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TO BE A WORLD-LEADING ANALYTICAL TESTING SOLUTIONS PROVIDER

• Spectroscopy • Chromatography • Mass Spectrometry



IEDX 1800B X-ray Fluorescence Spectrometer

RoHS Testing | Full-element Analysis for minerals | Plating Thickness Testing | Precious Metals Testing



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IEDX1800B X-ray Fluorescence Spectrometer

Instrument Introduction:

With the widespread of IEDX1800B over different fields, we design this type to meet the need of optimizing the product performance and improve the safety protection grade.

The reliability of the product is improved by using the high voltage source and X-ray tube of the new generation and the testing efficiency is improved by the adopting the high power of X-ray tube.



Testing 75 kinds of elements, 1ppm limit of detection, Repeatability 0.1%, Stability 0.1%



Application fields:

- RoHS testing
- Mining and alloy (Cu, stainless steel and so on) componential analysis
- Measurement of plating thickness, measurement of electroplate liquid and plating content
- The content test of precious metal such as gold, platinum and silver and different kinds of jewelry
- Mainly applied in RoHS directive industries, precious metals and jewelries processing industries; banks, jewelry shops and test institutes; electroplating industries

Good shielding action of X-ray tube of new generation, radiation level of X-ray is equal to that of common atmospheric environment

The performance is stable and reliable, achieving higher test efficiency

The automatic function of door sensor and high voltage lock gives you protection from all directions

Performance advantages:

- Down-side X-ray Source: meet the test requirements of samples of different kinds and shapes
- Collimator and filter: the Auto-switch between various collimators and filters to meet the application of different testing methods
- Movable platform: sophisticated manual movable platform is convenient for locating test point
- High-resolution detector: improve the analyzing accuracy
- High voltage source and X-ray tube of the new generation: the performance is stable and reliable, achieving higher test efficiency

Technical specifications:

- Measurable elements: S to U.
- Limit of detection (LOD) reaches 1ppm.
- Element content: ppm to 99.99%
- Arbitrary optional analysis and identification models
- Independent matrix effect correction models
- Multi-variable non-linear regression procedure
- Excellent repeatability: 0.1%
- Long-time working stability: 0.1%
- Ambient temperature: 15℃ to 30℃
- Power supply: AC 220V±5V, AC purified stabilized voltage power supply.
- Energy resolution: 160±5eV
- Sample chamber size: 439mm×300mm×50mm
- Instrument size: 550mm×410mm×320mm
- Instrument weight: 45kg

Standard configurations:

- Movable sample platform
- Signal-to-Noise Enhancer (SNE)
- Electric-cooling Si-PIN detector
- Signal detection electronic circuit
- High and low voltage power
- X-ray tube of high power
- Computer and ink-jet printer

Streamlined man-machine design, promising your operation security

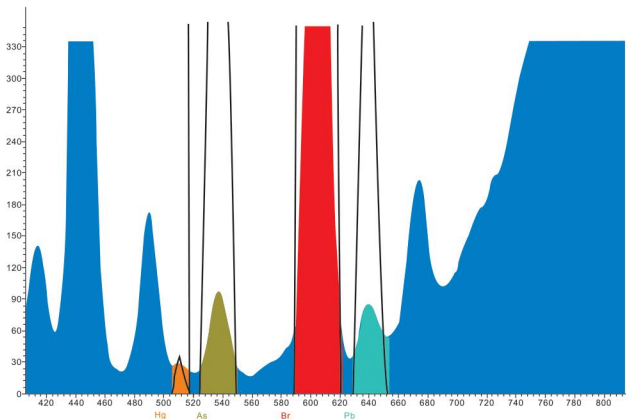
Operation indicator makes you operate comfortably



Test cases:



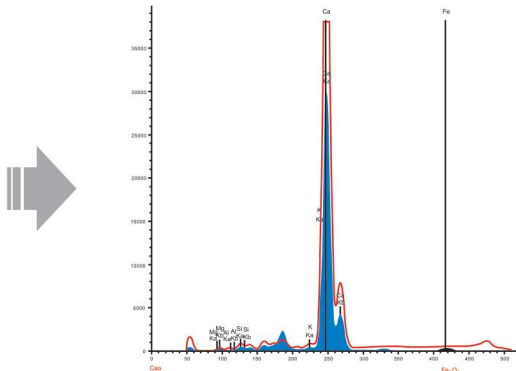
RoHS Testing



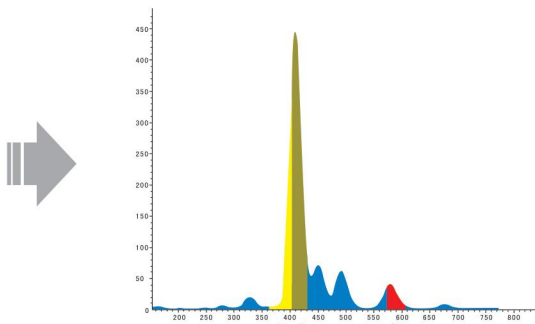
Test Results Spectrum



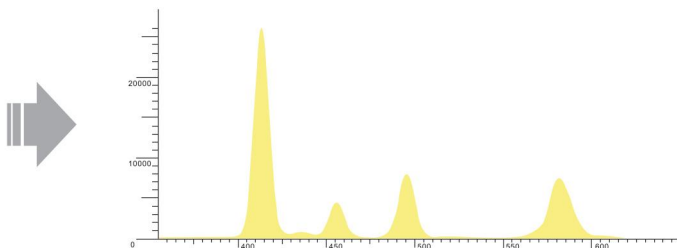
Mining Testing



Plating Thickness Testing



Precious Metals Testing



What are RoHS and WEEE Directives?

The European Union has adopted Directive 2002/95/EC on the restriction of certain hazardous substances (RoHS) and Directive 2002/95/EC on waste electrical and electronic equipment (WEEE) with their publication in the Official Journal of the European Union on February 13, 2003. WEEE comes into effect on August 13, 2005 and RoHS requires the substitution of various heavy metals (lead, mercury, cadmium and hexavalent chromium) and brominated flame retardants (polybrominated biphenyls [PBB] or polybrominated diphenyl ethers [PBDE]) in new electrical and electronic equipment put on the market from July 1, 2006.

Testing standard of substances restricted by RoHS Directive

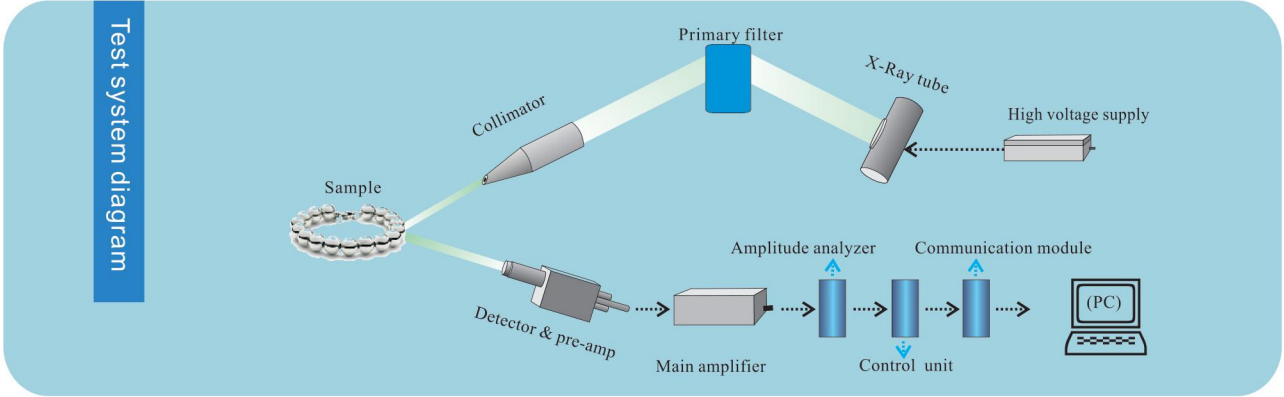
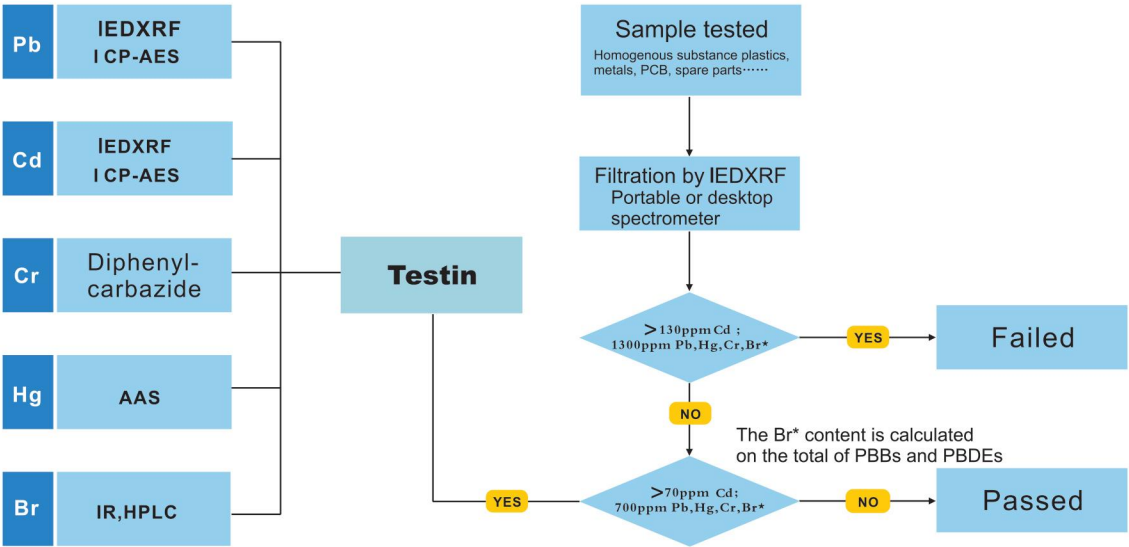
Hazardous substances	Standards (mg/kg)
Cd	100
Pb	1000
Hg	1000
Cr ⁶⁺	1000
PBBs	1000
PBDEs	1000

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
Plastics	PVC stabilizer and pigments
Batteries	Pb is allowed in acidic batteries for vehicles
Cd	
Plastics	Stabilizer and pigments
Solders	Seldom used
Ceramics	Seldom used
Connectors	Relays and switches
Batteries	Cd is allowed in Ni-Cd batteries
Semiconductors	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 ⁶⁺	
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
PBBs & PBDEs	
Plastics	Brominated flame retardants

IEDX1800B X-ray Fluorescence Spectrometer

The analytical method of filtration for XRF to test RoHS substances



Characteristic X-radiation of element

Each element will emit X-ray at its own energy level when excited. This X-ray is characteristic and called X-ray fluorescence. It is the foundation of analysis.

Scattering

It is the background of spectrum.

Photoelement

The photoelectron is the foundation of detector. In the sample, the X-ray intensity of every element is expressed as I1,I2,I3,I4,I5 respectively. The element content C is the function of X-ray fluorescence intensity I, expressed as follows:

$$C=f(I_1,I_2,I_3,I_4,I_5\cdots)$$

This equation is too complicated and can be simplified as:

$$C=K_1I_1+K_2I_2+K_3I_3+K_4I_4+K_5I_5\cdots$$

Where

C is the element content in the sample; I1,I2,I3,I4,I5 are X-ray intensity of element respectively; K1,K2, K3,K4,K5 are coefficients which can be determined by measuring known standard sample to calibrate.

PERIODIC TABLE OF EIEMENTS
(Characteristic X-Ray energy table)

INNOVA Instrument

Per.		1A	PERIODIC TABLE OF EIEMENTS																0	
1		1 H 1.008	(Characteristic X-Ray energy table)																2 He 4.008	
		IIA		INNOVA Instrument																
2		3 Li 6.94 0.052	4 Be 9.012 0.110																	
3		11Na 22.99 1.041	12Mg 24.31 1.254																	
		III B	IV B	V B	VI B	VII B	VIII				I B	II B	III A	IV A	VA	VIA	VII A			
4		19 K 39.1 3.312 3.589	20 Ca 40.08 3.690 4.012	21 Sc 44.96 4.088 4.459	22 Ti 47.90 4.508 4.931	23 V 50.94 4.949 5.427	24 Cr 51.99 5.411 5.947	25Mn 54.94 5.895 6.492	26 Fe 55.84 6.400 7.059	27 Co 58.93 6.925 7.649	28 Ni 58.7 7.472 8.265	29 Cu 63.54 8.041 8.907	30 Zn 65.38 8.631 9.572	31 Ga 69.72 9.243 10.26	32 Ge 72.5 9.876 10.98	33 As 74.92 10.53 11.73	34 Se 78.9 11.21 12.50	35Br 79.90 11.91 13.29	36 Kr 83.8 12.63 14.12	
5		37 Rb 85.47 13.38 14.97 1.694 1.752	38 Sr 87.82 14.14 15.85 1.806 1.872	39 Y 88.91 14.93 16.75 1.922 1.996	40 Zr 91.22 15.75 17.69 2.042 2.124	41 Nb 92.91 16.58 18.65 2.166 2.257	42Mo 95.94 17.44 19.63 2.293 2.424	43 Tc #(99) 98.906 20.65 2.424 2.558	44 Ru 101.0 20.91 22.76 2.558 2.696	45 Rh 102.9 21.02 23.86 2.696 2.838	46 Pd 106.4 21.12 24.30 2.838 2.990	47 Ag 107.9 22.01 24.99 2.984 3.151	48 Cd 112.4 23.11 26.14 3.133 3.316	49 In 114.8 24.14 27.38 3.287 3.487	50 Sn 118.6 25.19 28.60 3.444 3.662	51 Sb 121.7 26.27 29.85 3.605 3.843	52 Te 127.6 27.38 31.13 3.769 4.029	53 I 126.9 28.51 32.44 3.937 4.200	54 Xe 131.3 29.67 33.78 4.111 4.422	
6		55 Cs 137.3 30.85 35.15 4.286 4.620 5.280 3.794	56 Ba 137.3 32.07 36.55 4.467 4.828 5.531 3.953	Ln	72 Hf 178.4 55.38 63.56 7.898 9.021 10.51 6.958	73 Ta 180.9 57.11 65.56 8.145 9.341 10.81 7.172	74 W 183.8 58.86 67.59 8.396 9.670 11.28 7.386	75 Re 186.2 60.66 69.66 8.651 10.01 11.68 7.602	76 Os 190.2 62.48 71.78 8.910 10.35 12.09 7.821	77 Ir 192.2 64.35 73.93 9.173 10.71 12.51 8.040	78 Pt 195.0 66.25 76.13 9.441 11.07 13.38 8.267	79 Au 197.0 68.19 78.37 9.711 11.44 14.28 8.493	80 Hg 200.5 70.16 80.66 9.987 11.82 15.24 8.720	81 Ti 204.3 72.18 82.99 10.27 12.21 14.76 8.952	82 Pb 207.2 74.23 85.36 10.55 12.61 15.74 9.183	83 Bi 208.9 76.32 87.77 10.84 13.02 16.25 9.419	84 Po #(209) 78.46 90.24 11.13 13.44 17.00 9.662	85 At #(210) 80.64 92.75 11.42 13.87 18.10 9.841	86 Rn #(222) 82.86 95.32 11.72 14.32 19.22 10.10	
7		87 Fr # (223) 82.12 97.93 12.03 14.77	88 Ra # (226) 87.44 100.6 12.34 15.23 17.8 10.60	An	<div><div>Alkali Metals</div><div>Non-Metal</div><div>Transitional element</div><div>Halogen</div><div>Lanthanoids</div><div>Actinides</div><div>Alkaline earth</div><div>Rare gases</div><div>Main group metal</div></div> <div>Mark 1: #Radioactive Elements</div> <div>Man Made Elements</div> <div>Mark 2: All the Numbers are ordered one by one in this way, Atomic Number</div> <div>Element Symbol, Atomic Weight, K α , K β ,L α ,L β ,L γ ,Le</div>															

Ln	57 La	58 Ce	59 Pr	60 Nd	61 Pm	62Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69Tm	70Yb	71 Lu
	138.9	140.1	140.9	144.2	#(147)	150.4	152.0	157.2	158.9	162.5	164.9	167.2	168.9	173.0	175.0
	33.30	34.57	35.86	37.19	38.54	39.91	41.32	42.76	44.23	45.73	47.26	48.82	50.41	52.04	53.59
	37.99	39.45	40.95	42.48	44.05	45.65	47.28	48.95	50.65	52.38	54.16	55.96	57.81	59.69	61.61
	4.651	4.840	5.034	5.230	5.431	5.636	5.846	6.059	6.275	6.495	6.720	6.948	7.181	7.414	7.654
	5.043	5.262	5.489	5.722	5.956	6.206	6.456	6.714	6.979	7.249	7.528	7.810	8.103	8.401	8.708
	5.789	6.052	6.322	6.602	6.891	7.180	7.478	7.778	8.104	8.418	8.748	9.089	9.424	9.779	10.14
	4.124	4.287	4.452	4.632	4.816	4.994	5.176	5.361	5.546	5.742	5.942	6.152	6.341	6.544	6.752
An	89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95Am	96Cm	97 Bk	98 Cf	99 Es	100Fm			
	#	#	#	#	#	#	#*	#*	#*	#*	#*	#*			
	(227)	(232)	231.0	238.0	(237)	(244)	(243)	(247)	(247)	(251)	(252)	(257)			
	89.79	92.19	94.64	97.14	99.69	102.3	104.9	107.7	110.5	113.3	116.2	119.2			
	103.3	106.1	108.9	111.8	114.7	117.7	120.8	123.9	127.1	130.4	133.7	137.2			
	12.65	12.97	13.29	13.61	13.95	14.28	14.62	14.96	15.31	15.66	16.02	16.38			
	15.71	16.2	16.7	17.22	17.74	18.28	18.83	19.39	19.97	20.56	21.17	21.79			
	18.41	18.98	19.55	20.16	20.77	21.40	22.04	22.69	23.37	24.06	24.76	25.47			
		11.12	11.36	11.62	11.89	12.12	12.38								