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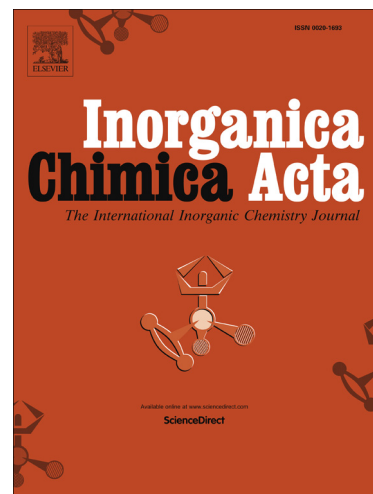
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Recovery of Critical Metals from Dilute Leach Solutions - Separation of Indium from Tin and Lead

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Abstract

The strategic metal indium is recovered from solutions containing tin and lead that are typical of those obtained from leach solutions of metal component fractions of electronic waste including the leach solutions from indium tin oxide thin film conductive layers that contain only indium and tin. Almost total recovery of the metals can be achieved from nitric, perchloric and acetic acid leach solutions using a novel cylindrical mesh electrode electrolysis cell under appropriate conditions. The optimum separation of indium from tin and lead is achieved by a novel three-stage process from nitric acid media in the presence of SCN^- as a complexing agent. Lead is removed from dilute indium-tin-lead solutions in the first stage from 0.1 mol L^{-1} nitric acid solution by electrodeposition over an 8 hour period in the absence of SCN^- to give a residual solution containing a maximum of 2 mg L^{-1} of lead (97% recovery). Tin is removed in the second stage by electrodeposition over an 8 hour period from the solution after addition of 0.02 mol L^{-1} SCN^- to give a maximum residual electrolyte tin concentration of 3 mg L^{-1} (94% recovery). In the third stage indium is recovered at the anode of the cylindrical mesh electrode

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