E-max

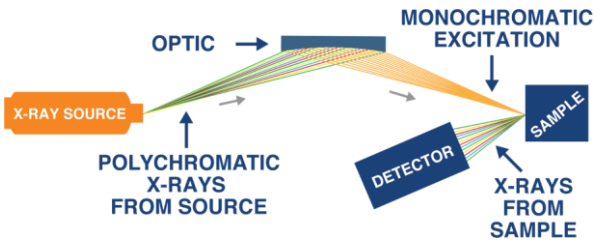
Quantify Cadmium and Other Heavy Metals in Soil and Water

Real-time analysis of Cd, As, Cu, Zn, Pb, Ni, Ca, and Sn.

Quantifiable Cd Analysis with MXRF

E-max is powered by Monochromatic X-ray Fluorescence technology: an elemental analysis technique offering significantly enhanced detection performance over traditional Energy Dispersive X-ray Fluorescence (EDXRF) technology. This technique applies state-of-the-art monochromating and focusing optics, enabling dramatically higher signal-to-background ratio compared to traditional polychromatic X-ray Fluorescence. **Figure 1** shows the basic configuration of MXRF and its use of focused monochromatic excitation.

Figure 1: MXRF Technology



Features

1. Ultra-high signal-to-background ratio and ultra-low detection limit
2. Portable design: light-weight and comfortable to carry;
3. Minimum sample preparation enables on-site sampling and quantification

Figure 2: On-site Rapid Screening

Quantify Cd at Unprecedented Low Level

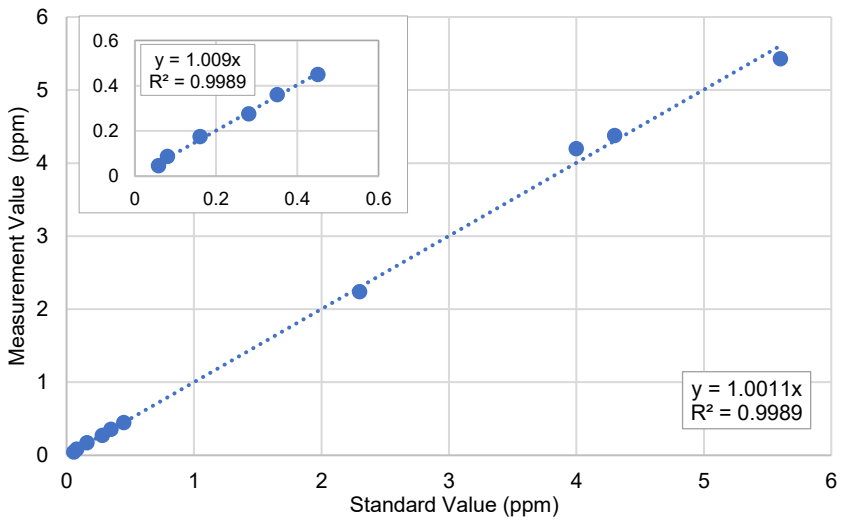
- Meets the challenge of measuring low level Cd in agriculture soil.
- Offers simultaneous measurement of other heavy metals like As, Pb, Cu, Ni, and Cr in soil and water.

Whether you are an agricultural inspector or environmental assessor, E-max enables you to run more samples in less time, allowing you to conduct a more thorough analysis for improved site remediation and land use decisions.

Accuracy

With complex matrices such as soil, it is essential to demonstrate accurate results that compare well with various standards. **Figure 3** shows that MXRF can deliver accurate results across a wide range of Cd concentrations, including soils that have contamination below 0.3 ppm.

Figure 3: Cd Concentration vs Certified Reference Standard



Repeatability

Reliable data is repeatable when following the same measurement process with well-prepared samples. **Table 1** depicts repeatable results for the reference standard Gss-29 with below-limit concentration of Cd in soil.

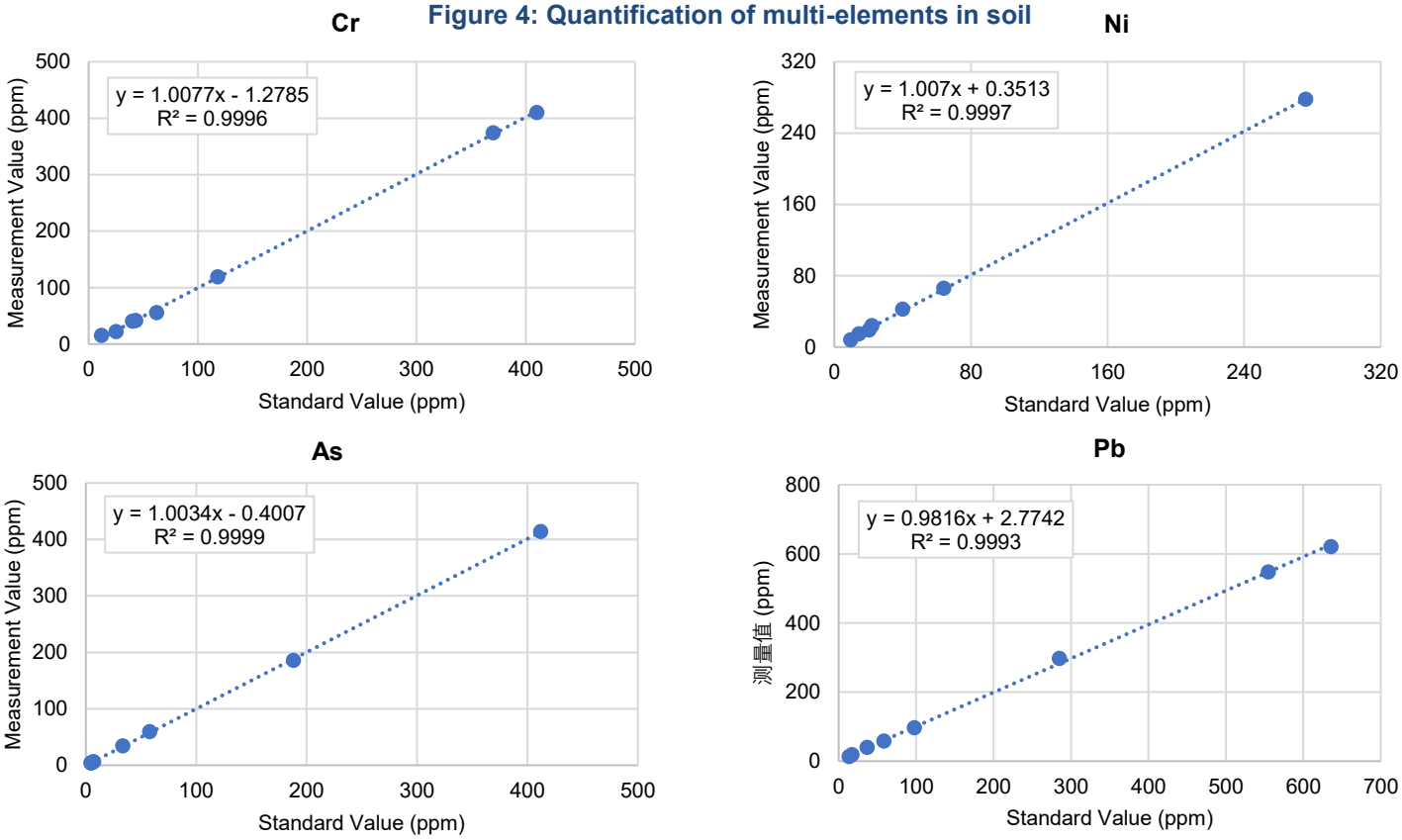
Table 1: Repeats of Reference Standard Gss-29 (unit: ppm)

Repeat	Cr	Mn	Ni	Cu	Zn	As	Cd	Sn	Sb	Pb
gss-29-1	77.95	752.61	37.92	34.62	92.59	10.15	0.27	7.29	1.06	30.72
gss-29-2	78.60	756.14	37.71	34.76	92.46	10.13	0.27	7.35	1.11	31.04
gss-29-3	80.11	759.12	37.85	35.18	92.70	9.99	0.28	7.28	1.16	31.05
gss-29-4	79.17	756.44	37.43	35.26	92.19	9.81	0.28	7.34	1.26	31.07
gss-29-5	78.17	756.50	37.21	34.17	93.02	9.94	0.29	7.22	1.16	31.05
gss-29-6	80.55	754.76	38.09	34.54	92.66	10.07	0.26	7.36	1.25	30.88
gss-29-7	79.32	759.32	36.75	34.42	92.90	10.01	0.32	7.22	1.15	31.16
gss-29-8	78.60	757.92	37.31	35.02	92.45	9.99	0.28	7.26	1.13	31.40
gss-29-9	77.50	756.25	37.81	35.09	92.65	9.89	0.28	7.32	1.06	31.14
gss-29-10	77.97	757.98	37.69	34.60	92.46	9.80	0.26	7.29	1.17	31.34
Avg	78.79	756.70	37.58	34.77	92.61	9.98	0.28	7.29	1.15	31.08
SV	80.00	760.00	38.00	35.00	96.00	9.30	0.28	7.20	1.16	32.00
SD	0.99	2.03	0.40	0.36	0.24	0.12	0.02	0.05	0.07	0.20
RSD(%)	1.25	0.27	1.07	1.03	0.26	1.21	6.24	0.70	5.91	0.64
LOD	2.96	6.08	1.21	1.08	0.72	0.36	0.05	0.15	0.20	0.60

Multi-elemental Analysis in Soil

E-max delivers multi-elemental analysis for other metal contaminants, including Cr, Mn, Ni, Cu, Zn, As, Hg, Pb, Sn, Sb, and other heavy metals. As shown in **Figure 4**, E-max gives accurate results for Cr, Ni, As and Pb for various types of soil standards.

Figure 4: Quantification of multi-elements in soil



Technical Specifications

E-max Limit of Detection (ppm) Application：Trace Heavy Metals in Soil															
Element	Cd	As	Hg	Pb	Cr	Cu	Ni	Zn	Mn	Co	Se	V	Sb	Tl	Mo
Screening	0.15	0.6	1.2	2.0	15	1.5	3	1.5	15	40	1.5	100	0.2	1.2	1.5
Quantification	0.05	0.2	0.4	0.8	5	0.5	1	0.5	5	16	0.5	40	0.07	0.4	0.5

E-max Limit of Detection (ppm) Application：Trace Heavy Metals in Water															
Element	Cd	As	Hg	Pb	Cr	Cu	Ni	Zn	Mn	Co	Se	V	Sb	Tl	Mo
Screening	0.1	0.15	0.2	0.2	9	1.5	3	0.6	15	40.0	1.5	100.0	0.12	0.2	0.12
Quantification	0.03	0.05	0.07	0.07	3	0.5	1	0.2	5	16.0	0.5	40.0	0.04	0.07	0.04

E-max Specifications	
Method Compliance	EPA 6200
Measurement Time	30 - 1200 seconds
Element Range	Up to 40 Elements from Al - U
Data Storage & Output	Printout, Ethernet, USB, Internal Storage
I/O Ports	Ethernet 10/100, USB
Power Supply	110-240 VAC ± 10%, 50-60 Hz (hertz)
Operating Temperature And Humidity	+41˚F - 104˚F (5˚C - 40˚C), 30 - 85 %
Weight	9 kg
Dimensions	32 cm W x 23 cm L x 26 cm H 

Z-Spec

Z-Spec is a fast-growing manufacturer of advanced X-ray analyzers, founded by the inventor of the MXRF technique, Dr. Zewu Chen. Its portable HDXRF systems deliver rapid, near real-time elemental analysis for applications like soil, water, food, and agriculture. With non-destructive testing and no sample preparation, Z-Spec enables faster workflows, reduced waste, and confident, on-the-spot decisions.

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