

INCREASING THE CARBON GRADE OF GRAPHITE BY VARYING PARTICLE SIZES USING THE GRAVITY SEPARATION TECHNIQUES

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Graphite is one of the main exporting mineral commodities in Sri Lanka which is found as flake graphite, vein graphite and amorphous graphite. Kahatagaha, Bogala and Ragedara mines produce world's best quality graphite with Carbon grades over 90%. Quartz, pyrite, chalcopyrite, feldspar, calcite etc. are the associated trace minerals found with the graphite. Froth flotation is one of the physio-chemical separation techniques. Nevertheless, it cannot be considered as an eco-friendly and a cost-effective method since chemicals used for froth flotation of graphite are toxic and expensive. In this research, Humphrey Spiral was used as the gravity separation technique to process the low-grade carbon, according to the particle sizes and also by varying the splitter distances. Flow rates, splitter distances and particle sizes were taken as variable parameters. Particle size of the samples tested were from 50-500 μm . The results concluded that low grade graphite can be processed up to 60-80 % or higher grade from an initial carbon grade of 37.89 %, by narrowing the splitter distance. To obtain the optimum carbon grade, particle size distribution, percentages of mineral in relation to the particular particle size should be studied, and suitable flow rate is to be selected accordingly. Further, splitter distance should narrow down the area of tailing conduit, in order to attain an optimum carbon grade.

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