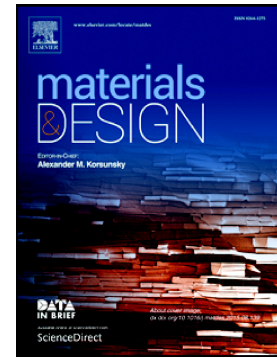


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Application of Power Ultrasound to Cementitious Materials: Advances, Issues and Perspectives

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Abstract

Novel techniques such as power ultrasound (PUS) are currently under consideration to improve the hydration of cementitious materials and to promote the effectiveness of replacing supplementary cementitious materials; SCMs, in terms of mechanical, microstructural and transport properties. This could enhance the properties of cementitious composites, reduce the quantity of waste materials, as well as decreasing the CO₂ footprint of cementitious materials. A handful of studies have investigated this promising field and little is known about the mechanisms by which the ultrasound acts in cement-based systems. This paper outlines the possible mechanisms involved on the effects of PUS as a method to promote cement hydration kinetics of Portland cement and binary blends. It also reviews and analyses previous research conducted mostly on the dispersing effects of PUS on the enhancement of pozzolanic reactivity of SCMs in cementitious systems. This review concludes with some perspectives on research needed to gain a fundamental understanding of this emerging field.

Keywords: Power ultrasound, Cementitious materials, Supplementary cementitious materials, Hydration, Sonocrystallization

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