

## Hydrometallurgical Treatment of Smelted Low-Grade WEEE

**Authors :** Ewa Rudnik

**Abstract :** Poster shows a comparison of hydrometallurgical routes of copper recovery from low-grade e-waste. Electronic scrap was smelted to produce Cu-Zn-Ag alloy. The alloy was then treated in the following ways: (a) anodic dissolution with simultaneous metal electrodeposition using ammoniacal and sulfuric acid solutions. This resulted in the separation of metals, where lead, silver and tin accumulated mainly in the slimes, while copper was transferred to the electrolyte and then recovered on the cathode. The best conditions of the alloy treatment were obtained in the sulfuric acid, where the final product was metal of high purity (99% Cu) at the current efficiency of 90%. (b) leaching in ammoniacal solutions of various compositions and then copper electrowinning. Alloy was leached in chloride, carbonate, sulfate and thiosulfate baths. This resulted in the separation of the metals, wherein copper and zinc were transferred to the electrolyte, while metallic tin and silver as well as lead salts remained in the slimes. Copper was selectively recovered from the ammoniacal solutions by the electrolysis, leaving zinc ions in the electrolyte. The best conditions of the alloy treatment were obtained in the ammonia-carbonate system, where the final product was copper of high purity (99.9%) at the current efficiency of 60%. Thiosulfate solution was not applicable for the leaching of the copper alloy due to secondary reactions of the formation of copper (I) thiosulfate complexes and precipitation of copper (I) sulfide.

**Keywords :** alloy, electrolysis, e-waste, leaching

**Conference Title :** ICWMRE 2015 : International Conference on Waste Management, Recycling and Environment

**Conference Location :** Barcelona, Spain

**Conference Dates :** February 26-27, 2015