Processing and characterization of calcined kaolin cement powder

Abstract

This paper aimed at investigating the possibility of calcined kaolin to produce cement powderthat could be an alternative to Portland cement by applying geopolymerization process. Cementpaste was firstly made by alkaline activation of calcined kaolin with alkali activator (mixture of 6-10 M NaOH and Na_2SiO_3 solution), heated in oven at temperature of 80°C forming a solidified product, followed by pulverization to fixed particle size powder. The parameters involved in thisprocessing route (alkali concentration, calcined kaolin to activator ratio, alkali activator ratio and heating conditions) were investigated. For compressive testing, cement powder was added with water and then cured to produce cubes. Compressive strength, microstructure, XRD and FTIR analysis were studied. Result showed that the processing route has the potential to producecement powder where SEM micrographs have proved that the geopolymerization process continued after addition of water forming a homogeneous structure and geopolymers bonding increased in intensity which was observed through IR analysis. It was believed that presences of crystalline phase as seen in XRD diffractogram were good for mechanical properties.