

Increasing the Purity of Graphite Samples Taken from the Under Flow of the Froth Flotation Process Using a Gravity Separation Method

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Graphite is the 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 a Carbon grade over 90%. Quartz, pyrite, chalcopyrite, feldspar, calcite etc. are the associated trace minerals with the graphite. Froth flotation is one of physio-chemical separation technique. 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. Moreover, froth flotation does not provide the optimum separation and about 37% of graphite get mixed with the underflow. In this research Humphrey Spiral was used as the gravity separation technique to process the under flow taken from froth flotation. Flow rates, splitter distances and particle sizes were taken as the parameters. Particle size of the sample tested were from 50-500 μm . The results concluded that under the flow, graphite can be processed up to 80% or higher grade from an initial grade of 37.89% with flow rate of 888 ml splitter distance at position 3 and for particle size between 300-500 μm . To obtain the optimum grade, particle size distribution, percentages of mineral in relation to the particular particle size should be studied and suitable flow rate chose accordingly. Further, splitter distance should be narrowed down the area of tailing conduit to attain an optimum grade.

Keywords: Graphite, Graphite Processing, Gravity Separation, Spiral