
How the device and the process parameters influence milling efficiency and agglomeration ?

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Abstract

Although grinding is a widespread operation in industrial processes, it remains poorly understood. The properties of the resulting particles and the milling efficiency not only depends on material properties and loading dynamics, but also on the stress transmission from the grinder to the particles [1]. The development of grinding technologies has followed to a large extent an empirical know-how and many efforts are still needed to better understand the comminution of particles. This objective can only be achieved by increasing the knowledge of the phenomena occurring during the milling in particular the competitiveness between the fragmentation and the agglomeration phenomena [2].

In this work, the key parameters influencing comminution mechanisms and the energy efficiency for grinding are investigated based on an extensive experimental study in different grinding devices. An energy evolution inspired by Rittinger model but taking into account the agglomeration phenomena was proposed and used to compare the milling of mineral, vegetal and their co-milling.

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