sub>2</sub> emissions and is as such one of the main industrial contributors to global warming. Decarbonising cement production cannot be simply accomplished by switching to clean energy sources as fossil CO<sub>2</sub> is released during the high temperature process of calcination of limestone, the main raw material of Portland cement. Instead important reductions can be made by changing the composition of cement, for instance by substituting part of the cement with natural resources or industrial by-products that react with it. To sustain and further increase cement replacement rates new materials are continuously being explored and developed.

This contribution presents recent methodological developments in the reactivity testing of cement replacement materials that enable more rapid and robust assessment in model reagent systems. These methodological advances are shown to draw from fundamental material and hydration reaction characteristics and provide reliable indications on performance in real cement for a broad range of materials. Concrete examples are given to illustrate the practicality of the test methods for the evaluation and development of new cement constituents, but also to highlight potential interferences and verification means.