

## SGS GRAPHITE CAPABILITIES

SGS is the world's leading inspection, verification, testing and certification company. We partner with you to offer independent services that will help you reduce risk, streamline your processes and operate in a more sustainable manner.

With our global network of industry specialists and cutting-edge facilities, SGS Minerals Services provides trusted third party services to exploration and mining companies, financial organizations and governments around the world. We provide a full range of testing, consulting, technology, laboratory, inspection and certification services to the minerals industry. To meet the challenges of this dynamic sector, we are constantly expanding our service offering across our global network. Our experts can help you make the most of market developments and advances in technology, enabling you to maximize opportunities and stay ahead of your competitors.

### GRAPHITE PROCESSING

Graphite is found as flakes, veins and amorphous masses. Due to its unique physical properties, graphite is used in applications such as refractories, batteries, steelmaking, lubricants, brake linings, fire retardants and reinforcements in polymers. Flake size, distribution and grade are the key factors in determining value and price of a graphite product. For example, jumbo flake (>48 mesh) or large flake (>80 mesh) graphite grading better than 95% carbon is suitable for use in lithium batteries.

Flotation is a common means of processing graphite but other approaches



can be necessary, depending on the concentrate grade required. Further upgrading of the flotation concentrate to grades greater than 99.5% carbon is generally achieved through hydrometallurgical processing. SGS offers a range of different upgrading routes that have been successfully demonstrated for different graphite deposits.

### FLWSHEET DEVELOPMENT

Graphite is a highly hydrophobic mineral and is easily recoverable by flotation. However, in the case of flake graphite, the preservation of the flakes is key to maximize the value of the final concentrate. SGS has the expertise, technologies and experience to determine the most effective and economical way to process your material



Our experienced professionals use conventional mineral processing technologies, including:

- Grinding
- Classification
- Magnetic and/or gravity separation.
- Mechanical and column flotation

We configure the flowsheet to ensure that liberated graphite flakes that meet the minimum specifications are removed as soon as possible. The remaining graphite is then upgraded by removing impurities from the surface of the flakes.

Exploratory bench-scale tests are performed to develop a preliminary flowsheet and determine the flake size distribution in the final concentrate. We then optimize this and determine the variability.

A pilot plant is typically required to confirm the final flowsheet under continuous operating conditions and to generate concentrate for downstream testing of potential buyers. SGS pilot plant programs are key ways to mitigate technical risk and are industry-recognized internationally.

If battery grades of graphite are required, the flotation concentrate can be upgraded through hydrometallurgical processing using conventional technologies and methods developed by SGS for this specific application.

## ANALYTICAL AND MINERALOGICAL SERVICES

Our state-of-the-art analytical laboratories have specific methods and protocols for graphite applications. These address the unique challenges associated with characterizing graphitic carbon in feed and concentrate samples. Our Advanced Mineralogy Facilities (AMFs) offer optical mineralogy and QEMSCAN® analysis as a diagnostic tool in support of process development work. Many of SGS' laboratories comply to the ISO/IEC 17025 standard for specific registered tests.



SGS has over 70 years experience finding practical, effective solutions to industry challenges. Our technical team offers you a unique, industry leading depth and breadth of services for graphite. Put SGS on your team and gain the competitive edge that follows when you have a flowsheet that is optimized for your ore.

### CONTACT INFORMATION

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