

Influence of oxide molar ratios on kaolin geopolymers

Abstract

Oxide molar ratios are the main key parameter determining the performance of a kaolin geopolymers. The kaolin composition and various mixture proportions will lead to different oxide molar ratios in geopolymer system. In this experiment, NaOH solution prepared in 6-14 M was mixed with Na₂SiO₃/NaOH ratio ranged between 0.16-0.36 to prepare a alkali activator, 24 h prior to use. Kaolin powder and alkali activator were mixed at S/L ratio of 0.60-1.20, and stirred using mechanical mixer. Finally, the samples were cured at temperature of 80 °C for 24 h. From the important factors investigated in this study, various oxide molar ratios of each mixture proportions were calculated and the optimum molar ratios obtained were SiO₂/Al₂O₃ = 3.28, SiO₂/Na₂O = 3.58, H₂O/Na₂O = 14.61 and Al₂O₃/Na₂O = 1.09. Besides that, the conditions to synthesize kaolin geopolymers were 8 M alkali concentration with S/L ratio of 1.00 and Na₂SiO₃/NaOH ratio of 0.32 in order to produce kaolin geopolymers.

Keywords

Geopolymers; Kaolin; Molar ratio