

Thesis Title	Effect of Curing Temperature and Alkali Concentration on Properties of Geopolymer Synthesized from Water Treatment Residue
Thesis credits	12
Candidate	Miss Khuanruan Jantawong
Thesis Advisors	Assoc. Prof. Dr. Suwimol Asavapisit Dr. Rungroj Piyaphanuwat
Program	Master of Science
Field of study	Environmental Technology
Department	Environmental Technology
Faculty	School of Energy, Environmental and Materials
Academic Year	2014

Abstract

This research investigated the effect of curing temperatures and alkali concentrations on properties of synthetic geopolymer from water treatment residue (WTR) calcined at a temperature of 800 °C for 1 hour. Sodium hydroxide (NaOH) was used as alkali activator at the Na₂O/SiO₂ ratios of 0.20, 0.25 and 0.30. The samples were cured at room temperature (32 °C) for 1, 3, 7, 14 and 28 days and by dry oven at temperature of 50 °C and 70 °C in an electric oven for 1, 2 and 3 days. Both effects were examined on the development of compressive strength and microstructure of geopolymer. Results found that the geopolymer prepared at Na₂O/SiO₂ ratio of 0.25 gave the highest final compressive strength at all curing temperature. In the geopolymer prepared at temperatures of 50 °C and 70 °C, the compressive strength was rapidly developed within 1 day but strength was insignificantly increased with further curing (2 and 3 days). However, the further curing time (2 and 3 days) has no significant on this property. The optimum conditions for preparing geopolymer from WTR was at Na₂O/SiO₂ of 0.25 and curing at temperature of 50 °C for 1 day. Microstructure analysis using. In microstructure analyzed by XRD and SEM, it found the crystalline of sodium aluminum silicate hydrate (NASH), which is gel-like, distributed throughout on the surface.

Keywords: Alkali activator/Curing temperature/ Geopolymer/Water treatment residue