EXTRACTION OF SOME METALS FROM ELECTRONIC WASTE

By

Dina Magdy Abdo Rezk

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
DOCTOR OF PHILOSOPHY
in
Chemical Engineering

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Under the Supervision of

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Title of Thesis:

EXTRACTION OF SOME METALS FROM ELECTRONIC WASTE

Key Words:
E-Waste; WPCBs; Nanoparticles; Eco-friendly; Extraction

Summary:
This thesis is based on recycling electronic waste, especially WPCBs, for recovery of important metals present as valuable nanoparticles using simple cost effective and ecofriendly method. The ability of chelation process in recovering metals especially, tin, and Lead from WPCBs is illustrated, and compared with traditional acidic leaching. The effects of leachant concentration (0.1 to 2M), particle size (-0.07 to -3mm), liquid / solid ratio (20 to 30), solution pH (3 to 12), time (0.5 to 4 h) and temperature (50-80 °C) on the extraction process were investigated, in addition selective precipitation of Sn metal as tin oxide nanoparticles (NPs) from the Na_2-EDTA leachant solution was performed via simple co-precipitation route using sodium hydroxide, while copper was precipitated as cuprous oxide NPs from acidic leachant solution using D-fructose as a green reducing agent.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

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