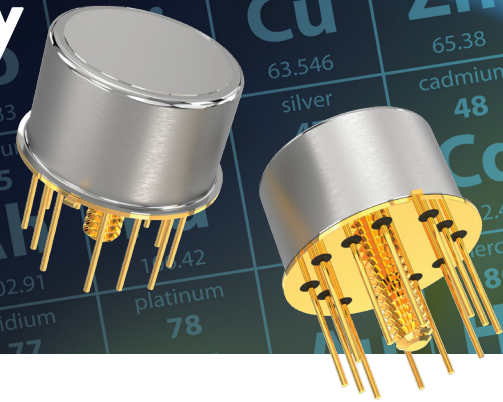


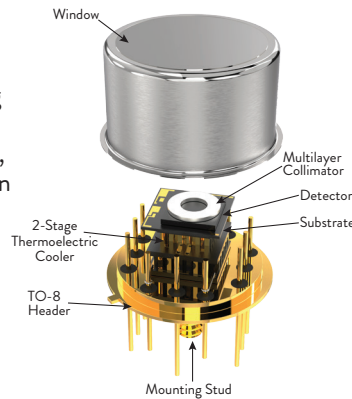
High-Resolution, High-Efficiency CdTe X-Ray Detectors

Redefining Spectral Performance



When it comes to high-energy X-ray spectroscopy, precision and efficiency are non-negotiable. Amptek's CdTe X-ray detectors deliver exceptional spectroscopic performance for X-ray energies ranging from 20 to 150 keV. Designed for high-energy X-ray fluorescence (XRF) and X-ray tube spectrum analysis, these detectors offer superior efficiency and resolution in a compact, low-power system.

By leveraging K-line analysis, Amptek's CdTe detectors eliminate the complexities of L-line interference, ensuring more accurate elemental identification- ideal for applications involving lead, gold, mercury and rare earth elements.



Parameters	Hardware Specifications
Detector Type	Reset (lower noise) Resistive feedback (higher count rates)
Detector Size	5 mm x 5 mm
Detector Thickness	1.0 mm
Energy Range	5 to 150 keV (best 20 to 100 KeV)
Energy Resolution@5.9 keV (55Fe)	<1.5 keV FWHM guaranteed at 122 keV (⁵⁷ Co) for Tpk=2.4μs 0.85 keV FWHM typical at 59.5 keV (²⁴¹ Am)
Count Rate	Reset: Less than 40 kcps recommended Resistive: Over 200 Kcps
Detector Window	1 mil (25μm) beryllium
Sensitivity	Reset: 0.8 mV/keV Resistive: 0.16 mV/keV RC time constant: ~350 μs
Size Detector Module	TO-8 package (0.640 in. high including pins, 0.600 in. diameter)
Total Power	<2 Watt
Warranty Period	1 Year
Device Lifetime	Typical 5 to 10 years, depending on use
Operation Condition	-35°C to +80°C

Why Choose Amptek's CdTe X-Ray Detectors?

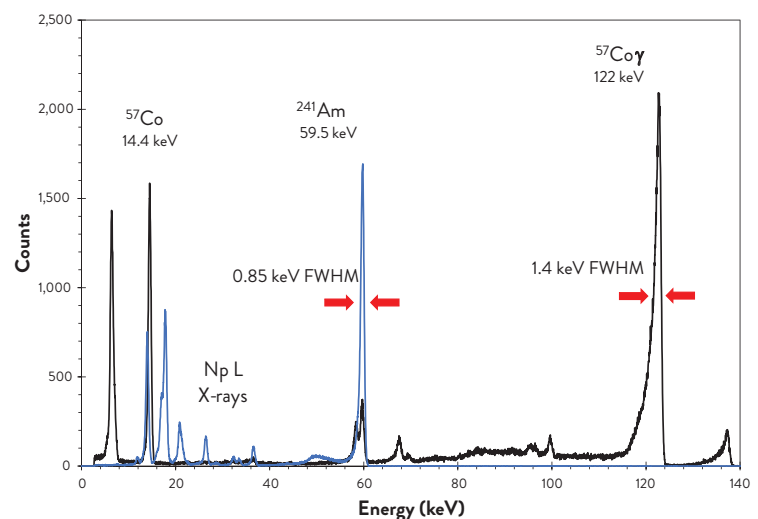
- **Industry-Leading Spectroscopic Performance** – High resolution and efficiency from 5 to 150 keV
- **Two Configurations for Maximum Flexibility**
 - **Reset Mode:** Lowest noise for applications under 40 kcps
 - **Resistive Feedback Mode:** Higher count rates, exceeding 200 kcps
- **Compact & Reliable** – TO-8 package with advanced cooling ($\Delta T > 80K$ @ 30°C ambient)
- **Optimized for High-Energy XRF** – Excellent detection of heavier elements' K lines
- **Quality Assurance & Radiology Applications** – Ideal for X-ray tube characterization and spectral analysis

Key Features & Specifications

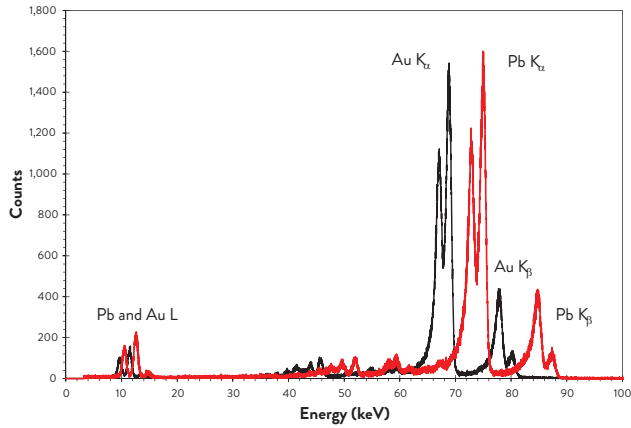
- **Detector Size:** 5 mm x 5 mm
- **Thickness Options:** 1.0 mm
- **Energy Range:** 5 to 150 keV (optimal 20 to 100 keV)
- **Configurations Available:**
 - X-123 CdTe – Fully integrated spectrometer
 - OEM CdTe – Customizable configurations for seamless integration
 - XR-100 CdTe – X-ray detector with digital pulse processing

Power Your High-Energy XRF Applications with Amptek's CdTe Detectors

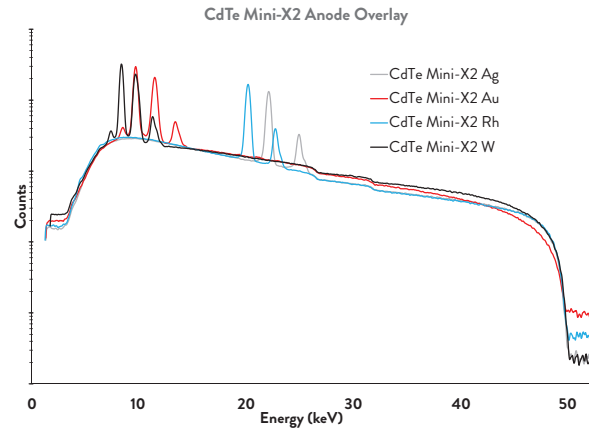
With Amptek's advanced CdTe detectors, you get unparalleled energy resolution, superior efficiency and a system optimized for high-performance X-ray spectroscopy. Whether for industrial, scientific or medical applications, Amptek delivers the state-of-the-art detection technology you need.



Plot showing characteristic X-rays of gold and lead, demonstrating the high sensitivity for the K lines and the ability to resolve the peaks.



Plot showing spectra measured from end window X-ray tube using W, Au, Rh, and Ag anodes, all at 50 kV, showing the effect of anode on tube spectrum.



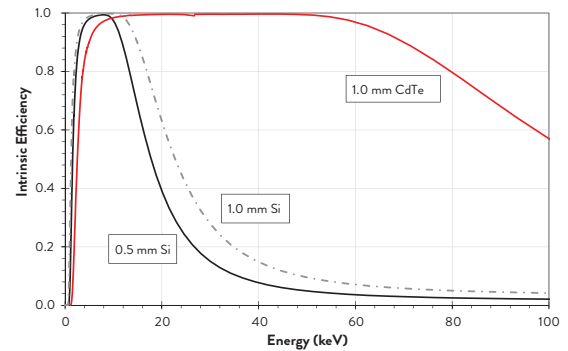
CdTe, a wide bandgap compound semiconductor using high Z elements, has been widely studied for use in X-ray and X-ray spectroscopy. Amptek uses planar CdTe diodes, with Schottky contacts, which are optimized for measuring the characteristic X-rays of elements with $Z > 50$. CdTe detectors have some unique characteristics for X-ray spectroscopy, discussed in the papers below:

Redus, R.H., J.A. Pantazis, T.J. Pantazis, A.C. Huber, and B.J. Cross, "Characterization of CdTe detectors for quantitative X-ray spectroscopy", *IEEE Trans. Nucl. Sci.*, Vol 56, No. 4, pp 2524 - 2532 (2009)

Redus, R.H., Huber, A., Pantazis, T., Pantazis, J. and Cross, B., "Combining CdTe and Si detectors for Energy-Dispersive X-Ray Fluorescence," *X-Ray Spectrom.*, Vol 41, No 6, pp 393-400 (2012)

We recommend operating at a bias of +800V and a temperature set point of 240K. These provide good charge collection and low noise for most applications. We recommend a Tflat (a.k.a. gap time) of 0.3 us to avoid ballistic deficit. Please contact Amptek for further information.

Compound Attenuation Plot showing (Be) window transmission efficiency and intrinsic efficiency of Si vs CdTe detectors.



Choose Your Perfect Setup:-

X-123 CDTE



X123 Complete Spectrometer Includes:

1. CdTe and Preamplifier
2. Digital Pulse Processor and MCA
3. Power Supply

OEM CDTE



The CdTe with its preamplifier is available in several OEM configurations

XR-100 CDTE



X-Ray Detector and Digital Pulse Processor with MCA

Elevate Your X-Ray Spectroscopy with Amptek's Next-Gen CdTe Solutions.

AMPTEK INC.® 14 DeAngelo Drive, Bedford, MA 01730-2204 USA
 +1 781-275-2242 Amptek.sales@ametec.com www.amptek.com

