**The Utilization of Dry Scrubber Material for the Production of Calcium Sulfoaluminate Clinkers and Cements**

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ABSTRACT:

Dry and wet scrubber flue gas desulfurization (FGD) systems are used to reduce SO2 emissions in power plants. While the by-products from wet scrubber (FGD gypsum) are widely used in various applications, dry scrubber materials (DSMs) are not, due to the high content of calcium sulfite. This paper summarizes the use of DSMs in calcium sulfoaluminate (CSA) clinker fabrication, and the mechanical performances of the CSA cements. Two types of CSA clinkers are considered: 1- CSA clinker mainly composed of Klein’s compound (C4A3Ś); 2- CSA-belite clinker closely similar to a commercial CSA clinker. The main goals of this study were to use as much DSMs as possible as a source of sulfate for the synthesis of Klein’s compound, and obtain a CSA cement made from DSMs to exhibit compressive strength as close as possible to a commercial CSA cement. Three DSMs originating from different plants are used for the production of CSA clinkers, and compared with a CSA clinker made exclusively from reagent chemicals. Both types of CSA clinkers were successfully produced from DSMs.

Regarding the mechanical performances, the best CSA clinker exhibited compressive strengths of 26.5 and 30.4 MPa, after 2 hours and 4 hours, respectively. Regarding the CSA-belite clinker, the optimal formulation exhibited strengths of 8.3 MPa after 4 hours, and 39.3 MPa after 1 day. The takeaway from this study is that FGD gypsum can successfully be replaced by DSMs as a source of sulfate for the production of CSA clinkers.

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