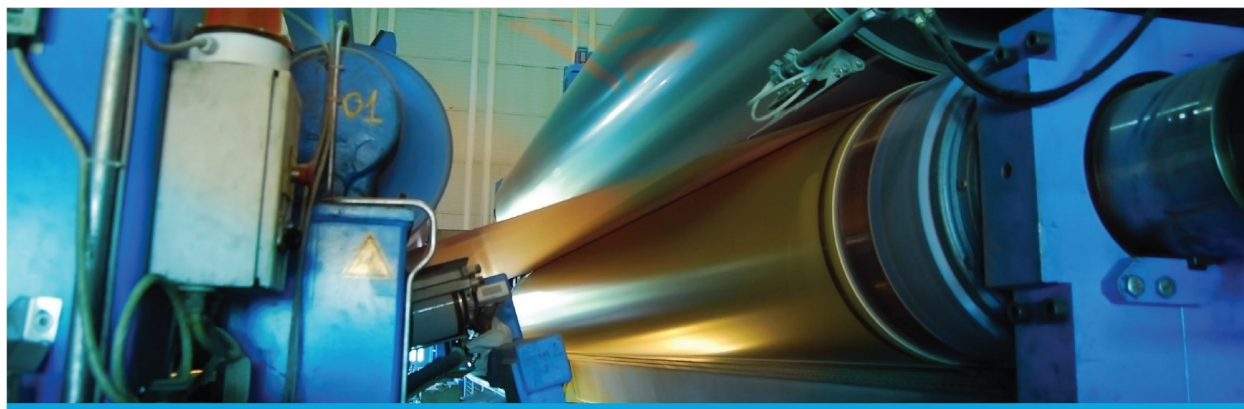


XRT1306 - Aqueous chemical bath containing Ni, Co, Mo, Zn, In



Scope

Measurement of aqueous chemical bath solutions containing nickel, cobalt, molybdenum, zinc, and indium is demonstrated.

Background

Surface treating is an important part of the manufacturing of copper foil for the electronics industry. Surface treatments are used to clean the copper foil, to create roughing and heat resistance treatments, and to make single or multiple layer thin film coatings to prevent oxidation or enhance the electro-chemical properties of the copper foil. The chemical baths must be constantly monitored to ensure the highest quality surface treatments. Rigaku offers the [NEX OL](#) analyzer to meet these analytical needs for trend analysis of bath composition.

Calibration

Empirical calibrations were developed using aqueous samples. A summary of typical calibration is shown here.

Component	Concentration range (ppm)
Zn	750 – 1425
In	140 – 320
Ni	4500 – 5500

Mo	780 – 1525
Co	1275 – 1750

Sample recovery and precision

A representative mid-concentration standard was selected and analyzed against the empirical calibrations to demonstrate effective recovery and precision. The sample was analyzed 10 consecutive times in a static position. Typical performance results are provided below.

Sample ID: Zn-In-Std3 / Units: ppm

Element	Assay value	NEX OL value*	Std. dev value*	RSD(%)
Zn	1100	1118	16	1.5
In	220	222	3	1.2

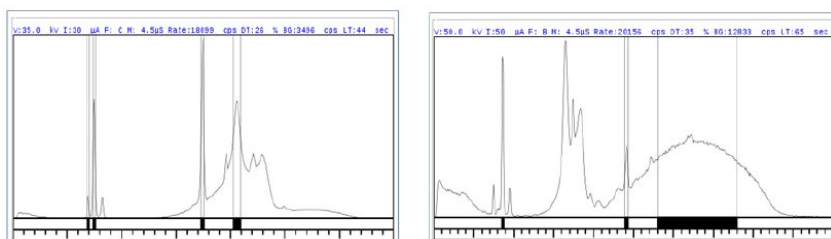
* NEX OL value reflects the average of the 10 repeat analysis

Sample ID: NMC Std3 / Units: ppm

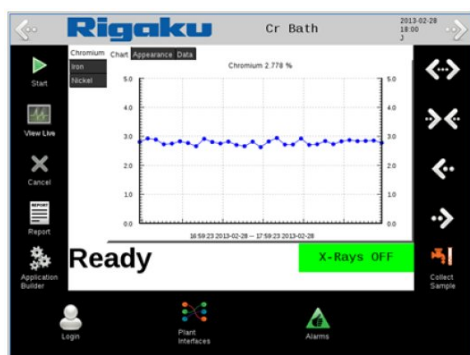
Element	Assay value	NEX OL value*	Std. dev value*	RSD(%)
Ni	5200	5362	36	0.7
Mo	1100	1115	4	0.4
Co	1500	1547	19	1.3

Multi-element analysis

The Rigaku NEX OL system uses a high-resolution semiconductor detector that achieves excellent resolution and sensitivity. Adjacent or near-adjacent elements can be measured with little or no peak overlap, as shown in these typical spectra.



NEX OL features and benefits



- Real-time process control
- Trend analysis charting
- Capable of measuring elements Al to U, depending on application
- Robust Rigaku NEX QC+ optical kernel with SDD detector
- Industrial touchscreen user interface
- Unique toolless flow cell design

Conclusion

The NEX OL offers high-throughput manufacturers a simple yet powerful and versatile system for quantifying the elemental composition of their process stream. The results of this study indicate that given stable samples, proper sample handling, and proper calibration technique, the Rigaku NEX OL EDXRF can achieve excellent results in monitoring the concentration of chemical solutions used in the manufacturing of copper foil.

Related products



NEX OL

On-line, multi-element process analyzer for liquid stream applications