

X-Ray Computed Tomography for analysis of gangue mineral rejection by gravity preconcentration

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ABSTRACT

Specific gravity washability curves used in the coal industry to define the theoretical gravity separation efficiency can be used in the same way for evaluation of preconcentration operations in the metal mining industry. These theoretical metal recovery/gangue rejection curves, which establish the maximum in gravity separation efficiency, can be determined from 3D image analysis by high resolution X-ray computed tomography (HRXCT) rather than by sink-float analysis using heavy liquid fractionation. In this way, the tedious, time-consuming, and toxic use of heavy liquids for laboratory sink-float analysis is avoided. In addition to the theoretical gravity separation efficiency curves by HRXCT, further 3D particle information on mineral composition and texture is obtained, including its grain size distribution. Experimental HRXCT results for low grade sulfide ores are presented and compared to the results from dense media cyclone experiments in order to evaluate the efficiency of gangue mineral rejection.