

HYDROMETALLURGICAL EXTRACTION OF GOLD FROM ELECTRICAL & ELECTRONIC WASTE (URBAN MINING)

Abdulrahim Farhat EN293-1351/2014

Brian Kiprof Rono EN293-0635/2014

Abstract

The mining industry of today should be reviewed for alternative sources of mineral to reduce pressure on natural resources of which its over-exploitation can not only lead to a serious land degradation but also cause adverse health problems. The ever increasing levels of electronic waste (e-waste) and limited capacities for disposal and recycling have worsened e-waste management in Kenya.

Therefore, this research studied the feasibility of a simple method for extracting gold from ceramics central processing units (CPUs) of computer circuit boards.

Ceramic CPUs of computer circuit boards were used. Gold was extracted using a hydrometallurgical method in six stages: Disassembling of CPUs, leaching in nitric acid, leaching in aqua regia, removing the excess nitric acid, extracting the gold and washing the gold deposits. Measurements of the extracted gold was carried out by mass spectrometer and XRF analyser.

The mean weight of gold in the first and second stages of leaching was approximately 0.439 and 1.535 g respectively. Following the washing stage, the final weight of the gold was 1.98 g and the final purity rate was about 79.8% (equivalent to 19 carats), and the final gold recovery to yield was 36%.

An understanding of end-user of electronic devices (consumer) participation is fundamental in planning for e-waste management as Kenya has a pending bill on e-waste management since 2013 that stipulates the role of consumers in e-waste management.