

Chalermchai Trakulphudphong 2008: Mechanism of Zinc and Chromium Encapsulation in Cement. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Associate Professor Patcharaporn Suwanvitaya, M.Appl.Sc. 99 pages.

Solidification in cement is widely use for hazardous waste. This study aimed to determine the containment mechanism of metal in cement. Sludge from electroplating factory was used in the study. The proportions of the cement to sludge used were 9:1, 8:2, 7:3, 6:4, 4:6 and 3:7. Specimens used were 5x5x5 cm. cube for compressive strength determination at the ages of 3, 7 and 28 days and 4x8 cm. cylinders for pore water expression. The amount of zinc and chromium in 3 portions namely in pore water, in leachate (by TCLP) and acid extraction from the cement-sludge matrix were determined. The solutions were then analysed for the amount of zinc and chromium. It was found that for untreated sludge the amount of zinc and chromium in mg/g sludge were 284 and 39 respectively, and only 15 and 0.74 respectively were found in the the leachate. After containment in cement, the amount of zinc and chromium in the leachate were less than those leached from raw sludge, conformed to the standard for secure landfill set by DOI. However the amount in the leachate increased with an increasing in sludge proportions. It was also found that the amount of zinc and chromium in mg/g sludge remained rather unchanged, at 300 and 36. Comparison of the amounts in the 3 portions showed that only small fraction of zinc and chromium were found in leachate 13% (2 mg/g sludge and 8% (0.06 mg/g sludge) in pore water 0.003% (0.008 mg/g sludge) and 0.01% (0.004 mg/g sludge). 90% of total amount was obtained from acid digestion portion.

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Thesis Advisor's signature