Skyray Skyray Instrument

X-Ray Fluorescence Spectrometer

EDX 3600B

Skyray Instrument Inc.
50 Braintree Hill Park, Suite 201,
Braintree, MA USA 02184
Tel: 617.202.3879 Fax: 781.519.4766
Website: www.skyrayinstrument.com

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SKYRAY INSTRUMENT INC.

شرکت ابزار طب
وارد کننده تجهیزات آزمایشگاهی - تحقیقاتی - علمی
تاسیس ۱۳۶۳
تهران، خیابان مطهری، خیابان فجر، پلاک 38
021-88832100
021-88321727
021-88321728
www.abzarteb.com
abzar.teb

www.skyray-instrument.com & www.gold-tester.com

Technical specifications:

Analytical range of elements: From sodium(Na) to uranium(U)
Analytical range of element contents: 1ppm~99.99%
Ability to analyze simultaneously: Can analyze 24 elements simultaneously
Detection limit: The detection limit can reach 1ppm for hazardous substances (Cd/Pb/Cr/Hg/Br) ruled in RoHS directive.
Range of functions: Used for RoHS substances detection, mineral aggregate analysis, plating thickness analysis, full element analysis, one machine for multiple purposes
Measurement of plating thickness: Can test plating thickness as thin as 0.005 μm and analyze plating of more than 11 layers
Analysis accuracy: 0.05%
Measuring object: powder, solid and liquid
Measurement time: 60~200s
Ambient temperature range: 15~30℃
Relative humidity: ≤70%
Revolution: Energy revolution is 140±5eV (SDD detector made in Germany)
Working voltage: AC 110V/220V
Instrument power: 200W
Tube voltage: 5~50kV
Tube current: 50~1000μA
3-D super-large sample chamber design and the size is Φ320mm×180mm
Weight: 75kg

Conciseness!

Simple? Smoothness...

Conciseness + Smoothness = **B**eauty of **I**ntegration

EDX 3600B

Configuration

- X-ray tube
- High and low voltage power supplies
- Amplifier circuit
- Double-laser positioning system
- The sample to be analyzed can be amplified 100 times
- Observe detected part clearly
- PC and ink-jet printer
- Si-PIN semiconductor detector
- High-resolution camera, and unique light path enhancement system
- Special software, with friendly operation interface

A combination of inner and outer cultivation is the nature of **HIGH QUALITY** instruments.

HIGH-PERFORMANCE SYSTEM operates with gorgeous appearance

A Vacuum pumping system——Sublimation of technical possibilities
Newly added vacuum pumping system shields the impact of air and expands the measurement range greatly compared with traditional instruments. Open and close, up and down, the instrument can be operated with your finger.

B Internal structure——Perfect combination of power and beauty
Integral steel-frame structure offers reliable assurance for power; the appearance is elegant and round with plastic shell.

C Automatic collimators and filters switching system
——Succession of intellectual traditions
Avoid trouble resulted from manual operation; the charm of science and technology expands in the humanization.

D Triple safety protection mode

E Mutually independent matrix effect correction model

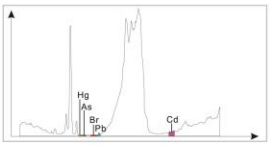
F Multi-variant non-linear regression procedure

G Arbitrary optional analysis and identification models

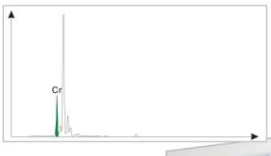
With the most advanced technology in the field of X-ray fluorescence detection——signal-to-noise enhancer(SNE), EDX 3600B decreases the detection limit greatly through lowering the interference of circuit and various ambient noises, and at the same time the interference from other elements has been brought down to a minimum and accuracy of detection is further increased. SNE can raise the signal processing ability of EDX3600B 25 times efficiently, and obvious results can be obtained especially while detecting Pb and Cd.

Examples of testing

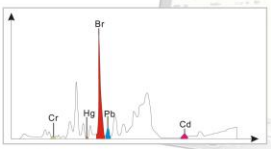
Plastic Sample — **The Spectrum of Sample**

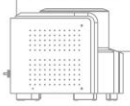


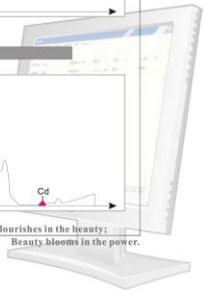
Stainless Steel Sample — **The Spectrum of Sample**



PCB Sample — **The Spectrum of Sample**







EDX 3600 B Power flourishes in the beauty; Beauty blooms in the power.

What is RoHS and WEEE Directive ?

On 13 Feb, 2003, European Union issued Directive 2002/95/EC on RoHS and Directive 2002/95/EC on WEEE. The EU directives RoHS and WEEE have been implemented. New electrical and electronic equipment put on the market from 1 July 2006 shall not contain lead(Pb), mercury(Hg), cadmium(Cd), hexavalent chromium (Cr^{6+}), polybrominated biphenyls(PBBs) or polybrominated diphenyl ethers(PBDEs).

Testing standards for substances restricted by RoHS Directive

Hazardous substances	Standards (mg/kg)
Cd	100
Pb	1000
Hg	1000
Br(PBBs & PBDEs)	1000
Cr^{6+}	1000

Restricted substances and their typical uses

Pb	
Solders	
Paints	Pigments and driers
Glass materials	Pb is allowed in fluorescent lamp
Ceramic materials	Pb is allowed in certain electronic ceramic materials
Iron, aluminum and copper materials	A certain amount of Pb is allowed
Plastic	PVC stabilizer and pigments
Batteries	Pb is allowed in acidic batteries for vehicles

Cd	
Plastics	Stabilizer and pigments
Solders	Seldom used
Ceramic materials	Seldom used
Connectors	
Batteries	Cd is allowed in Ni-Cd batteries
	Optical sensors and solar cell panels

Hg	
Batteries	Prohibited (see battery directive)
Connectors	Relays and sensitive switches
Fluorescent lamps	A certain amount of Hg is allowed

Cr VI +	
Passivation layers	Commonly used for naked metal surfaces to enhance adhesion of plating layers
Anti-corrosive plating layers	Painting and plating layers
Chrome plating layers	Plating layer of chromium metal is not under control
Plasticizer	Commonly used to plastics plating process but not final products

PBB&PBDE	
Plastics	Brominated flame retardants

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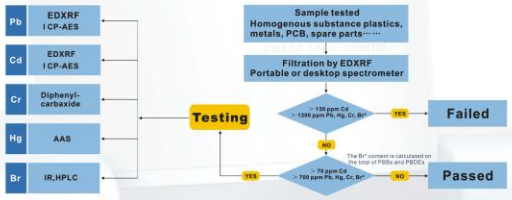
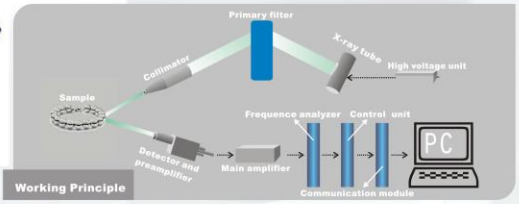
The analytical method of filtration for RoHS substances





Working Principle

Characteristic X-rays of elements
Each element will emit X-ray with its own energy when it is excited, this characteristic X-ray is called X-ray fluorescence. That is the basis for analysis.

Scatting
It is the background of the spectrum.

Photoelectron
It is what the detector analyzes.
The X-ray fluorescence intensities of interested elements in the sample are I_1, I_2, I_3, I_4, I_5 etc. And the element content is a function of X-ray fluorescence intensity I of the element. The general formula is as follows:
$C=f(I_1, I_2, I_3, I_4, I_5\cdots\cdots)$
The function is too complicated to calculate, and the empirical formula is as follows:
$C=K_1I_1+K_2I_2+K_3I_3+K_4I_4+K_5I_5\cdots\cdots$

C means
The content of element in the sample.

I_1, I_2, I_3……mean
X-ray fluorescence intensities of elements in the sample respectively.

K_1, K_2, K_3……mean
Coefficients to be calculated.
The coefficients K_1, K_2, K_3……can be determined with the samples of known contents though the establishment of scale merit.