MICRO-XRF

Dual Detector Option for M4 TORNADO

Reduced shadowing through mirror-symmetric detectors

Precision meets performance in micro-XRF analysis

High-speed micro-XRF analysis relies not only on strong excitation but also on detectors with high signal throughput. These detectors must efficiently collect and transfer large numbers of counts into the spectrum. Signal collection can be enhanced by increasing the detector's active area or placing it closer to the sample.

By integrating multiple detectors with independent signal processing units, the system enables parallel data handling, resulting in significantly higher count rates and improved analytical performance.

The M4 TORNADO features a mirror-symmetric detector arrangement relative to the X-ray beam, which simplifies the interpretation of element distribution images. Contrary to common belief, shadows in these images stem from detector geometry, not excitation. Imagine the detector as a flashlight illuminating the sample, while the beam acts as the observer. Shadows appear when the detector's view is obstructed, especially in samples with complex topography.

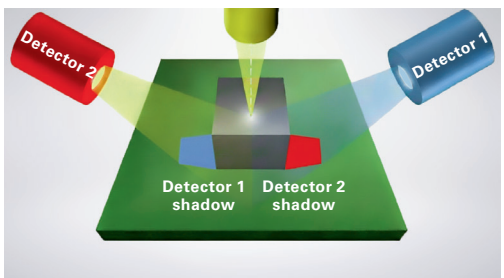
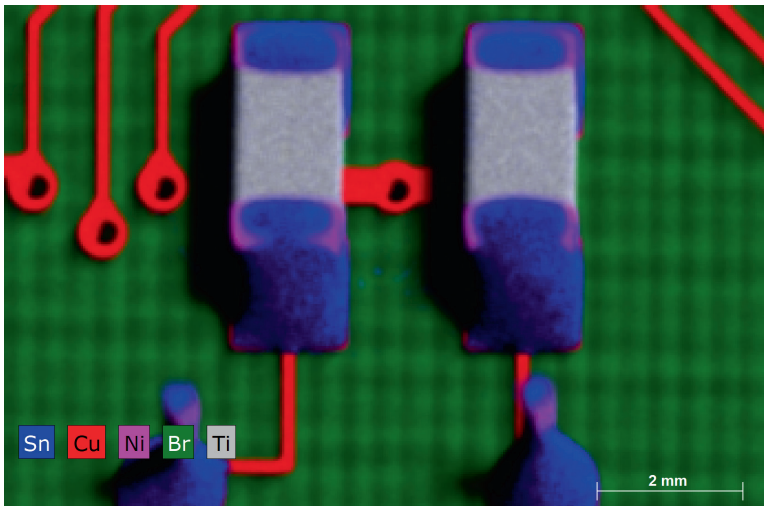


Figure 1
The shadow on element distribution images is solved with the dual detector configuration.



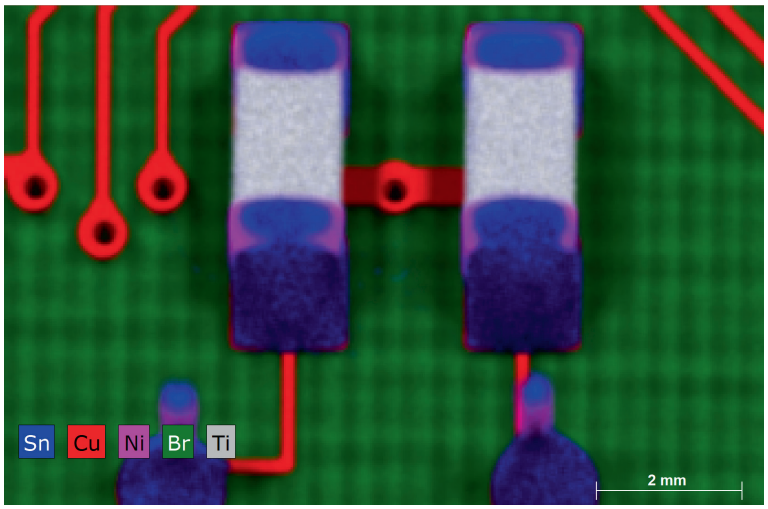


Figure 2 (top)
Elemental distribution on a populated printed circuit board (PCB), measured with a single detector positioned on the right. Shadows on the left indicate obstructed line of sight.

Figure 3 (bottom)
Elemental distribution on the same PCB using two mirror-symmetric detectors positioned on both sides of the beam. This setup significantly reduces shadowing and clearly reveals component connections.

Twice the insight. Beyond expectations.

Micro-XRF performance is never about a single feature. It is the result of a finely tuned balance of innovation, expertise, and precision – working together to deliver exceptional results. Driven by a passion for precision, our technology empowers users to push the limits of elemental analysis.

Designed to deliver deeper insights and exceed analytical standards, the M4 TORNADO's dual detector system delivers high performance with lasting durability. Detectors are among the most sensitive components in micro-XRF, especially in EDS-based analysis. Bruker ensures long-term reliability with integrated mechanical safeguards that protect the detectors from collision during operation.

Depending on the sample, millions of X-ray counts may be generated, but only efficient detection ensures meaningful results. Bruker's high-performance DANTE digital signal processors enable up to 500,000 counts per second, actively identifying and suppressing pile-up for optimal data quality and acquisition speed.

Bruker's advanced software automatically corrects detector artifacts such as escape peaks and pile-up, ensuring precise results. Backed by over 30 years of expertise in energy-dispersive spectroscopy, it delivers reliability and efficiency you can trust.

Bruker AXS
info.baxs@bruker.com

www.bruker.com/m4tornado