Heavy Metal Stabilization in Battery Recycling Sites Using Phosphate Amendments: Batch and Column Tests. (S11-singh182211-Oral)

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Abstract:

Transformation of soil lead to geochemical stable pyromorphite by addition of phosphate minerals may be a cost effective and environmental friendly in situ remediation technology. For effective in situ stabilization of Pb contaminated soils from battery recycling sites requires dissolution of soil lead carbonate and precipitation of the new sparingly soluble mineral. Efforts were made to optimize P amendments application rate, evaluate vertical effectiveness, and testing various design parameters for the full scale stabilization process using batch and column tests. Among investigated treatments, a mixture of H3PO4 + CaH2PO4 +CaCl2 showed the most effective Pb stabilization with minimum mobilization of other heavy metals, organic matter and the least adverse environmental impacts on soil properties. Column tests proved that trace metals mobilized from surface layers resulting from acidic conditions were sorbed back onto subsurface layers and vertical effectiveness for metal immobilization in subsurface remained high due to deep percolation of acidic P rich leachates into the deep soil layers. Based on experimental results, caution needs to be excised while using acid based P amendment to design highly efficient remediation strategy.

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