

## **Characterization of CdTe Detectors for Quantitative X-ray Spectroscopy**

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Silicon diodes have traditionally been the detectors of choice for quantitative X-ray spectroscopy but they have limited sensitivity at energies above 30 keV. Recent environmental regulations, such as Europe's RoHS/WEEE Initiative, require non-destructive measurement of heavy metals such as lead and mercury, with K X-ray emissions well above 30 keV. CdTe has much higher stopping power, making it an attractive alternative in these applications. With a Schottky diode structure and Peltier cooling, electronic noise is around 500 eV for a 5x5x1 mm<sup>3</sup> device, providing adequate energy resolution for distinguishing peaks of interest. However, the response function of a CdTe detector has some important differences from that of Si detectors and these differences must be understood and quantified to achieve accurate results. This paper will discuss several important effects in the response of CdTe, including hole tailing due to poor charge transport, escape peaks, spectral background, linearity, stability, and electronic noise. This paper will show the impact of these effects on X-ray spectra and will present correction methods.