

A novel method for the removal of chelator EDTA and sequential precipitation of heavy metals from heavy metals-containing extract and wastewater

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Many industrial wastewater and solid waste contain toxic heavy metals whose extraction and separation would benefit their remediation for safe discharge, landfill or further applications. Sewage sludge incineration ash (SSIA), a kind of non-incinerable waste, contains considerable amounts of heavy metals such as iron, zinc, copper, nickel, chromium and lead. With high content of heavy metals, most of SSIA are landfilled after treatment while some are treated and utilized as fertilizers in Japan and Europe with capped limits. Recovery and reuse of heavy metals from SSIA and further application of the heavy metals cleaned SSIA are still challenging. In this report, using heavy metals and EDTA-containing extract from SSIA as an example, we describe a novel method for the removal of chelator EDTA and sequential precipitation of heavy metals from extract and wastewater containing heavy metals and EDTA. It is compared with direct precipitation of heavy metals without prior removal of chelator EDTA. With this novel method, EDTA, potassium hexafluorosilicate, iron phosphate, calcium phosphate, aluminium hydroxide, zinc phosphate, copper phosphate, titanium dioxide and iron(III) hydroxide are recovered individually from the EDTA extract of SSIA. Small amounts of iron, phosphate and silicate were left behind. Chelator EDTA has been widely used for heavy metals chelation in various applications. We believe that this novel method can benefit the removal of EDTA from wastewater, the separation of chelator EDTA and heavy metals from their complexes in wastewater and solid waste extracts.