Abstract
Talc is an industrial mineral that has a theoretical formula of Mg₃Si₄O₁₀(OH)₂; it has been used in many industries such as paper making, paint, plastic, food, pharmaceuticals, cosmetics, ceramics, etc. The characteristics of the talc mineral in this project was investigated using X-ray diffraction and it was found to contain a fair amount of magnesite and iron oxide as major gangue. Experiments were conducted based on the interest of how well gravity separation (Spiral concentrator and Knelson concentrator) methods could enhance the whiteness of this specific talc mineral.

Theory & Equipment

Gravity Separation
Gravity separation is a type physical separation method that relies on the density difference of valuable mineral and gangue.

Spiral Concentrator
Wet spiral separation is the technique used in this project. It is based upon a combination of the solid particle density as well as the particle’s hydrodynamic properties.

Particles in spirals follow two simple rules of separation:
• Light and large particles are pushed into the outer radius region and flow down.
• Heavy and fine particles remain in the inner radius region and flow down.

Experiment Design
Talc, as the valuable mineral, has specific gravity of approximately 2.5 while one of the major gangue, iron oxide, has specific gravity of about 5.2.
• The objective is to concentrate the light particles (Talc).

Results
Talc and Iron Oxide Grade
The objective of this project is to improve talc grade whilst reduce gangue material’s mainly by spiral concentrators.

Whiteness
Whiteness is one of the most important criteria to decide the grade of talc; it is evaluated by the brightness and yellow index.

Conclusion & Future Work
• Gravity separation is proven to be an useful experimental method to improve the whiteness of Talc magnesite containing magnetite.
• Future work is mainly about optimizing the best condition for gravity separation of Talc.

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References