Ain shames University
Faculty of Science
Chemistry department

Effect of Some Nano-materials on the Phsico-Chemical and Mechanical Properties of Portland Cement Pastes

A Thesis Submitted For

Ph.D. Degree in Chemistry

By
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M.Sc. (chemesrtry), (2014)

Supervised By

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ABBREVIATIONS

OPC : Ordinary Portland cement

HFL : High free lime

BLC : Limestone Portland cement

BSC : Slag Portland cement

C_3S : $3CaO.SiO_3$

C_2S : $2CaO.SiO_2$

C_3A : Tricalcium aluminate

XRD : X-ray diffraction

DTA : Differential thermal analysis

SEM : Scanning electron microscope

NC : Nano clay

NMK : Nano Meta kaolin

SF : Silica fume

NS : Nano-silica

GBFS : Granulated blast furnace slag

LS : Limestone

PCC : Portland cement concrete

W/C : Water to cement ratio

FM : Fine material

SCC : Self-consolidating concrete

TS : Transition zone

SP : Superplasticizer

IST : Initial setting time

FST : Final setting time

CS : Compressive strength

FS : Flexural strength

CSH : Calcium silicate hydrate

CAH : Calcium aluminate hydrate

CASH : Calcium aluminosilicate hydrate

Q : Quartz (SiO_2)

CH : Portlandite

CC : Calcite $CaCO_3$

CH : Calcium hydroxide (free lime) $Ca(OH)_2$

E : Ettringite $Ca.Al\ (OH)_6)_2(SO_4)_3.\ 25.7H_2O$

G : Gypsum ($CaSO_4.2H_2O$)

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