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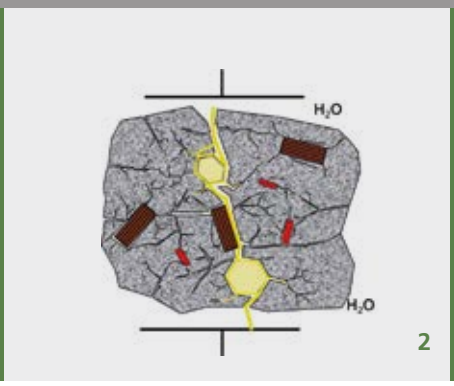

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1 *Waste incineration slag before fragmentation (center) and the dried and screened end products.*

2 *Physical principles of electric pulse disaggregation.*

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, and carbon-fiber-reinforced plastics) 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 discharge has a marked tendency to travel along the phase boundaries in the solid material. Electrical breakdown generates a pressure wave (p = 1 GPa), which breaks down the composite material into its component parts.

This technology is already being used on an industrial scale, for instance to crush high-purity silicon for the manufacture of silicon wafers and solar cells, or to liberate lithium minerals from the surrounding rock matrix. The advantage of this method compared with mechanical processes is that it generates no abrasion, and thus no dust or other contamination.

OUR AREAS OF EXPERTISE

- Fragmentation of:
  - Waste concrete
  - Incineration slag
  - Carbon-fiber-reinforced plastics
  - Electrical and electronic waste
  - Wood-based composites
- Materials analysis of products
  - XRD / XRF
  - SEM-EDX
  - Mechanical testing
- Fragmentation feasibility studies
- Applications research on uses of the end product; e.g. as building materials