

Comparisons of metal leachability for various wastes by extraction and leaching methods

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摘要.

Abstract

The objective of this research was to evaluate three extraction tests, i.e., toxicity characteristic leaching procedures (TCLP), extraction procedure (EP), and American Society for Testing and Materials (ASTM) methods, for their ability to extract metals in chemical sludge and incineration bottom ash, in terms of the precision of analytical results. Typical chemical sludges, including the electroplating and dye-stuff sludges, the municipal solid waste incineration bottom ash, the leather debris, and the steel-mill bottom residue containing Cd, Cr, Cu, Pb, and Zn were prepared for the lysimetry test (dynamic testing) to compare with the extraction results. Results show that for bottom residue and dye-stuff sludge, the concentration of metal leached was almost the same between the lysimetry leaching and the TCLP tests. The metal concentration followed the order: $TCLP \approx EP > ASTM$. TCLP and EP exhibited almost the same relative standard deviation (RSD) value. Therefore, the results of the TCLP tests for bottom residue and dye-stuff sludge, which have a low metal content and alkalinity, can be used to estimate the metal concentration leached by typical acid rain in Taiwan; whereas the ASTM extraction test may be a better indicator of the lysimetry test.