

## Recovery of Copper and Gold by Delamination of Printed Circuit Boards Followed by Leaching and Solvent Extraction Process

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**Abstract :** Due to increasing trends of electronic waste, specially the ICT related gadgets, their green recycling is still a greater challenge. This article presents a two-stage, eco-friendly hydrometallurgical route for the recovery of gold from the delaminated metallic layers of waste mobile phone Printed Circuit Boards (PCBs). Initially, mobile phone PCBs are downsized (1x1 cm<sup>2</sup>) and treated with an organic solvent dimethylacetamide (DMA) for the separation of metallic fraction from non-metallic glass fiber. In the first stage, liberated metallic sheets are used for the selective dissolution of copper in an aqueous leaching reagent. Influence of various parameters such as type of leaching reagent, the concentration of the solution, temperature, time and pulp density are optimized for the effective leaching (almost 100%) of copper. Results have shown that 3M nitric acid is a suitable reagent for copper leaching at room temperature and considering chemical features, gold remained in solid residue. In the second stage, the separated residue is used for the recovery of gold by using sulphuric acid with a combination of halide salt. In this halide leaching, Cl<sub>2</sub> or Br<sub>2</sub> is generated as an in-situ oxidant to improve the leaching of gold. Results have shown that almost 92 % of gold is recovered at the optimized parameters.

**Keywords :** printed circuit boards, delamination, leaching, solvent extraction, recovery

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