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Effect of Nano-$CaCO_3$ Addition on the Nano-Mechanical Properties of Cement Paste

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Abstract : In this study, the effect of nano-CaCO3 replacement with cement on the nano-mechanical properties of cement paste was investigated. Hydrophobic and hydrophilic characteristics Two types of nano CaCO3 were replaced with Portland cement at 0, 0.5 and 1%. Water to (cement+nano-CaCO3) ratio was kept constant at 0.5 for all mixtures. 36 indentations were applied on each cement paste, and the values of nano-hardness and elastic modulus of cement pastes were determined from the indentation depth-load graphs. Then, by getting the average of them, nano-hardness and elastic modulus were identified for each mixture. Test results illustrate that replacement of hydrophilic n-CaCO3 with cement lead to a significant increase in nano-mechanical properties, however, replacement of hydrophobic n-CaCO3 with cement worsened the nano-mechanical properties considerably.

Keywords : nanoindenter, CaCO3, nano-hardness, nano-mechanical properties
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