

Comparison of Physico-Mechanical Properties of Superplasticizer Stabilized Graphene Oxide and Carbon Nanotubes Reinforced Cement Nanocomposites

Authors : Ramanjit Kaur, N. C. Kothiyal

Abstract : The present study compares the improved mechanical strength of cement mortar nanocomposites (CNCs) using polycarboxylate superplasticizer (PCE-SP) stabilized graphene oxide or functionalized carbon nanotubes (SP-GO and SP-FCNT) as reinforcing agents. So, in the present study, GO, and FCNT have been sterically stabilized via superplasticizer. The obtained results have shown that a dosage of 0.02 wt% of SP-GO and 0.08 wt% of SP-FCNTs showed an improvement in compressive strength by 23.2% and 16.5%, respectively. On the other hand, incorporation of 0.04% SP-GO and SP-FCNT resulted in an enhanced split tensile strength of 38.5% and 35.8%, respectively, as compared to the control sample at 90 days of curing. Mercury Intrusion Porosimetry (MIP) observations presented a decline in the porosity of 0.02% SP-GO-CNCs and 0.08% SP-FCNT-CNCs by 25% and 31% in comparison to the control sample. The improved hydration of CNCs contributing to the enhancement of physicomaterial strength has also been shown by SEM and XRD studies.

Keywords : graphene oxide, functionalized CNTs, steric stabilization, microstructure, crystalline behavior, pore structure refinement

Conference Title : ICNN 2020 : International Conference on Nanoscience and Nanotechnology

Conference Location : Paris, France

Conference Dates : April 16-17, 2020