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Efficiency of high energy over conventional milling of granulated blast furnace slag powder to improve mechanical performance of slag cement paste

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Abstract

This work aims at bridging the efficiency of ball milling of granulated blast furnace slag (GBFS) to the structural and mechanical properties of slag cement pastes. Both conventional and high energy milling of GBFS are considered with a milling duration varied between 1 and 10 hours. X-ray diffraction, infra-red spectroscopy, granulometry analysis and scanning electron microscopy are used to draw the main lines of structural and morphological changes occurring during milling. Cement pastes formulated using 45% of GBFS in substitution are characterised. Workability, X-ray diffraction analysis, differential scanning calorimetry and compressive testing are performed to analyse main structural changes and reactions driven by the presence of milled GBFS as well as its direct consequence on the mechanical strength of slag cement pastes. Slag milling indicates the superior efficiency of high-energy milling,

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