Rigaku

NEX CG

Cartesian Geometry Energy Dispersive X-ray Fluorescence Spectrometer

EDXRF for high sensitivity elemental analysis of Na to U in solids, liquids, powders, and thin films

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Energy Dispersive X-ray Fluorescence

- Analyze ^{11}Na to ^{92}U non-destructively
- Solids, liquids, powders and thin films
- Polarized excitation for lower detection limits
- Semi-quantitative analysis without standards
- Reduced standards requirements with RPF-SQX
- Novel treatment of peak overlap reduces errors
- Simplified user interface with EZ Analysis

Versatility for qualitative and quantitative elemental analysis

Energy dispersive X-ray fluorescence (EDXRF) is a routinely used analytical technique for the qualitative and quantitative determination of major and minor atomic elements in a wide variety of sample types. The heart of its versatility stems from the ability to provide rapid, non-destructive, multi-element analyses – from low parts-per-million (ppm) levels to high weight percent (wt%) concentrations – for elements from sodium (^{11}Na) to uranium (^{92}U).

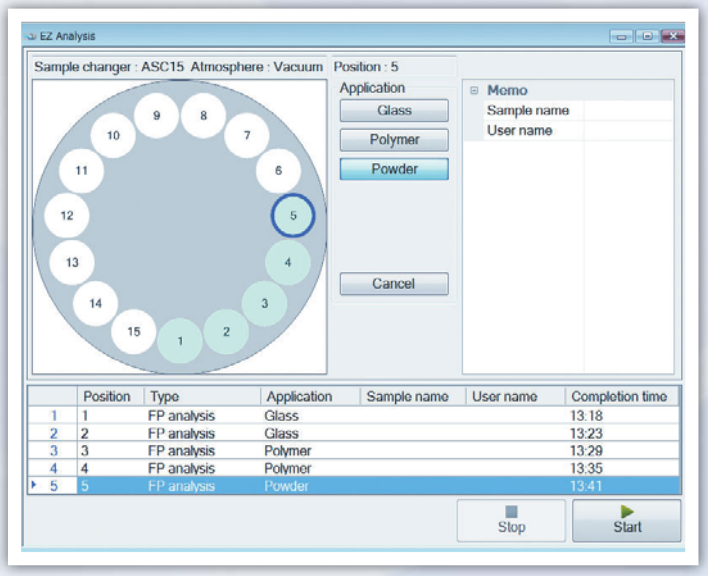
The versatile Rigaku NE**X** CG EDXRF spectrometer delivers routine elemental measurements across a diverse range of matrices – from homogeneous, low viscosity liquids – to solids, metals, slurries, powders and pastes. Especially well suited to the semi-quantitative determination of elemental content in complete unknowns, the superior analytical power, flexibility and ease-of-use of the NE**X** CG add to its broad appeal for research, industrial and in-plant monitoring applications.

EZ Analysis interface for simple routine operation

Rigaku NE**X** CG software was developed to be both extraordinarily powerful and extremely easy to use. Ideal for non-technical operators, routine analyses are performed through a simplified customizable EZ Analysis interface:

1. **Select the sample position and enter a name**
2. **Select the application method**
3. **Press start**

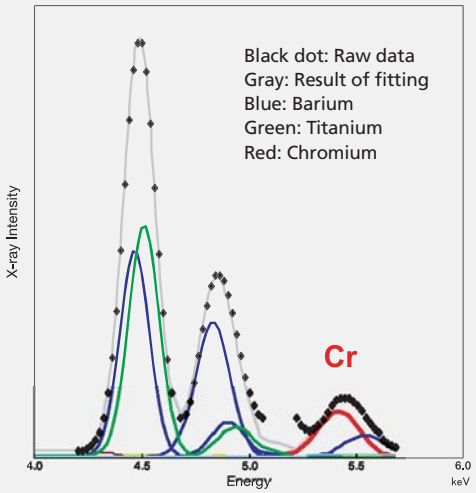
The depth and breadth of features, as well as the sophistication of the interface is the result of decades of XRF software development at Rigaku.



RPF-SQX reduces the need for standards

NEX CG is powered by a new qualitative and quantitative analytical software, RPF-SQX, that features Rigaku Profile Fitting (RPF) technology. The software allows semi-quantitative analysis of almost all sample types without standards – and rigorous quantitative analysis with standards. Featuring Rigaku's famous Scatter FP method, the software can automatically estimate the concentration of unobserved low atomic number elements (H to F) and provide appropriate corrections.

RPF-SQX greatly reduces the number of required standards, for a given level of calibration fit, as compared to conventional EDXRF analytical software. As standards are expensive, and can be difficult to obtain for many applications, the utility of RPF-SQX can significantly lower the cost of ownership and reduce workload requirements for routine operation.

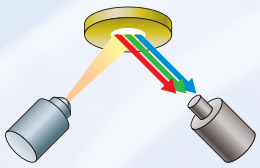


In the analysis of RoHS polymer standard BCR680, coexisting elements Ti and Ba overlap with Cr. RPF-SQX deconvolutes the overlap so that Cr can be analyzed.

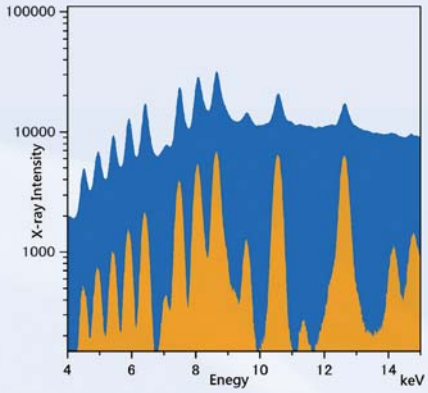
Cartesian geometry for highest peak-to-background

Unlike conventional EDXRF analyzers, the NEX CG was engineered with a unique close-coupled Cartesian Geometry (CG) optical kernel that dramatically increases signal-to-noise. By using secondary target excitation, instead of conventional direct excitation, sensitivity is further improved.

The resulting dramatic reduction in background noise, and simultaneous increase in element peaks, results in a spectrometer capable of routine trace element analysis even in difficult sample types. Up to five polarization and secondary targets cover the complete elemental range (Na-U) with optimized sensitivity.



Conventional EDXRF direct excitation

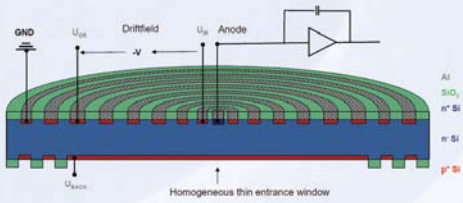


Cartesian geometry with secondary targets delivers exceptional signal-to-noise (orange spectrum) as compared to a conventional system (blue spectrum).

Excitation is provided by a 50 watt Pd-anode end-window X-ray tube. For maximum stability, the tube is fitted with a shutter so that the tube may remain on at all times for maximum stability and durability. An uninterruptible power supply (UPS) compensates for power line fluctuations and extends tube life. Superior counting statistics and designed-in high stability translate into extraordinary analytical performance.

Silicon drift detector for exceptional precision

A silicon drift detector (SDD) affords extremely high count rate capability with excellent spectral resolution. This enables NEX CG to deliver the highest precision analytical results in the shortest possible measurement times.



Simplified diagram of a SDD detector illustrating the concentric ring construction that allows for very high X-ray count rates.

NEX CG

makes routine analysis as easy as:

1. Prepare samples

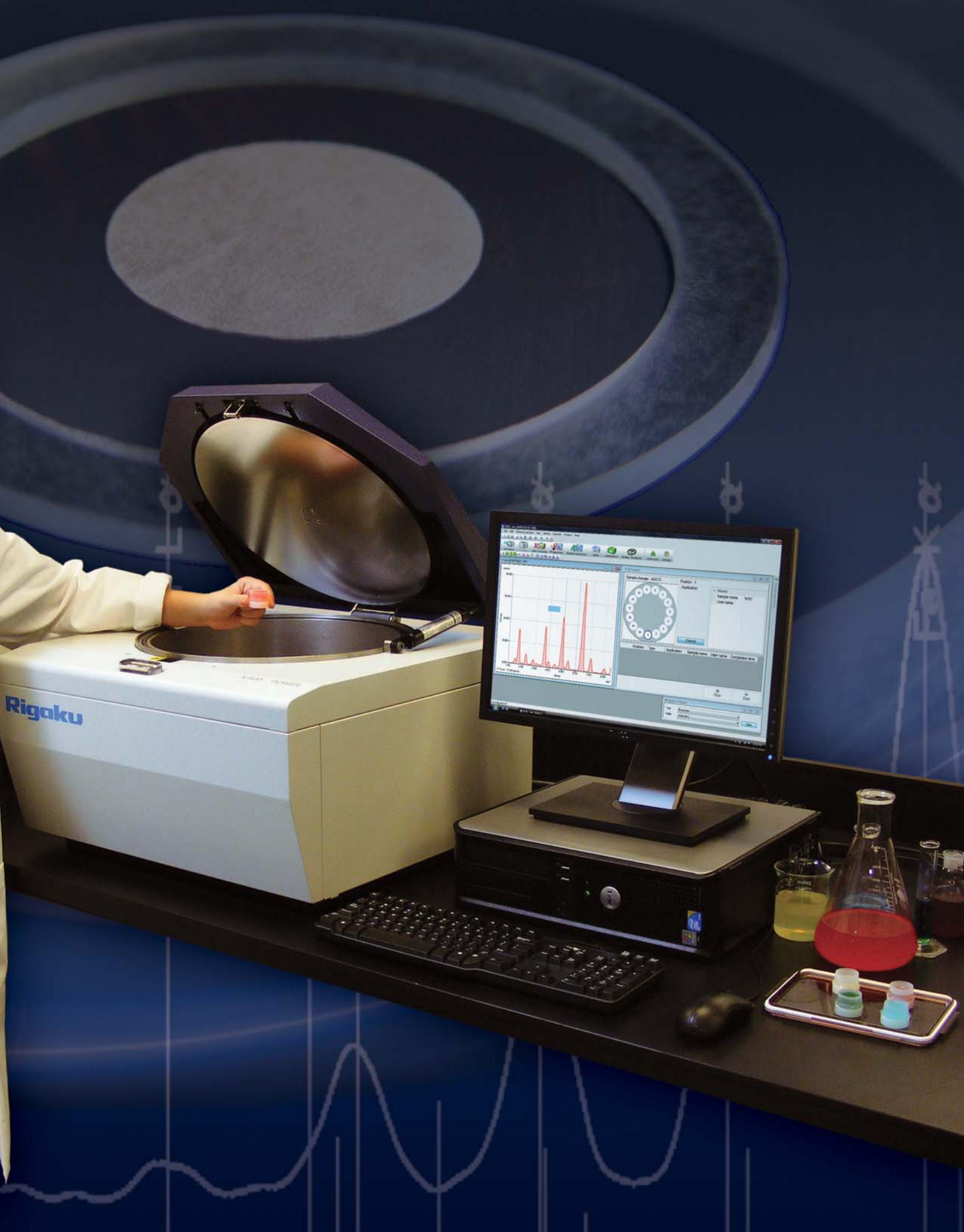
No digestion; minimal sample preparation
Direct non-destructive measurement of most materials

2. Load samples and enter sample names

Autosampler for unattended operation
EZ Analysis software interface for simple operation

3. Click the start button

Fast simultaneous multi-element quantitative results
Powerful RPF-SQX software minimizes standards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Versatile Sample Changer Configurations

Applicable to A4 Size Large Sample

Large sample chamber (38cm diameter and 10cm deep) accomodates up to A4 size large samples for direct analysis.

15-Sample Changer

High capacity 15-position changer for cups and coupons up to 32mm diameter. 10-position changer supplied for 35-40mm sample sizes.

Sample Spinner Option

Optional sample spinner and 9-position changer allows analysis of non-uniform samples.

NEX CG Specifications

Excitation

- X-ray tube with Pd anode
- 50W max power
- 50kV max voltage
- Four standard polarization and secondary targets depending on application, for optimum excitation
- Optional fifth target for optimal excitation of Na and Mg

Detector

- High performance SDD
- Peltier electronic cooling
- Large active detection area
- Optimum balance of spectral resolution and high count rate

Sample Chamber

- Large 38 cm diameter x 10 cm deep sample chamber for bulk samples
- 15-position automatic sample changer (32mm sample cups)
- 10-position automatic sample changer (35-40mm sample cups and pellets)
- 9-position automatic sample changer with sample spinner
- Analysis in air, helium purge, or vacuum

Environmental Conditions

- Ambient temperature 18-28° C (65-82° F)
- Relative humidity ≤75%
- Vibration: undetectable by people
- Free from corrosive gas, dust and particles

Computer

- External PC computer system
- Microsoft® Windows Vista® operating system
- Keyboard and mouse
- Monitor
- Printer

Software & Application Packages

- Menu-based software for control of spectrometer functions and data analysis
- Application templates
- Simple flow bar wizard to create your own methods
- RPF-SQX FP for qualitative and quantitative analysis
- Matching Library for augmentation of FP
- Automatic spectral overlap deconvolution
- Empirical calibration with overlap and matrix compensation

Spectrometer Data

- Single phase AC 100/220V, 15/7A (50/60 Hz)
- Dimensions: 60(W) X 60(D) X 40(H) cm (23.6 X 23.6 X 15.7 inch)
- Weight: 80 kg (176 lbs)

Options

- Fifth secondary target for optimum excitation of Na and Mg
- 9-position automatic sample changer with sample spinner
- Vacuum system
- Uninterruptible power supply (UPS)
- 10-position automatic sample changer

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