EDAX Smart Insight

AMETEK® MATERIALS ANALYSIS DIVISION

Product Bulletin - Micro-XRF

Orbis Coating Software

- Non-destructive, non-contact measurement for coating thickness and composition
- Measurement of single element and alloy layers
- Fundamental parameter algorithm allows for measurements without standards or with calibration standards for improved accuracy
- Suitable for measurements on small components or multiple measurements on larger parts to determine coating homogeneity

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With the Orbis coating analysis package, the Orbis micro-XRF spectrometer can make simultaneous measurements of layer thickness and composition of a multi-layered material structure.

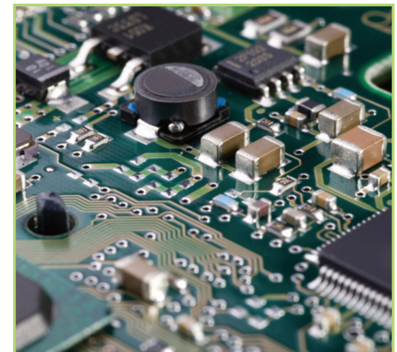
The Orbis micro-XRF system is well-suited for making nondestructive, non-contact measurements on individual, small components or multiple measurements on larger parts, to determine thickness and compositional homogeneity.

The Orbis coating analysis software package is based on EDAX's patented fundamental parameter software for bulk quantification.

Applications

The use of coatings in the modern manufacturing world continues to increase in an effort to improve product performance and reduce product cost. Orbis coating software can be used to measure coating structures employed in a wide variety of fields including:

- Microelectronics packaging and interconnect
- Optical filters
- Photovoltaics
- Anti-corrosion coatings
- Data storage/HDD
- Wear resistance
- RoHS applications
- Semiconductors
- Non-destructive testing - museum artifacts and currency notes



Electrical contacts on printed circuit board.

Photovoltaic panels.

Turbine blades in a jet engine.

Specifications

- Simultaneous measurement of thickness and composition of up to five layers
- Thickness measurements from 1 nm to 50 µm
- Fundamental Parameter algorithm
- Consistent with coating thickness measurement standards EN ISO 3497 and ASTM B568
- Available as an option on all Orbis micro-XRF analyzers

Features and Benefits

Measurement of thickness and composition on up to 5 layers with maximum 10 elements per layer

- Capable of analyzing complex layer structures and alloy layers

Thickness measurements from 1 nm to 50 µm depending on elemental line series available

- Capable of measuring thin precious metal passivation layers and thick wear/heat resistance coatings

Fundamental Parameter algorithm allows for “No Standards” measurement mode and calibration with minimal standards for improved accuracy

- Does not require calibration standards to enable measurements

Consistent with coating thickness measurement standards EN ISO 3497 and ASTM B568

Example

As an example of the power and utility of using the Orbis micro-XRF analyzer for coating analysis measurements, a CIGS/Mo photovoltaic cell was measured to determine the homogeneity of coating thickness and composition in a solar cell.

The CIGS layer is comprised of Cu, In, Ga, and Se coated on a Mo layer which in turn was supported on a glass substrate.

The Orbis measurements clearly show how the CIGS layer thickness (Figure 1) varies over this portion of a solar panel due to plasma eposition edge effects while the Se composition (Figure 2) is relatively homogeneous except for the extreme edges.

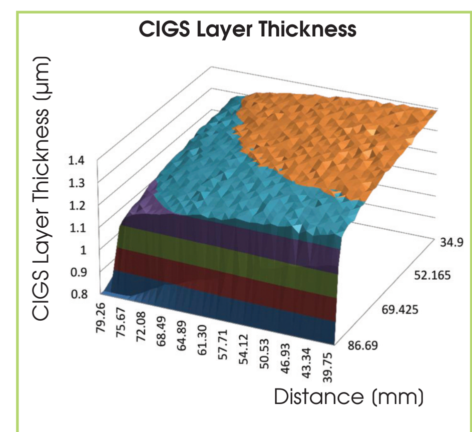


Figure 1. CIGS Layer Thickness.

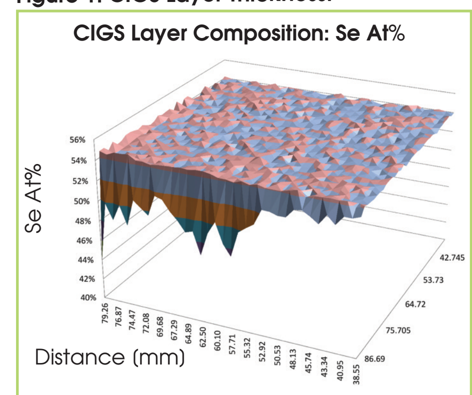


Figure 2. Se Composition of CIGS Layer.

Conclusion

The coating analysis software module enhances the analytical capability of the Orbis product line. It enables our customers to leverage the speed and sensitivity of their Orbis system to characterize complex coating structures quickly and accurately.

For more information about our products, contact edax.sales@ametek.com or visit us at edax.com.

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