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EDXRF1602 - Analysis of Cr, Hg, Pb, Br and Cd in polyethylene (RoHS)



Scope

The measurement of Cr, Hg, Pb, Br and Cd in polyethylene (PE) is demonstrated for RoHS rapid screening by XRF.

Background

The Restriction on Hazardous Substances (RoHS) initiative limits the allowable amounts of the toxic elements chromium, mercury, lead, bromine, and cadmium in plastics and consumer goods. Energy dispersive X-ray fluorescence (EDXRF) is an accepted analysis technique for the rapid screening by XRF and quantification of the hazardous element according to RoHS norms. To meet the industry needs, Rigaku offers the [NEX DE VS](#) analyzer with automatic collimators and a camera for sample positioning and sample image, giving QA/QC technicians the means for fast and simple screening and analysis of materials that must conform to RoHS and similar directives.

Calibration

Empirical calibration was performed using the thin certified standards available from Sumika Chemical Services, Ltd. and thick certified standards from ASI Standards. An automatic correction was used to compensate for variations in sample thickness. In this way, separate methods or user input is not required for the measurement of samples having different thicknesses.

Calibration validation

10 repeat measurements of ASI Standards QC check sample were measured to validate the calibration.

10 mm Collimator			
Units: ppm			
Element	Standard value	Average value	Std. dev
Cr	500	545	1.0
Hg	500	445	1.0
Pb	500	502	1.5
Br	250	254	0.6
Cd	50	57	0.5

3 mm Collimator			
Units: ppm			
Element	Standard value	Average value	Std. dev
Cr	500	536	1.2
Hg	500	435	1.4
Pb	500	497	1.6
Br	250	252	1.2
Cd	50	57	1.1

1 mm Collimator			
Units: ppm			
Element	Standard value	Average value	Std. dev
Cr	500	529	4.7
Hg	500	446	4.0
Pb	500	501	8.8
Br	250	261	4.2
Cd	50	54	5.9

Sensitivity validation

10 repeat measurements of ERM-680 k were measured to validate sensitivity at low levels.

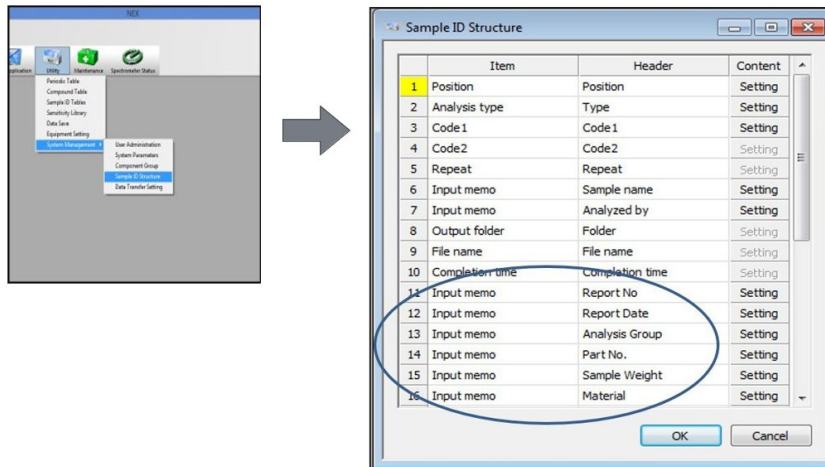
10 mm Collimator Units: ppm			
Element	Standard value	Average value	Std. dev
Cr	20	22	0.5
Hg	5	11	0.2
Pb	14	12	0.3
Br	96	92	0.4
Cd	20	19	0.4

3 mm Collimator Units: ppm			
Element	Standard value	Average value	Std. dev
Cr	20	22	0.6
Hg	5	9	0.3
Pb	14	8	0.4
Br	96	90	0.5
Cd	20	19	0.9

1 mm Collimator Units: ppm			
Element	Standard value	Average value	Std. dev
Cr	20	31	1.6
Hg	5	9	0.8
Pb	14	12	0.9
Br	96	89	0.7
Cd	20	22	2.7

User-definable RoHS report fields

The flexible Rigaku software allows users to design RoHS report field headers to suit specific reporting needs. Headers to report *Sample Name* and *Analyzed By* are automatically set by default, and the user simply enters up to six additional report memo headers as desired.



RoHS report

A RoHS report is automatically generated that includes the user defined fields, sample image, and element judgment.

Report No	16	Report Date:	14-Feb-16
Company	Acme Toy Co.	Analyzed by:	John Doe
Hazardous Element Analysis Report			
		Analyzed Date:	2/8/2016 12:56
1. Sample Information			
Sample name	Doll Eye Paint		
Analysis group	Consumer Toys		
Part No.	16a		
Sample weight	N/A		
Material	Polymer		

Conclusion

The NEX DE VS with automatic collimators and camera provides excellent sensitivity and reliable precision for RoHS rapid screening by XRF down to 1 mm spot size. Simple Point Analysis Screen allows operators to easily enter report information as designed using customizable report headers and automatically generates a RoHS report complete with sample image, analysis results, and Pass/Unsure/Fail judgment.

Related products



NEX DE Series

High-power 60 kV EDXRF systems delivering speed, precision, and small spot measurements