

AZtecWave – WDS and EDS Hardware

Wave WDS Spectrometers and Ultim[®] Max large area EDS detectors

AZtecWave

AZtecWave combines the unique power of WDS to **resolve X-ray peaks** and **quantify minor and trace elements** with the speed and flexibility of EDS. It uses the Wave WDS spectrometer which has the highest spectral resolution available for SEM to ensure more overlaps can be resolved and lower detection limits can be achieved. As the only EDS detector that gives the highest accuracy even at high count rates, Ultim Max combines with Wave to form the world's highest performing microanalysis system.



Ultim Max large area SDD detectors

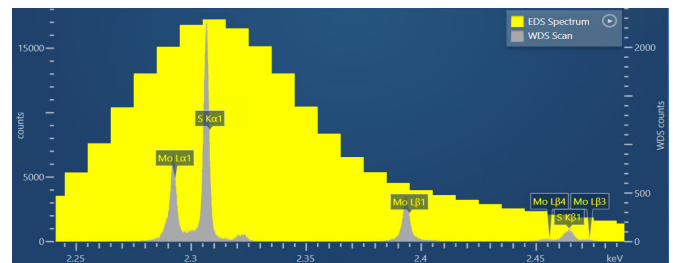
The latest EDS detector technology and pulse processing for faster and more accurate EDS collection and analysis

- Extreme electronics in Ultim Max detectors coupled with the X4 pulse processor, provide accurate and reliable data at high count rates typical when combining analysis with WDS
 - Accurate Quant analysis up to 400,000cps
 - X-ray mapping >1,000,000cps
- Guaranteed performance at high count rate and at high and low energy, fully in line with ISO15632:2012
 - Carbon, fluorine and manganese resolution all guaranteed at 130,000cps
- Up to 170mm² large area detectors for more flexible and sensitive EDS analysis, e.g. for very high spatial resolution SEM-EDS
- Unique Max+ assembly ensures EDS is collected under optimum count rates even when simultaneously collecting WDS data at hundreds of nA beam current

Wave fully focussing WDS spectrometer

AZtecWave uses the fully focussing Wave spectrometer with Rowland Circle geometry and curved crystals

- Outstanding spectral resolution to fully resolve the most closely spaced X-ray lines meaning the most challenging problems are easily solved
 - SiKa <2eV
 - FeKa <25eV



The highest SEM-WDS resolution available - for separation of closely spaced lines, such as S Ka = 2.307 keV and Mo La = 2.293 keV

- Higher peak to background ratios mean detection limits lower than 100ppm can be routinely achieved for many elements
- Motorised counter entrance slit optimises resolution and peak to background for every X-ray line
- Optimised for a wider range of energies using higher energy lines for more accurate quantitative results
- Unique dual counters in series using Ar-CH⁴ for optimised light element and Xe for optimised high energy collection
- Inclined geometry for fast, reproducible and easy sample positioning
- Spectrometer miniview and mimic shows spectrometer position and setup at all times



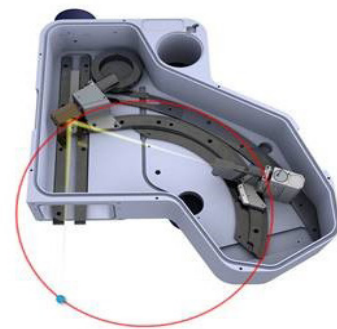
WDS Hardware – Wave Spectrometer with W1 electronics	
Geometry	Fully focussing Rowland Circle
Orientation	Inclined
Quantification range	Wave 500 - 0.17-10.84 keV B (5) to Pu (94) Wave 700 – 0.07 – 10.84 keV Be (4) to Pu (94)
Spectral resolution	SiKa <2eV FeKa <25eV
Detection limit	SiKa – 9ppm FeKa – 15ppm
X-ray counters	P10 (Ar-CH4) flow and Xe sealed
Motorised gate valve to microscope	Standard

EDS Hardware – Ultim Max with X4 electronics	
Sensor size	40mm ² to 170mm ²
Detection range	Be (4) to Cf (98)
Resolution @130,000cps Fully in-line with ISO15632:2012	MnKa <127eV FKa <64eV CKa <56eV
Mapping input count rate	>1,000,000cps
Quantitative count rate	>400,000cps
Motorised slide	Standard
Max+ assembly - with selectable apertures for optimum EDS at high beam current	Included for compatible microscopes
x-stream2/micsF+ electronics	Option – required for Energy+ electronics

Rowland Circle Geometry

The Wave spectrometer uses a unique geometry for WDS on the SEM. For this geometry the sample, diffracting crystal and counter must be positioned on the Rowland Circle

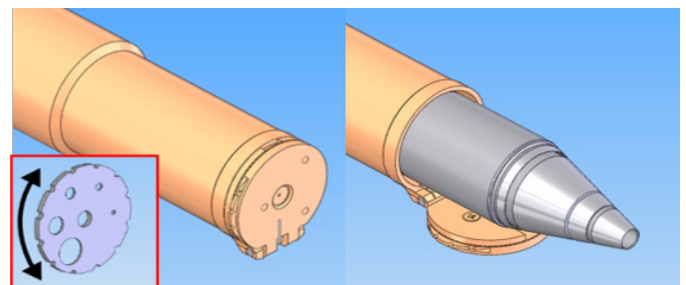
- The distance between sample and crystal and counter and crystal must be the same
- Bent and ground crystals are used for best resolution
- No requirement for fragile optic, slow mechanical alignment or transmission losses for higher energy lines
- This unique geometry works at all energies and provides real WDS spectral resolution on the SEM



Max+ assembly optimises EDS when using very high beam currents

The Max+ assembly has apertures of varying size used to reduce X-ray count rate into the EDS detector when working at very high beam currents

- Optimum EDS performance always achieved so the analysis can be optimised for WDS detection
- AZtecWave always produces accurate answers



Max+ assembly operation

Visit nano.oxinst.com/AZtecWave

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