

Effects of poly-sized grinding media and sodium polyacrylate dispersant on the fine grinding of limestone in a bead mill

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In this study, the fine grinding of limestone was performed by using a kind of circular-type stirred mill called a bead mill. Fine grinding characteristics with poly-sized grinding media with sodium polyacrylate (SPA) dispersant was compared to that when using mono-sized grinding media without dispersant. The fine grindability was evaluated by the mass of the ground product of size below 1 μm , expressed as a function of the number of revolutions of the rotor, the mass of the grinding media and the mass of the sample. The product mass of size less than 1 μm using the poly-sized grinding media and dispersant increased by about 30% in comparison with that using the mono-sized grinding media only. The reasons for improvement in productivity of fine particles of limestone are as follows: the specific surface area of the grinding media was increased by about 10% when poly-sized media was used rather than mono-sized media, and the slurry viscosity of the limestone particles decreased by about 20% with the addition of SPA dispersant in comparison with the case with no dispersant. These results indicate that an increase in frequency of collisions between grinding media and particles occurs when using the poly-sized media and in the presence of added SPA dispersant.

Keywords : Bead mill, Poly-sized media, Sodium polyacrylate dispersant, Limestone, Mass of products below 1 μm