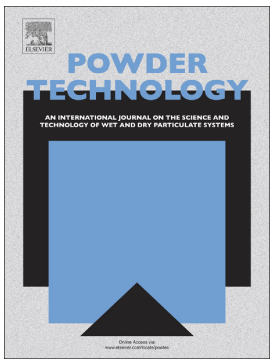

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Mineralogical characterization of the typical coarse iron ore particles and the potential to discharge waste gangue using a dry density-based gravity separation

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Abstract:

Discharging waste gangue from coarse iron ore prior to subsequent upgrading and purification is beneficial to decrease the energy consumption in the grinding stage. In this study, a dry density-based gravity separation technique was used to improve the quality of iron ore by discharging waste gangue. Mineralogical analysis results indicated that the major component of raw iron ore is hematite with small amounts of magnesioferrite and magnetite, and the elements included in the iron ore sample were Fe, Si, S, Mg, Al, and Ca, and the specific iron–compounds (Fe_3O_4, Fe_2O_3, and FeS_2) were determined. High-density gas-atomized iron powder and low-density zircon sand with specific size fractions were validated for appropriateness for mixing in proportion as a binary dense media for the dry separation of coarse iron ore. A regulatory model of the bed density based on the composition of the binary dense media was proven efficient in predicting and adjusting the bed density for separating the coarse iron ore. The actual separation experiments of −31.5+6 mm iron ore indicated that