



1 Waste incineration slag before fragmentation (center) and the dried and screened end products.

2 Principles of Electrodynamic Fragmentation.

3 Waste concrete before and after fragmentation.

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ELECTRODYNAMIC FRAGMENTATION

Background

The increasing scarcity of primary natural resources has led to a growing interest in methods of recovering secondary raw materials from the recycling of composites. There is a particular need for solutions capable of separating the various waste fractions and processing them for genuine reuse. Electrodynamic fragmentation is one such solution. It permits the selective separation of a wide range of different composite materials (including waste concrete, incineration slag) into their component parts, thus recovering them efficiently for reuse.

Technology

The process is based on the ability of ultrashort (< 500 nsec) underwater pulses to selectively break up solid materials into fragments. This works because the spark discharged has a marked tendency to travel along the phase boundaries in the solid material. Electrical breakdown generates

a pressure wave ($p = 10 \text{ GPa}$), which breaks down the composite material into its component parts. This technology is already being used for special applications. For the usage in the scope of recycling this technology has to be developed further for larger volume flow as well as to adapt for continuous operation.

Our areas of expertise

- Fragmentation of
 - waste concrete
 - incineration slag
 - slags from metal production
 - mining materials
- Materials analysis of products
 - XRD / XRF
 - Raman microscopy
 - SEM-EDX
 - mechanical testing
- Fragmentation feasibility studies
- Applications research on uses of the end product; e. g. as building materials
- Development of products