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