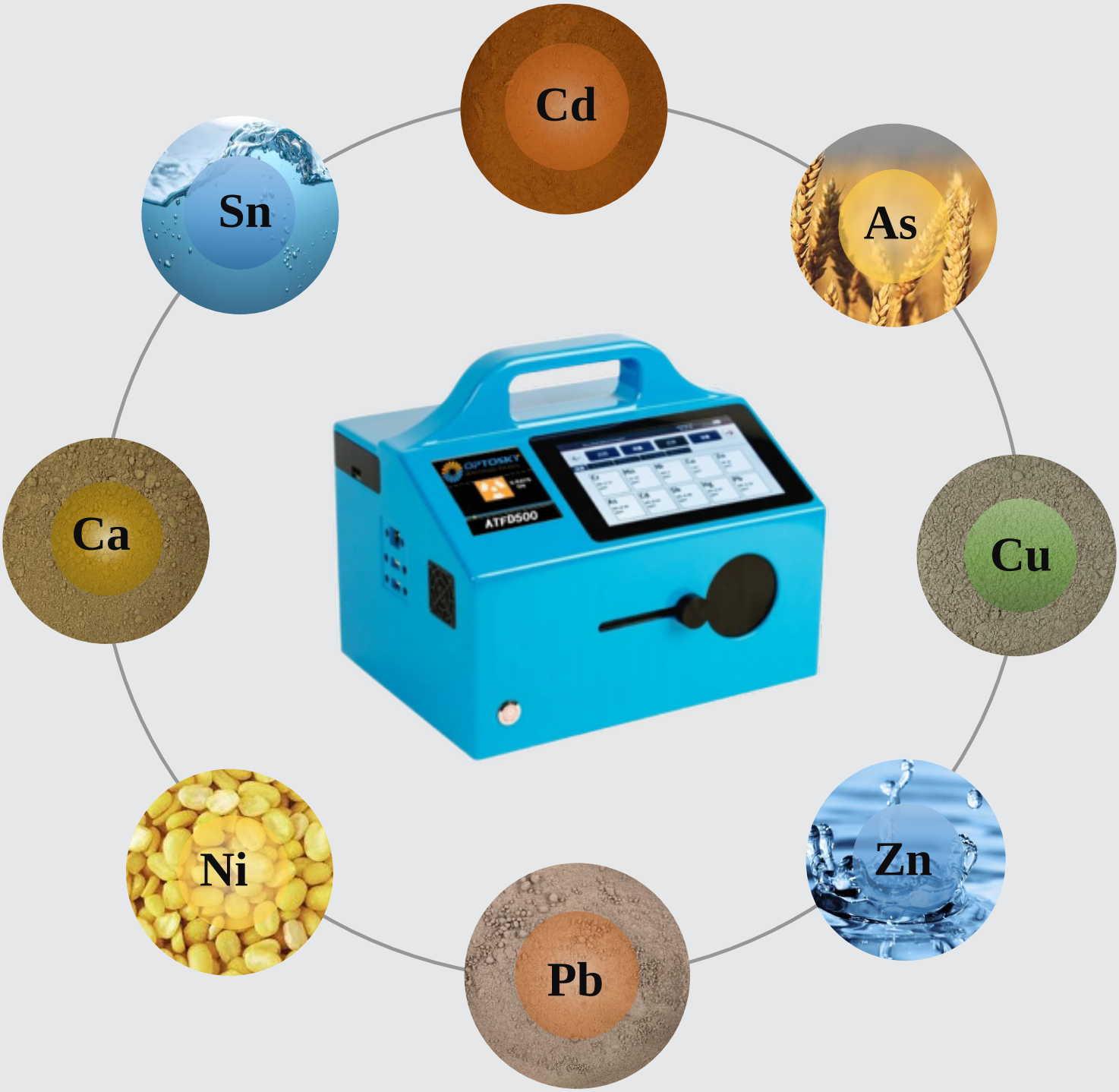
OPTOSKY
Spectroscopy Solutions

ATFD500-Soil

A portable and robust analyzer

Quantify Cadmium and other heavy metals in soil and water



Quantifiable Cd Analysis with HDXRF

ATFD500 is powered by High-Definition X-ray Fluorescence (HDXRF®) 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 HDXRF and its use of focused monochromatic excitation.

Figure 1: HDXRF Technology

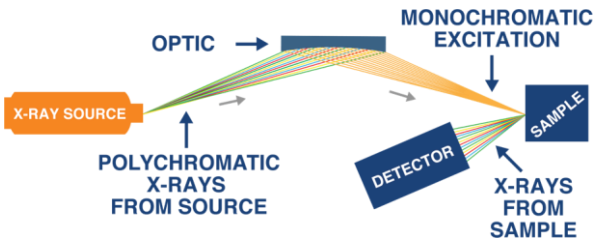


Figure 2: On-site Rapid Screening

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

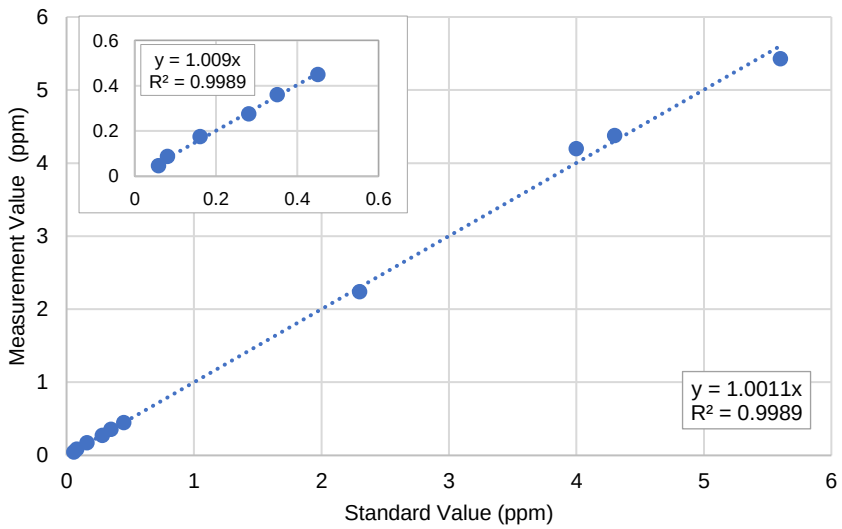
Quantify Cd at Unprecedented Low Level

Powered by low power Monochromatic X-Ray Fluorescence analysis technology, HDXRF® technology, ATFD500 meets the challenge of measuring low level Cd in agriculture soil. In addition, ATFD500 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, ATFD500 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 HDXRF can deliver accurate results across a wide range of Cd concentrations, including soils that have contamination below 0.2 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.

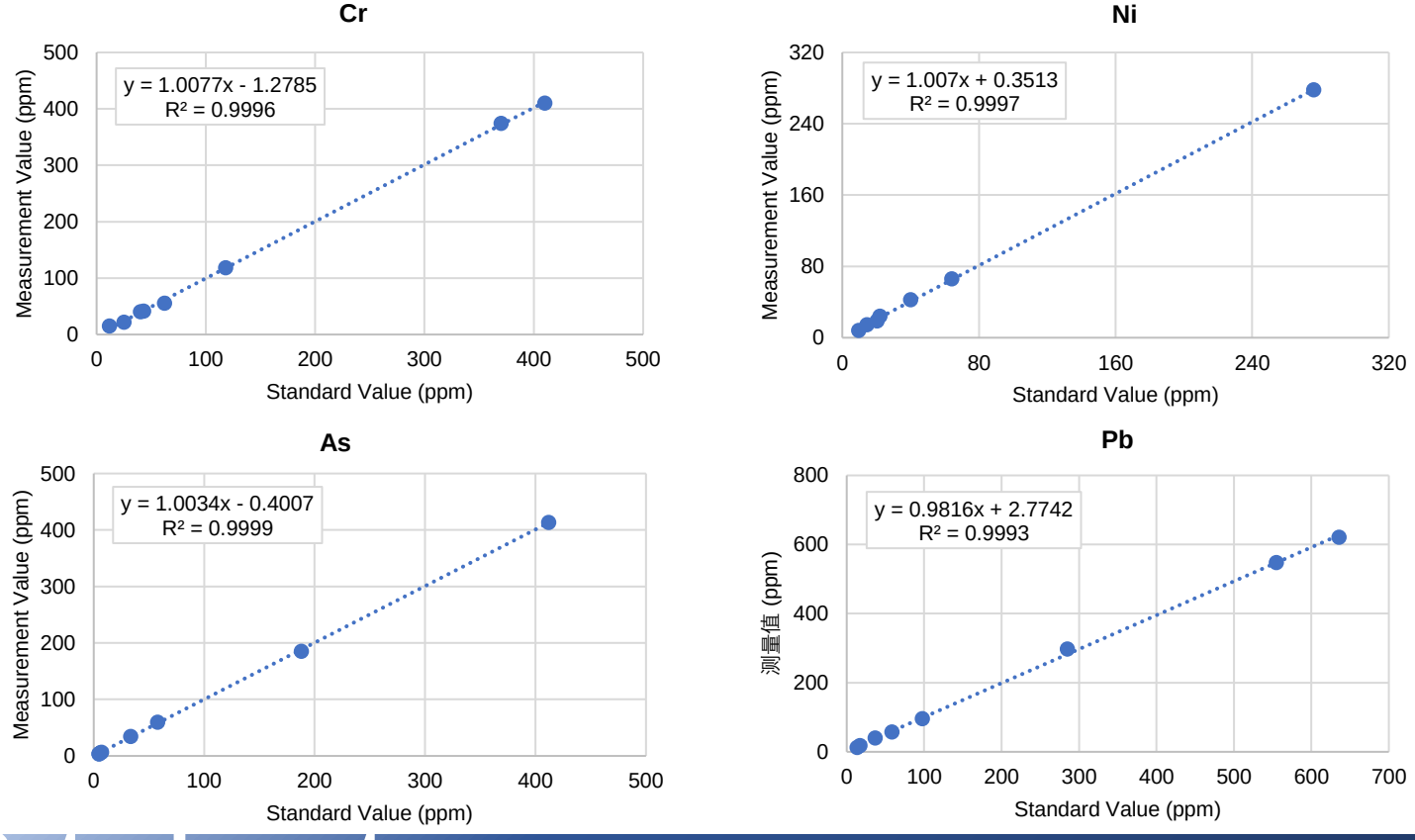
Table 1: Repeats of Reference Standard Gss-29 (unit: ppm)

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

ATFD500 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**, ATFD500 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

ATFD500 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	1.5	1.5	2.0	12	1.5	3	2	10	40	1	100	0.2	1.2	1.5
Quantification	0.06	0.4	0.5	0.8	4	1	1	0.7	3	16	0.3	40	0.07	0.4	0.5

ATFD500 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	1.5	6	40.0	1.5	100.0	0.2	0.2	0.15
Quantification	0.04	0.07	0.07	0.07	3	0.5	1	0.5	2	16.0	0.5	40.0	0.06	0.07	0.05

ATFD500 Specifications	
Method Compliance	EPA 6200
Measurement Time	30 - 600 seconds
Element Range	Up to 40 Elements from Al - U
Data Storage & Output	Printout, Ethernet, USB, Internal Storage, USB Flash Drive
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	9.5 kg
Dimensions	32 cm W x 23 cm L x 26 cm H 

Optosky & XOS

Optosky is a fast-growing manufacturer of X-ray analyzers founded by the inventor of the HDXRF technique who formerly served as the chief scientist and advanced director of R&D for XOS. Through a strategic partnership with XOS , Optosky offers accurate, efficient, and reliable elemental analysis solutions optimized for environmental protection and public safety, like soil,water, food, and agriculture products.

OPTOSKY
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