

How to use an alloy spectrometer for testing

Article Overview

Using an alloy spectrometer involves proper sample preparation, instrument calibration, spark excitation, and spectral analysis to accurately determine the elemental composition of metals.

1. Sample Preparation

Proper sample preparation is critical for accurate results. The metal surface should be clean, flat, and free of oxides, grease, or coatings. For aluminum alloys, samples can be in the form of chill cast disks, sheets, plates, or extrusions. Homogeneity is important; uneven surfaces or segregated elements can affect precision. For best results, follow recommended grinding and polishing procedures to expose a representative surface of the alloy .

2. Instrument Setup

Modern alloy spectrometers, such as the ARL easySpark, use spark excitation under an argon atmosphere with CCD or PMT detectors. Ensure the instrument is powered on, temperature-stabilized, and argon flow is active. The spectrometer should be positioned on a stable surface, and safety interlocks must be engaged before testing .

3. Calibration

Calibration is essential for accurate quantification. Use certified reference materials that match the alloy type being tested. Many modern spectrometers feature automatic calibration routines (e.g., iCAL 2.0) that compensate for environmental changes and reduce drift. Typically, a single calibration sample per day is sufficient for stable operation .

4. Measurement Procedure

- Clamp the sample securely in the spectrometer to ensure consistent contact.
- Initiate the spark discharge, which melts, atomizes, and ionizes a small portion of the metal surface.
- The emitted light passes through a diffraction grating and optical system to the detector, producing a spectrum of element-specific wavelengths.
- The spectrometer software analyzes the spectrum and compares it to calibration curves to determine the concentration of up to 40 elements in a single measureme...

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Analysis of Aluminum and its Alloys

Introduction nalysis of aluminum and its alloys. The instrument takes advantage of modern CCD technology combined with the lates

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1.1 This test method describes the analysis of aluminum and its alloys by spark-atomic emission spectrometry (Spark

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This technology is widely used for metal analysis, alloy verification, precious metal testing, and RoHS

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This arc spark spectrometer is even able to identify low alloy steel with the carbon content during the rapid

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Standard Test Method for Analysis of Aluminum and Aluminum Alloys

It is expected that laboratories using this test method will prepare their own work instructions. These work instructions

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Optical Emission Spectroscopy OES Uses & Applications Guide

Explore the most common applications of optical emission spectroscopy (OES) in metals manufacturing, quality

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