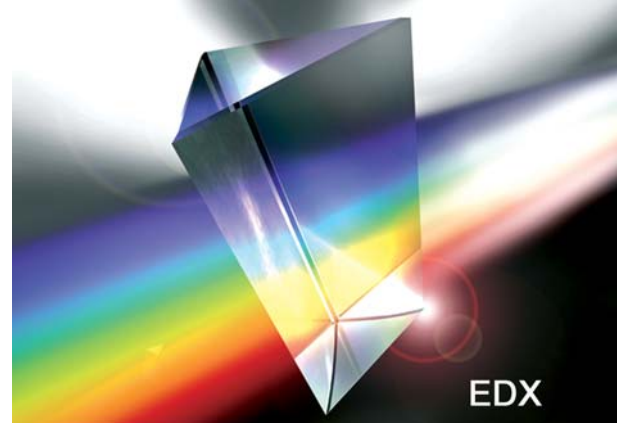


# Application Note

## EDXRF and WDXRF Analysis of Cd



It has been a must to analyze the heavy elements in the products, the industrial waste and the material for re-use as the interest for the environment has been built up in the recent. Then we report the lower limits of detection (Minimum Detection Limits) of Cd in many materials with different measurement conditions.

### Sample & Preparation

Cd is 0, 100, 250, 500 ppm in the glass beads. These glass beads are Lithium tetra-boron oxide added Cd which are got cool and solidified after melted. Then they are measured without treatment.

### Qualitative Result, Calibration Curve

[cps/uA] Cd

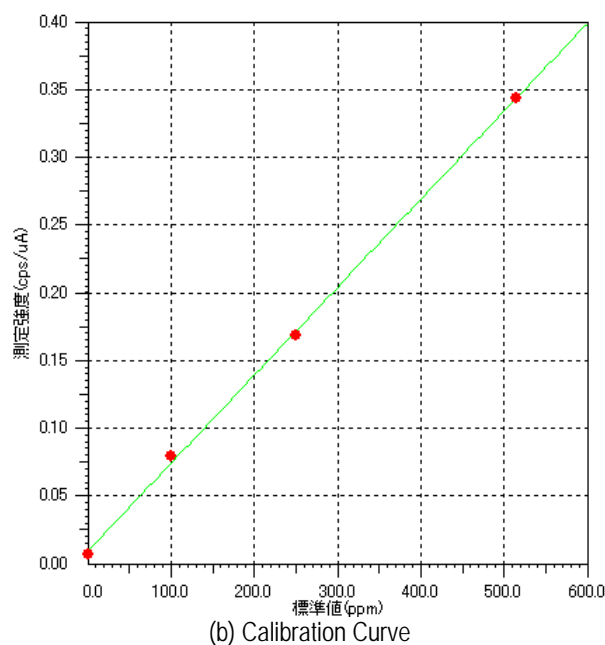
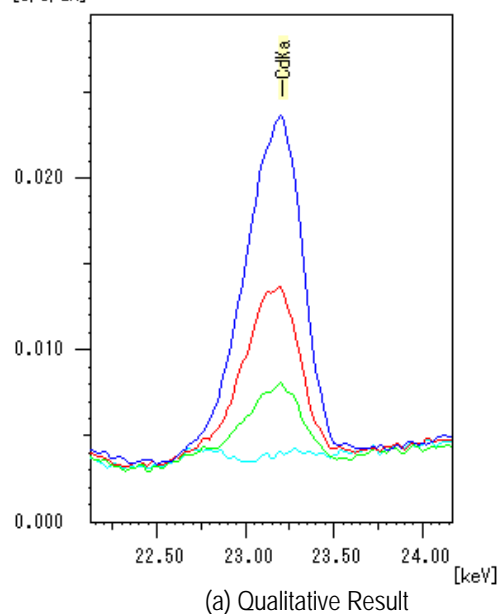


Fig. 1 Cd 0, 100, 250, 500 ppm (10 mm)

### LLD (MDL)

#### Lower Limits of Detection (LLD)

LLD	5.9 ppm
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#### Repeatability

Average	107 ppm
Repeatability	1.2 ppm
Coefficient of Variation	1.1 %

### Analytical Conditions

Instrument:	EDX-700
X-ray Tube:	Rh target
Voltage	50 kV
Current:	Auto
Filter	Zr
Atmosphere:	Air
Measurement:	10 mm, 5 mm
Diameter :	3 mm, 1 mm
Measurement Time:	600 sec
Dead Time:	0~25 %

## Relationship of Analytical Conditions and Lower Limits of Detection(LLD)

LLD (MDL) of different measurement conditions are shown in Table 1. The difference is aperture and measurement condition. EDX-700/800/900 has the optional 4 normal apertures, which are 10 mm, 5 mm, 3 mm, 1 mm, and optional special aperture, which is 0.3 mm.

Table 1 LLD of Each Measurement Time & Diameter (ppm)

Diameter/Time	30 Sec	100 Sec	300 Sec	600 Sec	1000 Sec
10 mm	26	14	8.3	<b>5.9</b>	4.6
5 mm	27	15	8.6	<b>6.1</b>	4.7
3 mm	36	20	11	<b>8.1</b>	6.3
1 mm	103	56	33	<b>23</b>	18
0.3 mm	309	169	98	69	53

Thick are actually measured values, others are calculated values.

## Relationship of Material and Lower Limits of Detection (LLD)

The LLD's (MDL) are calculated theoretically for some materials such as cellulose, resin and soil. And they are shown in Table 2.

Table 2 LLD of Each Sample

Material	Main Composite	LLD (ppm)	Density
Glass bead	$\text{Li}_2\text{B}_4\text{O}_7$	5.9	1.3
Poly Vinyl Chloride	$\text{C}_2\text{H}_3\text{Cl}$	11	1.16~1.7
Cellulose	$\text{C}_6\text{H}_{10}\text{O}_5$	5.9	--
Water	$\text{H}_2\text{O}$	6.3	1
ABS resin	$\text{C}_{15}\text{H}_{17}\text{N}$	5.3	0.98~1.12
Soil	$\text{SiO}_2$	8.6	2.65
Ash	$\text{CaO}$	18	3.3~3.4

The given specifications serve purely as technical information for the user. No guarantee is given on technical specification of the described product and/or procedures.