BRUKER

Layer Analysis

- Full Control over Coating Analysis with Micro-XRF

Micro-XRF

Innovation with Integrity

Non-destructive Layer Analysis

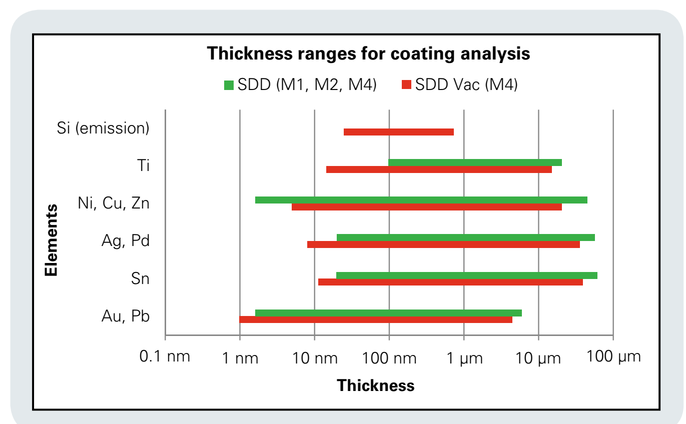
The XSpect Pro / XData package is a powerful and versatile software for the non-destructive characterization of metal multi-layers. XSpect Pro / XData runs on Bruker's small-spot spectrometers M1 MISTRAL and M2 BLIZZARD. The micro-spot spectrometer M4 TORNADO uses the combination of its native ESPRIT and the XMethod software. Analysis is performed in accordance with ASTM B568 and DIN/ISO 3497.

XSpect Pro for instrument control and analysis

- Instrument control with tube and acquisition time settings
- Monitoring of instrument stability and drift correction
- Support of correct sample positioning by camera system, including auto focus
- Mouse, foot switch and touch screen operation
- Spectra acquisition, display and processing
- Spectra evaluation with peak fit and intensity calculation
- Standard-based or standard-supported quantification of bulk and layer samples
- Report generation and data archiving

XMethod / XData for method and standards management

- Standard sample manager
- System spectra manager
- Spectra display and processing
- Method creation for standard-based or standard-supported bulk and layer quantification
- Calibration of standard-based and standard-supported methods for bulk and layer quantification
- Analytical method manager

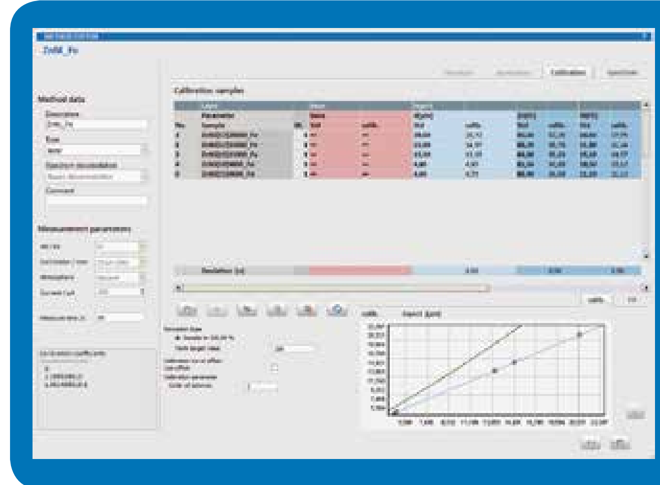


Measurable thickness ranges for selected coating systems using different detectors and measurement conditions. The limits of detection for layers depend on the instrument geometry of X-ray tube and detector. Thinnest layers or layers consisting of lighter elements need to be measured under vacuum (SDD Vac, M4 TORNADO).

Fast, Easy and Reliable

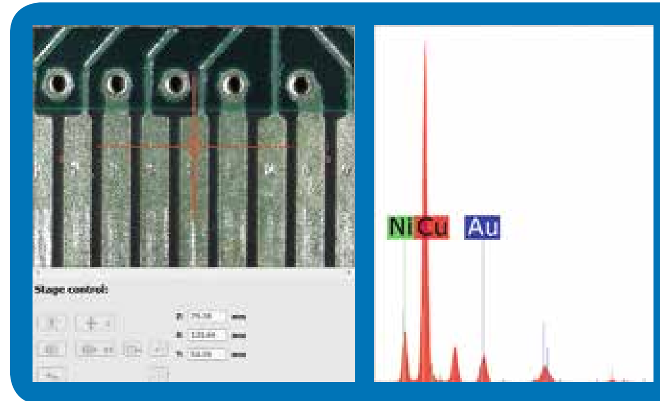
Set-up

- Create method structure with elements and layer order
- Set basic parameters
- Load standards suitable for the method structure
- Define calibration regions
- Calibrate all layers and concentrations



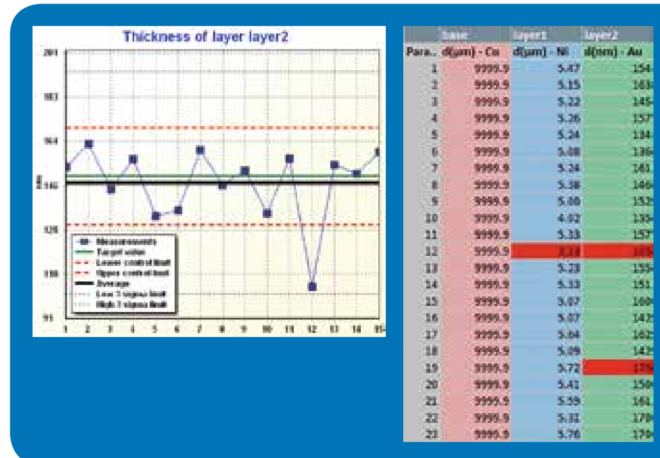
Measure

- Position sample
- If desired, save sample image
- Perform acquisition
- For spectrometers with motorized stage: perform MultiPoint measurement
- Automatically save spectra for later reprocessing



Evaluate

- Quantify according to the selected method
- Present results, e.g. as
  - Trend-line graphics with additional statistical information
  - Result table with PASS/FAIL highlighted
- Generate reports or export results to Excel®.



Instrument specifications

Parameter	M1 MISTRAL	M2 BLIZZARD	M4 TORNADO
Element range	Ti (22) to U (92)		Na (11) to U (92)
External dimensions (W x D x H)	550 x 680 x 430 mm³	1055 x 680 x 430 mm³	815 x 680 x 620 mm³
Sample chamber size (W x D x H)	480 x 490 x 200 mm³	–	600 x 350 x 260 mm³
Z-travel (max. sample height)	120 / 80 mm	20 mm	120 mm
Measurement medium	Air		Air, low vacuum
Sample positioning	Auto Z, programmable X-Y-Z stage	Auto Z	Programmable X-Y-Z stage
Stage resolution	10 µm		4 µm
Auto focus	Standard, MultiPoint	Standard	Standard, MultiPoint
Excitation	40 kV W or 50 kV W	50 kV W	50 kV Rh (W, Cr, Mo on request)
Spot size	0.1 mm to 1.5 mm using collimator		< 20 µm using polycapillary optics
Detector	Single SDD, 30 mm²		Single or double SDD, 30 mm² or 60 mm²
Maximum count rate	40,000 cps		400,000 cps
Energy resolution at Mn Kα	< 150 eV		< 145 eV
Maximum number of layers	12 (up to 25 elements each)		unlimited

Application examples

Application	Layer Type	M1 MISTRAL	M4 TORNADO
Automotive	Cr/Ni/Cu(ABS), Ni/Al, Cr-Ni/Al, Zn/Fe, ZnNi/Fe	X	X (thin layer)
Electronics	Au/Ni/Cu Sn(Pb)/Ni/Cu Au/Ni/Cu(PCB) SnPb/Cu(PCB) SnAgCu/Cu(PCB)	X	X
Microelectronics	Au/Pd/Ni/Cu Ag/Cu AuAg/Pd/Ni/Cu	X X X	X (sensitivity) X (spot size) X
General Metal Finishing	Cr/Ni/ABS Cr/Ni/Cu/Fe(Zn)	X	X
Jewelry	Rh/Au/PdNi/CuSn/Brass Au/PdNi/Ni/Brass	X	

Analyis performed according to ASTM B568 and DIN/ISO 3497 standards.

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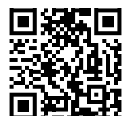

www.bruker.com/layeranalysis

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