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# Nano-core effect in nano-engineered cementitious composites

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## Abstract

Nanoscale impact can bring big changes in micro-meso-macroscale behaviors of the composites.

The addition of nano fillers makes cementitious materials stronger, more durable and multifunctional/smart. This paper aims at investigating the underlying mechanism for understanding and controlling the nano-engineered cementitious composites. The nano-core effect is proposed through integrating core-effect with nano effect, and is proved by experimental evidences for the cementitious composites with different nano fillers. The nano-core effect is closely relative to the intrinsic properties of nano fillers, composition and processing of the cementitious composites. The behaviors of the nano-engineered cementitious composites are governed by nano-core effect zone, i.e. nano-core-shell element. It is therefore concluded that the nano-core effect is fundamental for design, fabrication and application of the nano-engineered cementitious composites.

**Key words:** A. Reinforced cement/plaster; A. Smart materials; B. Physical properties; B. Microstructures

## 1 Introduction

Cementitious composites are the most widely used materials for infrastructures because they are resistant to water, easily formed into various shapes and sizes, cheap and readily available everywhere. Twice as much cementitious composites are used in infrastructures around the world

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