

Compressive strength and morphology of fly ash based geopolymer as artificial aggregate with different curing temperature

Abstract

This paper presented the compressive strength of geopolymer paste with different NaOH concentration and morphology analysis for sintered artificial aggregate. This artificial aggregate was produce based on mix design with highest compressive strength which is 12 M. The sample was cured at 70 °C for 24 hours and then it was exposed to different temperature at range 500 °C to 700 °C. Scanning Electron Microscopy (SEM) has been used to identify the formation of microstructure. The geopolymer artificial aggregate was an alternative ways to produce a greener environmental. In this study, the compressive strength for different $\text{Na}_2\text{SiO}_3/\text{NaOH}$ ratio has been analyzed. The morphology for best mix design then were analyze for different curing temperature. The result shows fly ash based geopolymer paste with 12 M of NaOH concentration shows excellent result with 7.30 MPa at 2.5 ratio of $\text{Na}_2\text{SiO}_3/\text{NaOH}$ and for geopolymer artificial aggregate, when temperature of heat treatment increased, the open porosity of porous geopolymer surface decreased.

Keywords; Artificial Aggregate, Compressive Strength, Fly Ash, Geopolymer, Morphology, Sintering