FACT SHEET

BATTERY & ENERGY METALS

With the the push towards a net zero future, the production of renewable energy sources is becoming increasingly more important. Technologies such as wind power, solar power, and batteries need a wide range of minerals to produce.

Overview

Battery and energy metals constitute a wide range of materials required for the energy sector. Intertek Minerals defines a battery and energy metal as any metal that is necessary for the transition towards net zero through the development of renewable energy technology. To ensure a net zero future, the world needs to expand production in electric motors, energy storage, carbon capture and storage, electric vehicles, nuclear power, solar photovoltaic cells. LED's, and wind power.

It is estimated that the current production of battery and energy materials needs to increase by a factor of 5 by 2030 to keep up with the demand of the renewable energy sector. As a result, the quantification of battery and energy metals critical in both the exploration sector and the production sector. This flyer outlines the recommended analytical techniques for the quantification of Li, rare earth elements, Cu, Mn ores, graphite, U, and battery and energy metal concentrates..

Our Expertise

Intertek Minerals has a wide range of packages that are available for the quantification of battery and energy metals. The category of battery and energy metals constitutes a large number of metals and minerals, therefore there are a large number of testing methods available. Quantification may be required for the battery and energy metals for exploration, grade control, or resource development purposes or for the impurities in the battery and energy metal concentrates. To best determine the appropriate quantification method for your samples, please contact your Intertek representative.

Factor of 5
BY 2030

Estimated increase required for Li-Ion battery production to keep up with the demand of the renewable energy sector

>20
ELEMENTS

Number of Rare Earth Elements that are critical for the transition to a net zero future

Lithium

Li is a commodity of interest in the renewable energy sector being a major component in batteries. It is a lithophile element that occurs predominantly in silicate minerals where it is diadochic with K, Na, Fe and Mg. Sources of Li include brines, certain granite pegmatites in the minerals spodumene, petalite and lepidolite and clays, hectorite, in particular.

Two methods are available for the quantification of Li. Multi acid digestion may be suitable for simple silicate-hosted Li assays, Li minerals in pegmatites may be associated with other important economic minerals such as columbite-tantalite, wolframite and cassiterite which require fusion decomposition to quantify accurately. Intertek Minerals has extensive experience with Li analysis in pegmatites, alkaline rocks and brine solutions as well as almost all common geological materials including vegetation. For analysis of Li bearing lithologies that contain significant quantities of Sn, Ta, Nb a fusion digest is recommended to accurately quantify these refractory elements.

Rare Earth Elements

Rare Earth Elements (REE) cover the 15 elements from Y to Lu and are playing a significant part in the worldwide push to net zero. The selection of the correct analysis package for your samples is imperative as REE are generally dispersed within the earth's crust and do not form concentrated ores. They are often contained within refractory minerals meaning particularly aggressive digestion techniques are required.

To ensure full quantification of your rare earth samples, Intertek Minerals offers two fusion packages; a peroxide fusion and a borate

BATTERY & ENERGY METALS

fusion. The instrument used for the analysis is an Triple Quadrupole Inductively Coupled Plasma Spectrometry (ICP-MS-QQQ) for an interference free analysis of rare earths to achieve the low detection limits required for exploration samples. If you have high concentration samples with the need for highly precise quantification, Intertek Minerals can provide an XRF package.

Along with the REE contained in refractory minerals, they are also often bonded to clay. The concentration of rare earths in clays are often lower but are extracted much easier through an ion exchange method. Intertek Minerals offers a package that replicates the larger scale process with an ion exchange with ammonium sulphate and subsequent analysis via ICP-MS-QQQ.

Copper

A spectrum of analytical techniques are offered that add value to the Cu industry supply chain. These include ultra-sensitive exploration methods, ore grade characterisation and empirical digestion techniques that target Cu in different forms. Intertek Minerals offers a number of partial digests, including acid soluble and cyanide soluble Cu, to target particular Cu containing minerals. Acid soluble Cu refers to the metal content extractable using dilute sulfuric acid. This includes the most common oxide Cu species malachite, azurite and chrysocolla. Cyanide soluble Cu includes most oxide minerals, common sulfide minerals but not chalcopyrite.

These techniques are empirical in that the recovery depends on the conditions of the digest, the degree of comminution and the deportment of the metal in the ore. Total Cu is offered by four acid digest. Umpire and commercial exchange assay services are available at Intertek's specialist LSI laboratory, for minerals trade services.

Manganese Ore

XRF, with a single point LOI (1000°C), is routinely used in the accurate quantification of the chemical components of Mn ores. A complete oxide suite is analysed which includes Pb and Ba. These two elements can be important components of the ore and the concentrations of these elements are required to do the requisite matrix corrections in the XRF analysis.

Intertek Minerals ICP instruments at the Global Centre of Excellence

Graphites

Important commodities in the battery and energy sector are not exclusively metals. Graphite is a critical component in lithium-ion batteries, acting as the anode. Intertek Minerals offers packages suitable for C analysis with an analysis for total carbon and an acid digest followed by analysis for non-carbonate carbon and graphitic carbon.

Uranium

U is a metallic, radioactive element which has some affinities with REE, Th, Y, Zr Mo, Ba and Ca. It occurs in a variety of primary and secondary minerals. Most exploration programs exploit the radioactive properties of U with radiometric surveys the first step in a U exploration program, however, be aware of the limitation of such surveys. Intertek Minerals offers a wide range of analysis techniques that can be used in conjunction with the radiological surveys for the quantification of U in your samples. A multi-acid digest is often suitable for exploration samples with a fusion-ICP or XRF package offered for higher concentrated ores.

Battery and Energy Metals Concentrates

It is sometimes not necessary to quantify the concentration of the battery metal but to quantify the impurities within the concentrate. Oxide and hydroxide concentrates of Al, Co, Ni, Li, and Mn are used in batteries often require purities of greater than 99.99%. Intertek Minerals offers numerous packages for the quantification of impurities of battery and energy metal concentrates.

Additional Capabilities

For the quantification of your battery and energy minerals, please contact your Intertek Minerals representative to determine the most appropriate analytical package. If your specific requirements are not featured in our price book, please get in touch to discuss your needs with our technical team in order to find the best solution.

FOR MORE INFORMATION

+618 9263 0100

min.aus.per@intertek.com

intertek.com/minerals