

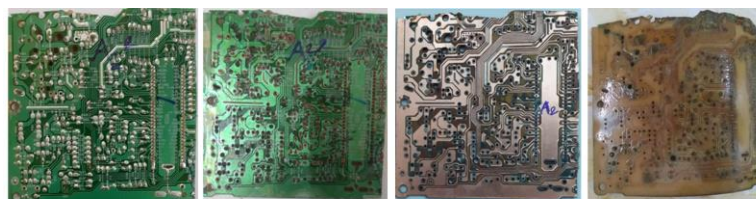
UNMET NEED AND OPPORTUNITY

With rapid urbanization and digitization, the surge in electronic waste demands effective management strategies to prevent environmental pollution and resource depletion. Existing methods for processing waste circuit boards primarily involve acid treatment, which dissolves all metals into a single solution, making selective recovery challenging and posing environmental risks. Alternatively, some approaches use incineration, which leads to air pollution. There is a need for proper e-waste management which can ensure sustainable recycling, reduce production of hazardous waste, and promote a circular economy.

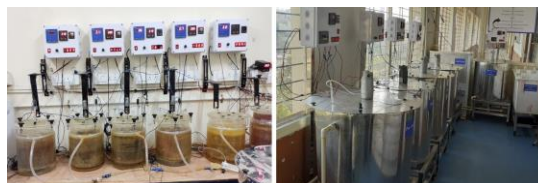
TECHNOLOGY DESCRIPTION

This technology deals with a combination of biological and non-biological solutions for the management of electronic wastes like circuit boards. It is a four-step process involving pre-leaching, pre-treatment, bioleaching and regeneration of leaching agent. Bioleaching has been employed worldwide for extracting metals from low-grade ores.

The process flow for this reaction has been optimized for both pilot scale and large-scale use.



Before pre-leaching After pre-leaching After pre-treatment After bioleaching
Morphology of circuit boards at various steps



Set up of 10L reaction

Set up of 100L reaction

UNIQUE SELLING PROPOSITION

- Cost-effective method.
- Ecofriendly and sustainable method.
- Over 90% metal removal from the waste circuit boards.
- High purity (>90%) of recovered metal.

STAGE OF DEVELOPMENT

The technology has been successfully validated at 100L reaction condition.

INTELLECTUAL PROPERTY

Indian Patent Application has been filed.

MARKET POTENTIAL

The [electronic waste management market in India](#) is projected to reach USD 1.00 billion by 2030, growing at a CAGR of 8.11%. However, only 5% of e-waste is recycled through formal channels, while the remaining 95% is processed in informal sectors, leading to severe environmental and health hazards. The [Indian metal recycling market](#) is projected to reach USD 21.38 billion by 2030, growing at a CAGR of 6%.

LICENSING OPPORTUNITY

BCIL is looking for potential licensees for commercialization of this technology.

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