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EFFICIENT METHOD OF PRODUCING CLINKER-FREE BINDING MATERIALS USING ELECTROMAGNETIC VORTEX MILLING

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Abstract: Blast furnace slags are a by-product resulting from the production of pig iron that can be used as partial cement replacement materials. However, latent hydraulic properties and a low chemical activity of slags limit their wide application. Here, we demonstrate some methods for slag activation using electromagnetic vortex milling and alkaline activation. We show that slag powder with an average particle size of 8 μm and a specific surface area of 2,4 m^2/g is achieved at “slag/ferromagnetic elements” ratio of 1:2 and the processing time of 5 min in the electromagnetic vortex mill. The using of a 5M sodium hydroxide solution stimulates the dissolution of the slag and results in the average 28-days compressive strength of a cement of 45.8-59.8 MPa.

Keywords: granulated blast-furnace slag; grinding; fineness; compressive strength

1. Introduction

Blast furnace slags are a by-product resulting from the production of pig iron. It is formed during the melting of iron (~1350–1450°C) as a result of the interaction of iron ore, coke, and fluxes.

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