

MECHANICAL PROPERTIES OF CEMENT MORTAR WITH GRAPHENE OXIDE

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Abstract

These days, nanotechnology has already influenced many fields of science and technology, including civil engineering. Cementitious composites incorporating various nanomaterials have emerged as novel materials with improved microstructure, mechanical properties and durability. Over the past decades, graphene oxide has appeared as one of the most promising nanomaterials for civil engineering applications. However, the effect of graphene oxide addition on the properties of cementitious composites has not yet been fully investigated. The paper presents the studies on the mechanical properties of cement mortar reinforced with the 0.03 wt.% of graphene oxide (dosage by weight of cement). Graphene oxide proved to accelerate the cement hydration, in particular at the early stages of mortar hardening, hence improving the mortar performance during mechanical tests. The significant enhancement of the flexural, cubic and cylindrical compressive strength has been reported, thus showing the great nanotechnology potential for concrete structures.

Keywords: Cement mortar; Compressive strength; Concrete nanotechnology; Graphene oxide; Poisson's ratio; Young's modulus.