

Industrial Effort on Low Carbon Cements and Application in China

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ABSTRACT

There are a number of best available technologies (BATs) and practices to reduce the energy consumption and environment impact of the key construction materials – cement. As outlined in the Global Cement Technology Road Map towards 2050 jointly launched by IEA/CSI in 2018, besides the technical levers such as energy efficiency, alternative fuels and clinker substitutes having been commonly regarded as BATs for cement sustainability, it is worth mentioning that alternative binding materials containing di-calcium silicate (C2S) and Calcium sulfo-aluminate mineral (C4A3\$, CSA) were included in the new roadmap to offer potential opportunities for process CO₂ emissions reductions.

Industrial effort on the evolution of developing low energy and low carbon clinker cements, i.e., C4A3\$ based and C2S-based alternative binders through innovative clinker mineralogy since 1970s in China. Industrial effort on the development of CSA and reactive belite-rich Portland cement (i.e., high belite cement, HBC) and its modification through the introduction of CSA mineral in the clinker mineralogical design, i.e., belite-calcium sulfoaluminate mineral (BCSA) are reviews. The performance of these low carbon clinker cements and the resultant concretes as well as their field application are also introduced accordingly.

Recent progress on limestone calcined clay cement (LC3) in China is presented in terms of industrial trial effort in thermally activating the kaolinitic clay to make the LC3-50 cement with clinker factor of 0.5 while maintaining its 28d strength equivalent to that pure Portland cement.