



Fraunhofer Project Group Materials Recycling and Resource Strategies

We offer tailor made solutions in the business fields of resource strategies, recycling and sustainable material cycles and substitution.

Our services

- Consulting
- Economic feasibility studies
- System analysis
- Material flow analysis
- Development of strategic concepts
- Criticality concepts and analysis
- Analytics of various materials
- Substitution analysis

Our technologies

- Shredding and sorting technologies
- Physical, chemical and biological separation technologies
- Material development

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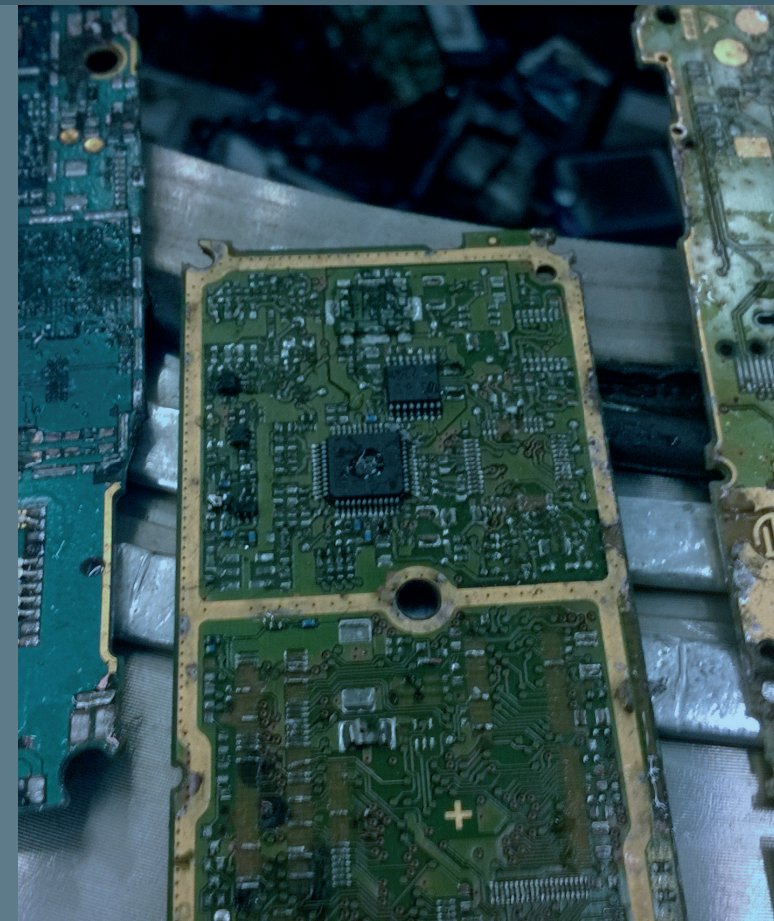
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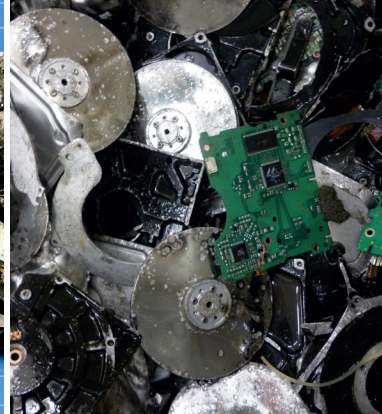
ELECTRO-HYDRAULIC FRAGMENTATION EHF

SELECTIVE SEPARATION OF COMPOSITE MATERIALS





Conventional shredding



Selective fragmentation

The processing of primary and secondary raw materials usually starts with a mechanical treatment. Besides the generation of manageable bulk materials, the disintegration and separation of the materials are essential for the success of downstream classifying and sorting processes.

Conventional comminution: crushing, cutting, shredding

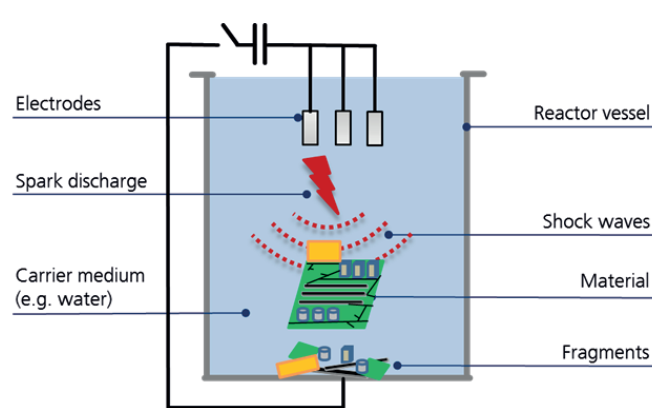
Using conventional processes like crushing, cutting or shredding, the disintegration is usually defined by the lump or grain size: The higher the desired disintegration, the more comminution is necessary.

However, intensive comminution is not the best solution for the disintegration of many composite materials. Despite the enormous energy input the separation is still incomplete or the result are very fine particles that can hardly be classified or sorted.

Electrohydraulic Fragmentation – a new approach

The specific weakening of interfaces within the material enables a selective separation that is largely independent of the degree of comminution. As a result, there is a high liberation of materials without excessive comminution: **As much as necessary, as little as possible.**

The example of the EHF of hard disks shows that individual components can be separated. These components have specific material profiles and can easily be identified. In contrast, shredding destroys valuable components like printed circuit boards or permanent magnets and thus makes the recovery of raw materials more difficult.



The EHF-Technology: Selective and effective

The technology is based on shock waves which are generated by pulsed high voltage spark discharges. The shock waves propagate through the surrounding carrier medium and hit the material. The short but very intense mechanical impacts preferably attack weak spots within the material: The fragmentation occurs at macroscopic joinings (clamped, bonded, screwed) or microscopic phase or grain boundaries.

Application examples

- Fragmentation of WEEE (e. g. mobile phones, hard disks)
- Liberation of metallic inclusions from slags
- Disintegration of fibre composites and laminar structures (e. g. CFRP, GFRP, laminated glass)
- Disintegration of rubber-metal compounds
- Contamination-free comminution of high-purity materials



A pilot plant with high application potential

The Fraunhofer Project Group IWKS is operating a pilot plant that is accessible to the recycling and raw materials industry for processing of specific materials.

Technical Data

- Operating voltage 30-40 kV
- Integrated EMC and noise protection
- Automated operation via touch screen
- Batch operation with manual exchange of reactor vessels
- Reactor vessels with a nominal diameter of DN 400 and volumes of 29 l or 39 l

Our offerings

- Optimization of process parameters for your material
- Detailed evaluation of experiment results
- Physical and chemical analyses of input and output materials
- Economic assessment of your application
- Upscaling for commercial applications