being conducted to characterize the performance of the sampler for collecting wind blown dusts at hazardous waste sites.

Solidification of salts of arsenic, chromium and lead using cement and various additives

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Abstract

Solidification/stabilization (S/S) is a valuable technology for the treatment of certain waste streams; e.g., metal plating wastes, incinerator ashes, etc., and has great potential for use in treatment of contaminated soils arising out of historical malpractice or inadvertent spills. While the technology is relatively cheap to apply, significant questions remain about the range of its applicability. The broad aims of the present project are to survey solidification/stabilization binding agents and additives with respect to their abilities to immobilize As, Cr and Pb, three species which are known to give problems in S/S practice. The most basic information being obtained is metal concentration in TCLP leachates from solidified samples prepared with cementitious and pozzolanic binders and a variety of additives. The results of this survey to date have documented the utility of portland cement (OPC) and have shown that certain deficiencies of OPC can be corrected using additives.

The second goal of the project is to understand the interactions between waste and matrix with the eventual intention of predicting performance and designing effective mixes. That work employs sophisticated characterization techniques, including solid-state nuclear magnetic resonance (NMR) spectroscopy and is being carried out in collaboration with the group in the Chemistry Department at Lamar University. The metals being solidified cause profound changes in the nature of the cement matrix, and these effects can be conveniently measured by NMR.

In the second year of the project, our work has concentrated on four tasks: (1) gathering a great deal more TCLP data on various binders, on the metals in different oxidation states, and on combinations of metals; (2) beginning to gather data, mainly by solid-state nuclear magnetic resonance (NMR) spec-

troscopy, on the nature of metal-binder interactions; (3) collaboration with the Lamar group in studyingt the differences between behavior under TCLP leaching conditions and under buffered conditions where pH of the leachate remains at 5 and; (4) gathering preliminary data on the effect of ferrous sulfate on the leachability of samples containing chromate.

Solidification/stabilization of organic waste using cementitious and polymeric materials

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Abstract

Methods of handling organic wastes more safely and decreasing the degree of hazard of disposed organic wastes are becoming critical elements in any hazardous waste management planning. The primary concern of the current solidification/stabilization technology, using cement and pozzolanic systems, is the interfering effects of organic contaminants which affect setting, chemical stability and sometimes destroys the cement after setting. Due to the lack of understanding of treating organic wastes and anticipating problems from using the currently available treatment regulators have used limitations on the amount of organic treatable, which range from 1% to 20%. Hence alternative materials for solidification/stabilization of non-volatile organic hazardous wastes (liquids and semi-solids) must be developed to meet the current demand in organic waste management. This demands better understanding of the binder–organic waste interaction and leaching mechanisms.

The initial objective of this study was to investigate the interfering effect of phenol on setting and solidification process of cement and polyster polymer. Phenol was selected to represent the organic contaminant because of its wide industrial use, toxicity, boiling point and difficulty in treating with currently available methods. The interaction between phenol and polyester and phenol and cement were studied in a fundamental way from the time of mixing to final solidification. The study included setting time, TCLP tests (continued for 7 days), mechanical property tests and microstructural analysis using the SEM, XRD, FTIR and Microprobe at various curing times. Studies show that even