

Butsaraporn Suphuang 2007: Heavy Metal Containment in Geopolymer. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Associate Professor Patcharaporn Suwanvitaya, M.Appl.Sc. 108 pages.

Geopolymer is a product from polymerization of silica and alumina under alkaline activation condition. The strength of the product is comparable to Portland cement product, with the possible capability of containing heavy metal in its matrix. In this study fly ash based geopolymer was used for heavy metal containment of sludge from zinc-plated factory. The trial mixes of fly ash:sludge ratio of 1:0, 1:0.1, 1:0.2, 1:0.3, 1:0.4 and 1:0.5. and alkaline activator using $\text{Na}_2\text{O} \cdot \text{SiO}_3$ to NaOH at the ratios of 0.67, 1.00, 1.50 and 2.33 Compressive strengths of geopolymer from fly ash with sludge ($29 - 235 \text{ kg/cm}^2$) were found to be less than those of fly ash based geopolymer ($446-487 \text{ kg/cm}^2$). The ratio of $\text{Na}_2\text{O} \cdot \text{SiO}_3$ to NaOH that yielded maximum compressive strength was 1.00. Leaching tests with acetic acid (Toxicity Characteristic Leaching Procedure) showed that Cd, Pb and Cr were securely contained in geopolymer. Concentration of Cd, Pb and Cr in leachant conformed to DOI Standard. Nitric acid was found to leach more heavy metals out than acetic acid.

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Thesis Advisor's signature

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