DISCRETE ELEMENT METHOD ANALYSIS OF PARTICLE BREAKAGE MECHANICS IN STIRRED MILLS

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Abstract

The growing demand for energy materials has intensified the need for minerals such as copper, cobalt, and lithium. However, the depletion of ore deposits has resulted in lower-grade ore bodies, necessitating fine grinding (1-10 microns) to liberate valuable minerals. This energy-intensive process presents a significant challenge in mineral processing. Our study employs discrete element method (DEM) simulations to investigate the mechanics of particle breakage in stirred mills. By analyzing stress distribution within the mill, we aim to identify high-stress concentration areas that contribute to particle breakage. The insights gained from this research will inform mill optimization strategies, potentially leading to more effective and efficient grinding processes in the mineral processing industry.

Keywords: Breakage, Ore, Stress, Mineral processing, low-grade