

Mechanical performance of natural fiber-reinforced alkali-activated composites

Abstract

Alkali-activated material exhibits brittle behavior with low tensile strength and is sensitive to cracking which also affect the durability of the structures. To address this issue, alkali-activated material is frequently made into alkali-activated composites (AACs) by using by fiber reinforcement. Natural fibers have a number of advantages, including lightweight, high strength, and safety in use and processing compared to synthetic fiber. The developed natural fiber-reinforced cementitious composites exhibit outstanding flexural, fracture, and impact resistance. However, the chemical incompatibility that may exist between cement and fiber is the main problem for natural fiber-reinforced cement composites. The pyrolytic behavior of natural fibers can be viewed as a multiconditional coupling in a cement-based environment with high alkalinity and a large variety of mineral species. Thus this review provides in depth analysis on the diverse natural fiber and its utilization in the development of fiber-reinforced AACs (FRAACs). Hence, this would guide in finding the best fiber source for the development of high mechanical strength FRAAC to meet building and construction application.

Keywords

alkali-activated; composites; mechanical properties; Natural fiber