LEADING WITH INNOVATION

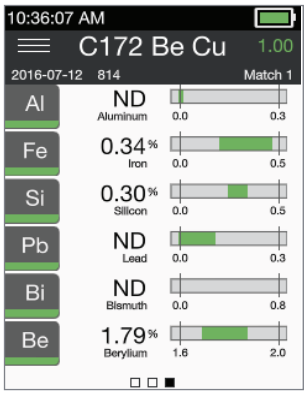
Rigaku Analytical Devices

APPLICATION NOTE

ACCURATE IDENTIFICATION OF LIGHT ELEMENTS IN COPPER ALLOYS USING HANDHELD LIBS

- Identification in seconds
- Precise copper grade separation
- Certified rugged to withstand drops
- No licensing/registration requirements*

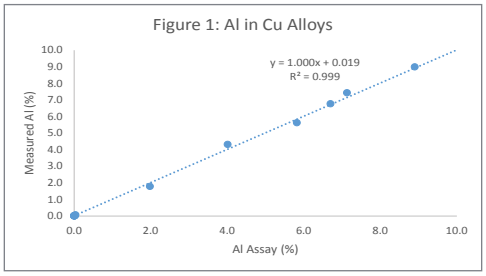
Copper (Cu) is one of the most commonly used metals in various applications dating back thousands of years. Pure copper is most commonly used in electrical applications because of its superior conductivity, ductile form, and corrosion resistance. In addition, there are over 400 different Cu alloys – including brasses, bronzes, and cupronickel – used in construction, plumbing, and transportation. Because copper-based alloys are so common and are made up of various light elements, it is difficult for recyclers to accurately verify grades using old methods.

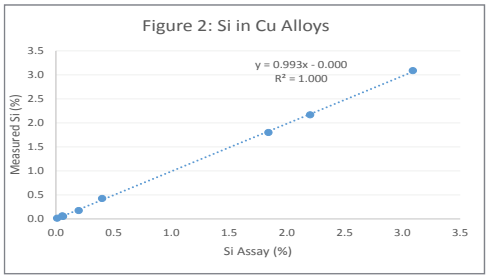


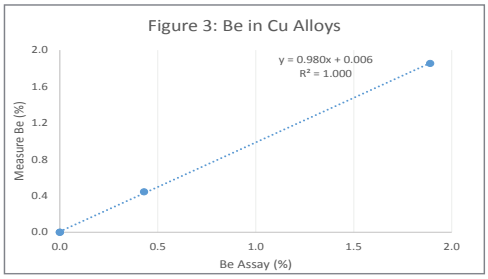
Analysis of a copper alloy using KT-100 Katana.

IMPROVED SORTING PRECISION

Improved analytical capabilities have been made available in copper alloy recycling through the use of on-site tools – such as handheld x-ray flourescence (XRF) analyzers. However, XRF is very limited for accurate light element analysis, can require regulatory registration/licensing, and is typically not robust enough to withstand the harsh environments of modern day recycling. A recently introduced analytical tool with much superior light element detection is the handheld KT-100 Katana analyzer. KT-100 utilizes laser induced breakdown spectroscopy (LIBS) and has been drop-tested with a MIL-STD 810G certification for durability. To demonstrate its performance, a number of analyses were performed on in-house certified reference materials (CRM) containing light elements, including aluminum, silicon, and beryllium. Each CRM was analyzed 10 times and the average of these readings was used to plot the given versus calculated trends for Al, Si and Be shown below in figures 1-3. Figure 4 shows the precision and accuracy of KT-100 for two copper reference standards that contain Al, Si and Be. The standard was analyzed 10 times and the average, standard deviation and relative standard deviation (RSD) are included.







Figures 1-3.

Standard	MBH 31x B25		MBH 36x CBC2
	Al (%)	Si (%)	Be (%)
Average	0.46	0.24	0.45
Std. Dev.	0.024	0.012	0.018
RSD (%)	5.24	4.87	3.98
Assay	0.47	0.25	0.45

Figure 4. Precision and accuracy of KT-100 for two copper reference standards that contains Al, Si and Be.

CONCLUSION

This study clearly demonstrates the capabilities of KT-100 for identifying light atomic number elements in copper alloys, such as aluminum bronzes, silicon bronzes, and beryllium coppers. KT-100 also identifies all the common grades of copper, brass, bronze and most other metals and alloyed metals in an average of two seconds. Its use of LIBS technology means there are no regulatory licensing or registration requirements.* Additionally, KT-100 is the only handheld metal identification device certified rugged to withstand repeated drops and other environmental rigors found in harsh environments.

Rigaku Analytical Devices

Rigaku Analytical Devices
Toll Free: +1 855.785.1064
Direct: +1 781.328.1024
Email: info@rigakuanalytical.com
www.rigakuanalytical.com

*Varies by state/country. Please contact Rigaku or your local distributor for more information.