

Assessment of Vermiculite Concrete Containing Bio-Polymer Aggregate

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Abstract : The present study aims to assess the performance of vermiculite concrete containing poly-lactic acid beads as an eco-friendly aggregate. Vermiculite aggregate was replaced by poly-lactic acid in percentages of 0%, 20%, 40%, 60% and 80%. Mechanical and thermal properties of concrete were investigated. Test results indicated that the inclusion of poly-lactic acid decreased the PH value of concrete and all the poly-lactic acid particles were dissolved due to the formation of sodium lactide and lactide oligomers when subjected to the high alkaline environment of concrete. In addition, an increase in thermal conductivity value of concrete was observed as the ratio of poly-lactic acid increased. Moreover, a set of equations was proposed to estimate the water-cement ratio, cement content and water absorption ratio of concrete.

Keywords : poly-lactic acid (PLA), vermiculite concrete, eco-friendly, mechanical properties

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