Conti-E-Pulse Comminution

Sustainable raw material processing by means of high-voltage pulses is led to industrial application.

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Approximately 7% of the electrical energy generated worldwide is used for comminution processes. In most processes, the feed material is just mechanically stressed. The energy efficiency seldom exceeds 1%. An energetically favourable and resource-saving processing of raw materials by means of high-voltage pulse technology has increasingly come into the focus of scientific research in recent years. In particular, the hybrid technology, i.a. the weakening of the material by means of high-voltage pulses, preferably along grain boundaries of the microstructure, in combination with subsequent mechanical comminution appears to be promising.

For example, an energy saving of 46% could be demonstrated in copper ore processing on laboratory scale. Quartz sand has been freed of undesired ferrous contaminants by the selective liberation of metal-bearing minerals. Further advantages over the purely mechanical comminution methods used hitherto are a higher recovery of material and better concentrate quality. Dust emissions often associated with comminution processes are significantly reduced.

However, systems for high-voltage comminution have hitherto essentially been limited to laboratory systems in batch operation. The few systems designed so far for continuous operation have weaknesses, i.a. due to the stressing of moving components,for instance of conveyor parts, with the high voltage pulses.

The concept presented allows for the continuous use of the innovative technology on an industrial scale with a process room that for the first time does not require any mechanical moving parts, and a scalable pulse generator. It is thus suitable for the processing of both, primary and secondary raw materials as well as building materials.

The system development is carried out by a team of scientists from the TU Bergakademie Freiberg and the TU Dresden and engineers from the medium-sized family owned companies HAVER ENGINEERING GmbH, G.E.O.S. Ingenieurgesellschaft mbH and Thomas Werner Industrielle Elektronik e.Kfm.. In addition to opening up worldwide market potentials for corresponding equipment deliveries by the participating companies, there are opportunities for consulting services and the possibility of spin-offs by participating scientists. Likewise the use in an own raw material project of a partner is in discussion.

With reduced overall costs, raw materials are used more sustainably by Conti-E Pulse Comminution and the environmental impact of raw material production is reduced. Thus, even smaller or more complex deposits with strategic elements (such as indium, tungsten, germanium) that were previously not economically viable can be developed in an environmentally friendly manner and used sustainably -

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an important contribution to the long-term security of Europe's raw material base. In the field of secondary raw materials, slag processing appears to be particularly interesting. Not only can valuable raw materials be recovered, but also waste can be cleared of contaminants and thus sustainably reused as aggregate, instead of occupying valuable landfill space.

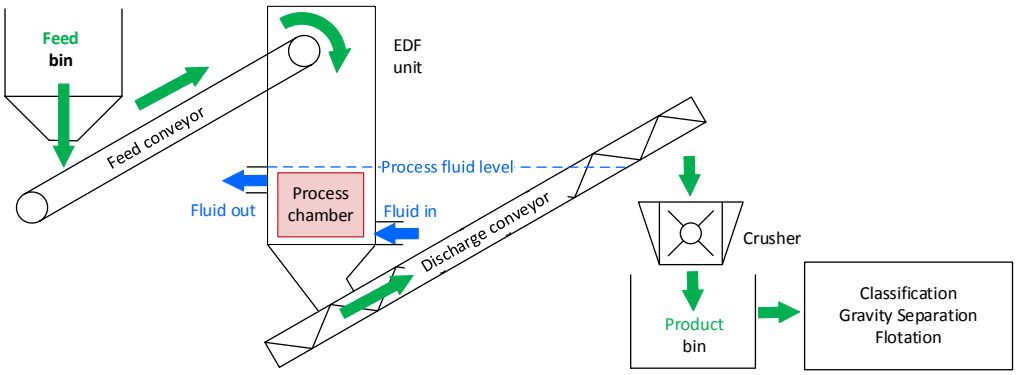

Abb. 1 Process flow chart (Conti-E-Pulse Comminution)

Abb. 2. Laboratory plant at the TU Bergakademie Freiberg

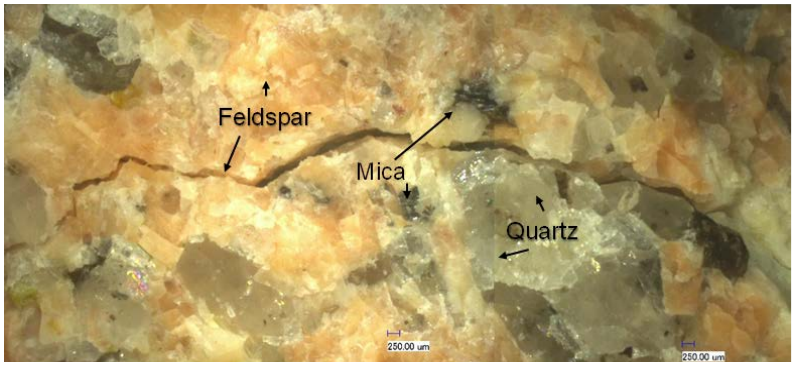

Abb. 3 Selective liberation along the grain boundaries after one high-voltage impulse

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