Title: On Site Remediation Feasibility of Electroplating Heavy Metal Contaminated Soil in Chang-Hua, Taiwan

Abstract: A representative electroplating heavy metals, including Cd, Zn, Ni, Cu, and Cr, contaminated soil was remediated by shaking and ultrasonic extractions in this paper for application feasibility. 0.1, 0.01, 0.005 M of HCl, HNO$_3$, H$_2$SO$_4$, Fe(NO$_3$)$_3$ and artificial Fe(NO$_3$)$_3$ were used for shaking extraction. Result shown that the total Cd content, originally exceeded “monitoring” level, had been remediated to background level. Moreover, the total contents of Zn, Ni, Cu, and Cr were reduced one or two levels from their original “control” level. The overall metal removal for extractants was in the order H$_2$SO$_4$ > HCl > HNO$_3$ > Fe(NO$_3$)$_3$ > artificial Fe(NO$_3$)$_3$, and high removal was obtained in high concentration of extractants. Ultrasonic extraction, 1, 5, and 10 min, was further conducted for remediation in the same extractants and concentrations, except Fe(NO$_3$)$_3$. Result provided that most of the metal removal by ultrasound was less than that of shaking system. Nevertheless, HCl and H$_2$SO$_4$ were verified as available extractants that metals could be removed one or two levels. Finally, feasibility assessment of on site remediation was made, including optimal extractant, time consuming, and financial considerations for both shaking and ultrasonic extractions.