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A Novel theory for Energy Considerations in breakage function

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Abstract

The simulation of grinding in tumbling mills using size-mass balance is not sufficiently efficient in simulation of AG/SAG mills and their scale-up. Thus, it is also necessary to regard the required energy for material size reduction. In the present work, the novel theory of specific breakage energy was developed to be considered for energy in comminution modeling which was consistent with common empirical size distributions of broken materials, Gates–Gaudin–Schuhmann (GGS) and Rosin-Rammler (RR). In the given theory, “specific breakage energy distribution” is principal rather than particle size distribution. Based on the theory of specific breakage energy, excess specific breakage energy distribution function (ESBEDF) was defined to explain the effect of impact energy and parent particle size on material breakage. The theory of specific breakage energy was validated by fragment size distribution of three different sets of drop weight tests results. Thus, it was found that ESBEDF is compatible with breakage function,

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