

Clean Gold Solution from Printed Circuit Board Physical Processing Dust by Selective Complexation

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Abstract : The two-step leaching process of PCB dust will produce a first leaching stream containing assorted metals that still requires more demanding multistage processing afterward to recover base metals and precious metals. In this work, three-step selective complexations produce a clean gold solution from printed circuit board dust. After optimizing for temperature and concentrations, the first step under oxidative ammonia leaching recovered no gold, 90 % Cu and 50 % Zn. Second step acid leaching recovered no gold, 89 % Fe, 48 % Zn, 94 % Ni. The recoveries generally increased with reducing dust particle sizes, except for zinc under oxidative ammonia, and it was noted that its various alloy forms in PCB could be responsible for this. At the third leaching step using acidified thiourea with 0.1 M H₂O₂ at 25 OC, gold recovery was 99 %. The leaching rate was shown to be chemically controlled, implying that reagent dosage control will compensate for feed assay shifts in an operation design. Copper, zinc and nickel will be easily recoverable from leach solutions of the first two steps in this leaching scheme. The third step produced a clean gold solution for easy processing downstream.

Keywords : gold thiourea complexation, printed circuit board, step leaching, selective recovery

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