# Recycling Of Metallic Values From Gold Plated Brass Scrap

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## Abstract

Waste can be defined as a substance, which may be dangerous to human health and the environment when it is consumed or once the production process is over. The aim of recycling is to use resources efficiently and to ensure that waste with economic value is reprocessed. Gold is a metallic yellow-colored metal mostly used in jewelry, decoration, and electronic applications owing to its high electrical conductivity and excellent corrosion resistance to oxidation and sulfurization. Due to its economic value and its widespread use in many sectors, recycling of gold from secondary sources is crucial. In this research, the recycling processes of gold-plated brass alloy containing 62.8 % copper and 33.6 % zinc were investigated. The first step of this study was the release of gold by dissolving the base material. For this purpose, leaching was carried out using $HNO_3$ and $H_2SO_4$. All of the base material was taken into the solution and only gold flakes were left behind. Upon leaching, it was observed that the gold particles at the bottom of the solution contained some nickel and copper. Therefore, the gold particles were reprocessed with aqua regia and taken up in solution, and then purified in metallic form using $Na_2S_2O_5$ (sodium meta bisulfite). Through digestion of base metal and reprocessing with aqua regia, 0.0614 % gold found in brass alloy was recovered efficiently. Lastly, $CuSO_4$ - $ZnSO_4$ based solution was later subjected to electrolysis in a laboratory-scale cell and copper with 99.5 % purity was obtained with 90 % efficiency.

**Keywords:** Gold, recycling, aqua-regia, electrolysis, leaching