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Manufacturing of Nano Zeolite by Planetary Ball Mill and Investigation of the Effects on Concrete

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Abstract : This study is engineering the properties of concrete containing natural nano zeolite as supplementary cementitious material in the blended Portland-cement based binder in amounts of 5,7 and 10% by mass. Crashing of clinoptilolite zeolite is performed by means of planetary ball mill. Two types of concrete along with water to cementitious material ratio (W/(C + P)) in 0.45 and 0.4 at the ages of 7, 28 and 90 days and were compared with each other. The effect of these additives on mechanical properties (compressive and tensile strength) and durability has been investigated by Electrical Resistivity (ER) and Rapid Chloride Penetration Test (RCPT) at the ages 28 and 90 days. Scanning Electron Microscopy (SEM) and X-Ray Diffraction (XRD) revealed that nanoparticles of natural clinoptilolite could improve quality of concrete. As a result of the tests, decrease in penetration of chloride ion and increase electrical resistivity significantly that are appropriate option for controlling of corrosion in reinforced concrete structures but increase of mechanical characteristics is not considerable.

Keywords : ball mill, durability, mechanical properties, nano zeolite
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