# Recovery of cooper and gold from electronic waste by laser ablation

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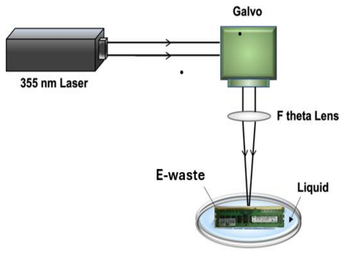
## OBJECTIVE

The project objective is to economically recover critical materials, such as copper, from electronic waste in the form of micro and nanoparticles using a laser processing method. We will employ characterization techniques, including Scanning Electron Microscopy (SEM) for size distribution analysis and Energy Dispersive X-ray Spectroscopy (EDX) for purity assessment of the recovered particles, addressing environmental concerns associated with the disposal of increasing electronic waste.

Note: Electronic waste will reach 74.7 million tons by 2030. Current chemical methods are not economical and have environmental concerns.

## APPROACH



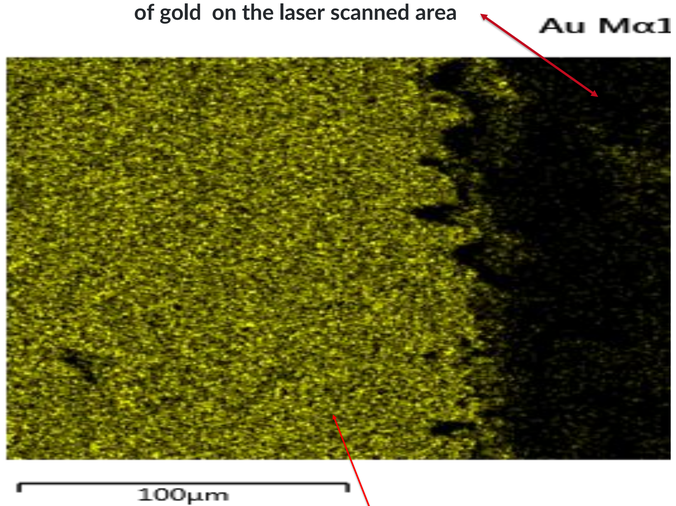

Schematic diagram of experimental setup


## CONCLUSION

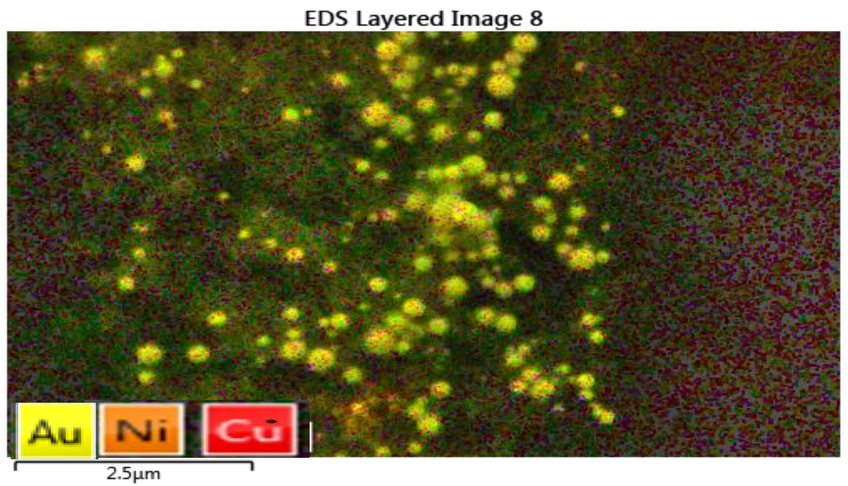
- Demonstrated recovery of gold from E-waste in microparticle & nanoparticle form.
- Optimized process conditions to achieve high purity (up to 90 wt%) recovery of gold nanoparticles without the usage of any hazardous chemicals.
- The market price for gold nanoparticle ranges from $50 to $300 per gram for different sizes of nanoparticles
- The market price for bulk silver is approximately $75.7 per gram , The method represents a significant step forward in the environmentally friendly and cost-effective metal recovery from E-waste.

## RESULTS

EDS image showing complete removal of gold on the laser scanned area




EDS image of gold platted strip before ablation




Gold nanoparticles recovered from waste PCBs with purity of 90 wt%