

South Africa – EUREKA Smart Cities



MINTEK

A global leader in mineral and
metallurgical innovation

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Mintek

- Mintek is South Africa's national mineral research organisation
- Focuses on innovation in mineral processing, extractive metallurgy, metal technology and green technologies.
- Undertakes R&D activities funded by South African state grant and transfers the technology to industry by providing consultancy and testwork services and by technology licensing.
- Has a permanent staff of about 750, including 300 engineers and scientists.
- Mintek's integrated pilot plant facilities, covering minerals processing and hydro-, bio- and pyrometallurgy are amongst the largest in the world.



PROJECT IDEA

- In South Africa, research on e-waste recycling in early stages.
- E-waste stream is growing at a rate 3x that of municipal waste.
- Around 10% of e-waste in South Africa is recycled, majority ends up in landfill
- The South African Department of Science and Technology have declared e-waste a priority waste stream.

- Currently majority of recyclers focus on collection, followed by manual dismantling and sorting.
- Valuable e-waste fractions such as PCBs are shipped overseas to smelters (cherry picking).
- Mintek evaluating:
 - pyro- and hydrometallurgical processes
 - re-use of e-waste plastics



- Due to the low rate of e-waste collection and high cost of transport it is not economically viable to establish a central toll smelter.
- Concept of a mobile hydrometallurgical plant makes more sense.
- The plant will be transported to the recyclers' location instead of transporting large quantities of e-waste over long distances.

Objectives

The specific objectives of the project are to:

- Demonstrate a mobile hydrometallurgical solution for the recovery of valuable materials including precious metals, base metals and rare earth elements from electronic waste fractions such as printed circuit boards, fluorescent lamp powder and cathode ray tube monitors.
- Demonstrate a process for the re-use of e-waste plastics including granulation, palletisation and extrusion with the aim to establish small businesses selling useful products such as roof tiles, gutters, manhole covers and fence poles.

Expected outcomes

- Flowsheet design and cost analysis of a mobile hydrometallurgical process, adapted to the needs of the South African scenario for the treatment of fractions such as PCBs, REE containing powder from the treatment of lamps and CRTs.
- Pilot-scale demonstration of the integrated technology.
- Piloting of a process for the treatment of e-waste plastics to produce useful products. This will be done in collaboration with a small business/existing plastic recycler.
- The outcomes of the project can serve as a model system for the treatment of e-waste in developing countries such as South Africa and the rest of Africa.

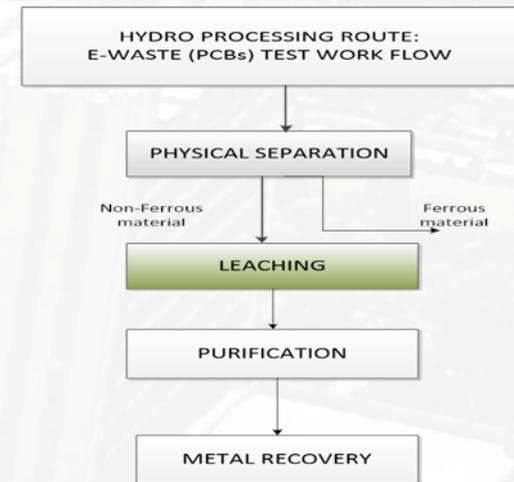
Skills offered and required

What can Mintek offer?

- Provide background information on materials flow, participate in optimisation and piloting of the hydrometallurgical process, provide flowsheets and cost analysis
- Laboratory and piloting facilities, analysis of samples, pre-treatment of waste as well as leaching, metal refining and rare earth separation and recovery.
- Equipment for the extrusion of plastic prototypes.

Expertise required

- To avoid reinventing the wheel, it is proposed that the project build on the technology and know-how already available.
- Pre-treatment of the waste to reduce, e.g. reagent consumption (physical separation and sorting test work).
- Partner collaboration on further improvement in metal refining and economic viability will be required.
- Design of mobile unit – fitting all unit operations in container



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