

Li Lithium 3.091	Be Beryllium 9.012	B Boron 10.811	C Carbon 12.011	N Nitrogen 14.007	O Oxygen 15.999	F Fluorine 18.998	Ne Neon 20.180										
Na Sodium 22.990	Mg Magnesium 24.305	Al Aluminum 26.982	Si Silicon 28.086	P Phosphorus 30.974	S Sulfur 32.06	Cl Chlorine 35.45	Ar Argon 39.948										
K Potassium 39.098	Ca Calcium 40.078	Sc Scandium 44.956	Ti Titanium 47.88	V Vanadium 50.942	Cr Chromium 51.996	Mn Manganese 54.938	Fe Iron 55.845	Co Cobalt 58.933	Ni Nickel 58.693	Cu Copper 63.546	Zn Zinc 65.38	Ga Gallium 69.723	Ge Germanium 72.64	As Arsenic 74.922	Se Selenium 78.96	Br Bromine 79.904	Kr Krypton 83.796
Rb Rubidium 85.468	Sr Strontium 87.62	Y Yttrium 88.906	Zr Zirconium 91.224	Nb Niobium 92.906	Mo Molybdenum 95.94	Tc Technetium 98	Ru Ruthenium 101.07	Rh Rhodium 102.905	Pd Palladium 106.42	Ag Silver 107.868	Cd Cadmium 112.411	In Indium 114.818	Sn Tin 118.71	Sb Antimony 121.76	Te Tellurium 127.6	I Iodine 126.905	Xe Xenon 131.29

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.

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.



KT-100S
Handheld LIBS Analyzer

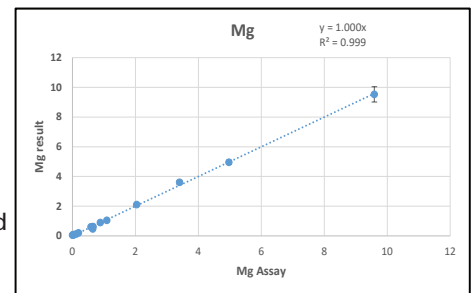


Figure 1 Magnesium

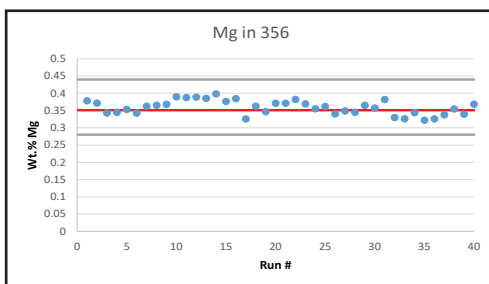


Figure 3 Multi-unit study

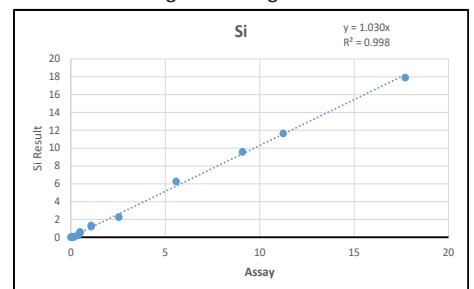


Figure 2 Silicon

CONCLUSION

Regulatory initiatives, 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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