ADVANTAGES OF THE SGM XRF-BS VERSUS THE LIBS
(Laser Induced Breakdown Spectroscopy).

ALUMINUM SCRAP

- Better performing in case of critical material surfaces (painting, dirt, ...). Even though the XRF-BS technology is also a surface analysis, it interacts deeper into the material.

- Greater accuracy as XRF-BS performs a continuous analysis vs LIBS which performs a spot micro analysis.

- More competitive price-wise in terms of cost per ton per hour capacity.

SGM
TECHNOLOGY AND PROXIMITY

SGM WORLDWIDE

Always available, near you, in your language.

The SGM business model is based on providing technological expertise, staying close to its customers through a network of SGM Magnetics corporations located in Italy, Germany, UK, Belgium, USA, China, Mexico and India, as well as a few long standing agents with extensive experience in the SGM products and technologies.

Because the BEST SOLUTION is often a combination of different BEST TECHNOLOGIES!

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SGM
TECHNOLOGY AND PROXIMITY

SGM XRF-BS
X-RAY FLUORESCENCE BACK SCATTERING

A new technology
for the sorting of aluminum alloys

Patent pending

X-RAY BACKSCATTERING

THE TECHNOLOGY

X-ray Back Scattering is a well-known underlying phenomenon to the X-ray Fluorescence.
The combined analysis of the two phenomena is at the basis of the SGM proprietary XRF-BS sorter and offers a more accurate and extended analysis for sorting different metals from each other.

Fluorescence

The Fluorescence is the physical phenomenon by which an atom emits a photon when struck by a high energy photon provided by a specific X-ray source. The emitted photon is called fluorescence photon and its energy level is specific to every chemical element and can be seen as its chemical signature.
The X-ray Fluorescence separation technology consists in the spectrographic analysis (intensity/energy) of the distribution of the fluorescence photons emitted by a material and captured by some XRF sensors called SDD (Silicon Drift Detectors) during a certain time frame called acquisition time (2-3 milli seconds).
Traditional XRF sorters only work on the identification of heavy metals as those chemical elements are characterized by fluorescence photons with levels of energy that are high enough to be sensed by the XRF sensors.
XRF spectrographic analysis displays peaks indicating concentrations (high intensities) of photons of some specific energies characterizing the presence and concentration of some specific heavy metals or heavy metals alloys.

Back Scattering

The X-ray Back Scattering phenomenon is an underlying phenomenon to the fluorescence and is generally considered as rumor in the XRF spectrographic sorting analysis as, instead of being represented by a few high intensity peaks of specific energies, it is characterized by a continuous distribution of low intensity photons.
Standard XRF spectrographic sorting analysis filters Back Scattering information by disregarding signals below a certain intensity.
XRF Back Scattering signals are also specific to the chemical composition of the material analyzed and, the combination of the peak analysis provided by the XRF together with the specific profiles of the continuous low energy signals provided by the Back Scattering, allow for a more accurate identification of heavy metals from each other but also for the sorting of most of the different aluminum alloys series from each other.

**SGM XRF-BS PROTOTYPE.
INDUSTRIAL COMMERCIAL VERSION EXPECTED FOR
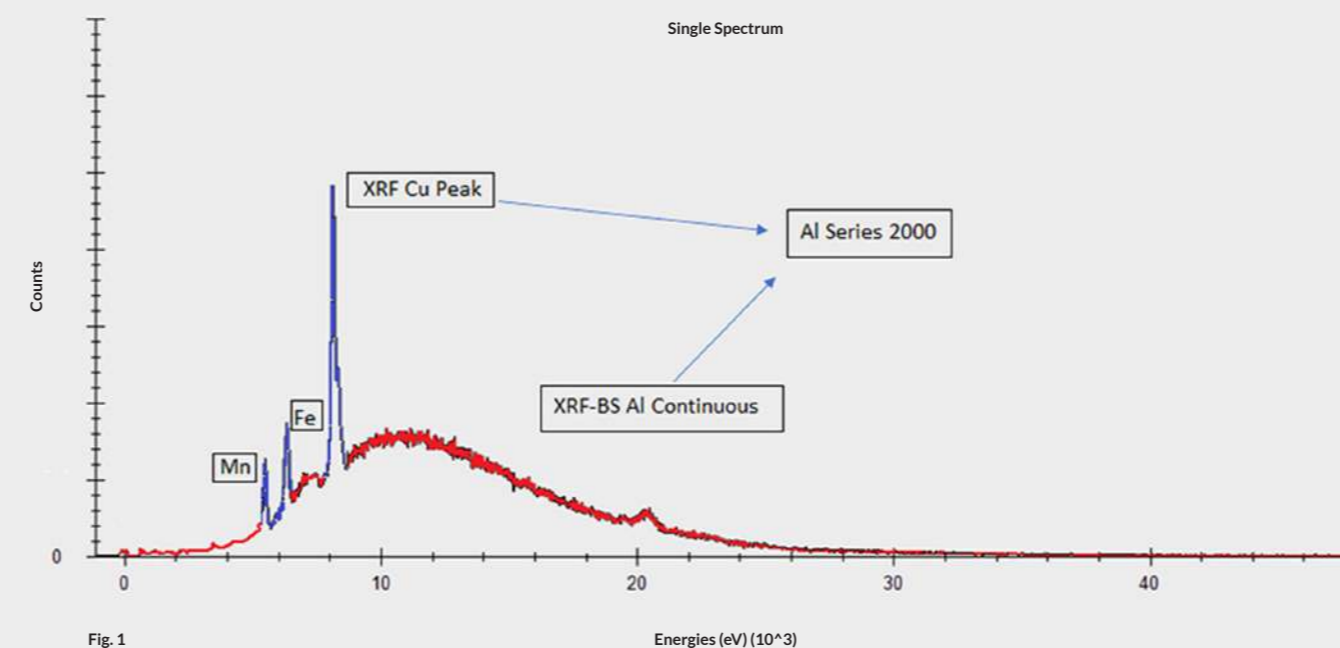SEPTEMBER 2022**

HOW IT WORKS

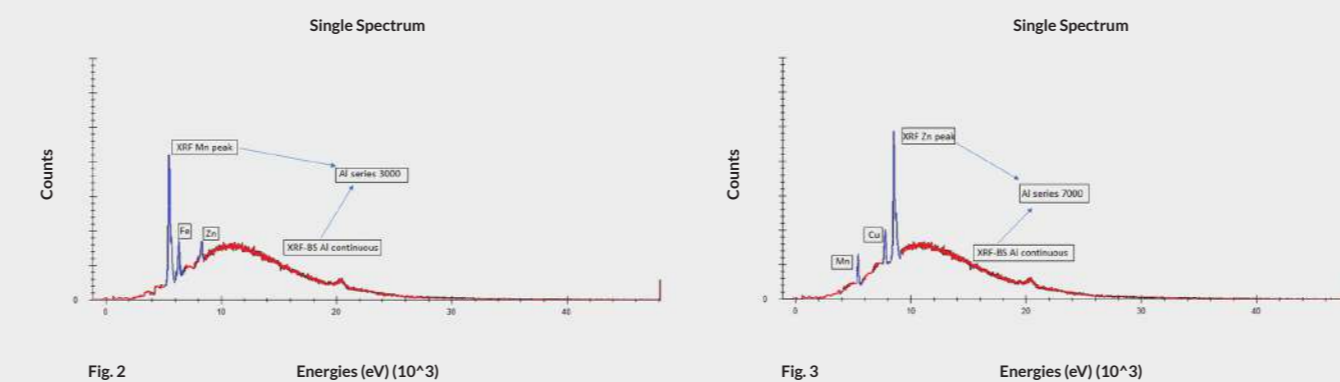Single Spectrum

XRF Cu Peak

Al Series 2000

XRF-BS Al Continuous

Fe

Mn

Counts

Fig. 1

Energies (eV) (10^3)

Single Spectrum

Fig. 2   Energies (eV) (10^3)

Single Spectrum

Fig. 3   Energies (eV) (10^3)

Fig. 1.
The presence of XRF Back Scattering **Continuous** distribution of low intensity energy photons characteristic of Aluminum with a **Peak** (high intensity, specific energy) characteristic of Copper (3-4%) indicates that we are in the presence of 2000 series Aluminum.

Fig. 2-3.
In the same way, the presence of a profile of **Continuous** characteristic of Aluminum (high intensity, specific energy) with a **Peak** characteristic of Manganese (2-4%) or Zinc (2-4%) would respectively indicate that we are in the presence of Aluminum of the 3000 or 7000 series.

WHAT XRF-BS DOES

Aluminum scrap

Sorting of scrap aluminum in different alloy series (2000, 3000, 4000 and 7000) with the exception of the 5000 series from the 6000 one.
Advantages of the SGM XRF-BS versus the LIBS (Laser Induced Breakdown Spectroscopy).

■ Better performing in case of critical material surfaces (painting, dirt, …). Even though the XRF-BS technology is also a surface analysis analyzer, it interacts deeper into the material.

■ Greater accuracy as XRF-BS performs a continuous analysis vs LIBS which performs a spot micro analysis.

■ More competitive price-wise in terms of cost per ton per hour capacity.

Capacity on aluminum scrap: fraction 30 mm – 120 mm/1 ¼" – 5": > 1 ton per hour.

Sorting of aluminum scrap in different alloy series (2000, 3000, 4000 and 7000) with the exception of the 5000 series from the 6000.