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Review

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Multifunctional cementitious composites modified with nano-titanium dioxide: A review

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Abstract

Nano titanium dioxide (NT) as a zero-dimensional nano material has received widespread attention from both industry and research communities due to its distinguished physical and chemical properties. Much research work indicated that NT can modify material structures, thus providing a new approach to develop high-performance, durable, multifunctional, and environmentally friendly cementitious composites. This paper reviews state-of-the-art research carried out on the effect of NT on the properties of cementitious composites and aims to provide a comprehensive insight into possible development of NT-engineered cementitious composites. The detailed introductions on the processing, microstructures (hydration products and pore structure), properties (hydration, workability, density, mechanical properties, shrinkage, functional properties and durability) and applications of NT-engineered cementitious composites are presented. Finally, the risks, challenges and future development of NT-engineered cementitious composites are discussed.

Keywords: A. Multifunctional composites; A. Nanocomposites; A. Smart materials

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