

Characterization of mechanical and microstructural properties of palm oil fuel ash geopolymer cement paste

Abstract

This study delineates activation of palm oil fuel ash (POFA) by a combination of sodium silicate and sodium hydroxide at 60 °C to be used as a geopolymer binder. Qualitative observations as well as compressive strength were recorded to assess the viability of POFA utilization. Also, XRD, SEM/EDX, DSC, FTIR tests were conducted to investigate underlying mechanisms of geopolymerization. The post-test observations revealed that activation of POFA is applicable and compressive strength of up to 32.48 MPa at the age of 28 days was achieved. Chemical tests indicated that formation of calcium silicate hydrate was the dominant cause of geopolymerization.

Keyword: Palm oil fuel ash; POFA; Alkali activation; Geopolymer binder