Effect of friction coefficient on the grinding zone of a traditional ball mill using a DEM simulation

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In this study, the effect of the friction coefficient on the milling performance of a traditional ball mill by a discrete element method (DEM) simulation with different experimental conditions. Using the ball motion of the DEM simulation was obtained as the optimal friction coefficient under different friction coefficient compared with actual motion and photographs taken by the digital camera and the snapshot images analyzed. In the simulation, the rotation speed of the mill, the materials and linear velocity of grinding media, and the friction coefficient between the balls and the wall of pot fixed into actual experimental conditions. We observed the linear velocity according to the friction coefficient. As a result, the friction coefficient increases with linear velocity. Finally, grinding experiments using a traditional ball mill by the same experimental condition with DEM simulation were conducted to verify the simulated results.

Keywords: traditional ball mill, optimal friction coefficient, DEM simulation, linear velocity