LEADING WITH INNOVATION

Rigaku Analytical Devices

APPLICATION NOTE

ROBUST RECYCLED ALUMINUM IDENTIFICATION USING HANDHELD LIBS

- Scrap metal identification in seconds
- Alloy grade separation that's precise
- Rugged and light-weight advantage
- Reduced licensing/registration

As the global demand for aluminum (Al) increases, the role of recycled aluminum has become more significant. Accurate alloy grade verification is essential throughout the life-cycle of aluminum-based products. This is particularly true in secondary production because scrap aluminum is often obtained from a variety of sources. Ultimately, profitability and product quality are greatly impacted by incorrect scrap sorting.

KT-100S
Handheld LIBS Analyzer

MODERN METAL RECYCLING REQUIREMENTS

To meet the rigorous demands of modern aluminum recycling, handheld tools must provide accurate alloy grade separations for fast scrap identification. Equally important, the device must be robust to withstand harsh scrap yard environments while being easy to operate for users of all skill levels. Previous generation handheld analyzers often require annual licensing and registration, may not be tolerant for rugged use and are not sensitive enough for rapid and accurate analysis of light base metal alloys - such as aluminum alloys.

ADVANCEMENTS IN LIGHT ELEMENT ANALYSIS

Laser-Induced Breakdown Spectroscopy (LIBS) offers a new and improved way to identify elemental composition for both heavy and light elements in metals. The Rigaku KT-100S handheld LIBS analyzer utilizes a 1064nm laser excitation to measure light alloying elements and identify the most popular aluminum grades.

To demonstrate precision, assayed concentrations were plotted versus their certified concentrations using standards with a wide dynamic range of Magnesium (Mg) and Silicon (Si). Multiple measurements were then taken using KT-100S. Figures 1 and 2 at the right show this device's accurate quantitation of the standards' concentrations (larger blue dots) which consistently match the plotted data.

Shown below in Figure 3, the precision and reproducibility of the KT-100S across multiple units is clearly demonstrated in a subsequent study where data was collected using 4 different units. The measurements were repeated 10 times per unit and resulted in consistently accurate identification of Mg concentrations.

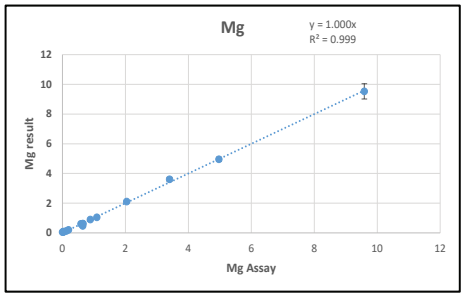

Figure 1 Magnesium

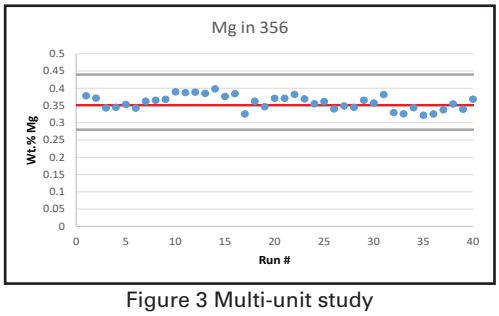

Figure 3 Multi-unit study

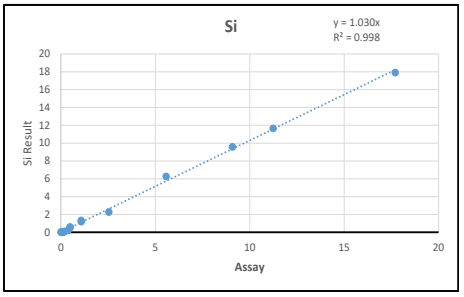

Figure 2 Silicon

CONCLUSION

Regulatory iniatives, financial gains, political views, and environmental factors will continue to drive the reuse of aluminum in metal production. Handheld LIBS technology provides advanced analysis for faster and more accurate grade identification and sorting, generating higher scrap recycling profits. With superior levels of detection for magnesium (Mg) and silicon (Si), and grade identification in only 2 seconds, the KT-100S LIBS analyzer delivers a unique advantage resulting in a cost-effective handheld analysis tool that is easy to integrate into any scrap metal sorting process.

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