



Application of Nanotechnology in Civil Engineering

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Abstract

Word nano is a word derived from Greek dwarf which means a billionth part. Nanotechnology is a sector of science that discuss about materials and their properties in nano scale. By this technology phenomena that are not possible in normal or micro scale can be happen in nano size. One of the sectors that have significant effect on is civil engineering and especially materials used at this area. Adding nano particles to materials mixtures like concrete or using new nano particles in production of materials will lead to change engineering properties of them. New nano particles like nano-silica, nano carbons, nano fibers, nano Titanium dioxide are some examples of these nano particles used for getting to new materials. These properties can be listed as increasing strength, durability, resistance in front of fire or heat conductivity or new materials with self-cleaning property. Although nanotechnology is to some extent new field of study in comparison with other fields, but it is growing very fast and the results of these technology is clear in all areas especially in construction materials.

Key words: Nanotechnology, Civil Engineering, Concrete, Nano Silica, Nano Carbon,

1. Introduction

The word "Nano" was derived from the Greek word dwarf which indicates a billionth part (Rao et al., 2015). Nanotechnology is a field of science that control materials and devices at the nano and atomic scale (Roco et al., 1999) and developing on fields of basic chemistry and physic (Chong 2004). By use of nanotechnology phenomena that are not possible to be happen at normal and microscopic form can be happened at atomic scales (Firoozi et al., 2014) and nano-materials can get new and fresh properties and functions (Rao et al., 2015). From years 1997 to 2003 investment in nanotechnology increased to 40% and reached to 35000 millions Euros (Andersen et al., 2007). At recent years nanotechnology has been entered to many of fields and civil engineering is one of them. The main part of affected and developed by this field of science is manner of buildings and construction materials (Zhu et al., 2004). It can be listed as below: