

and performance of Cosmic Guard and Compton Suppression System for Environmental Radiological Analysis

Gamma spectrometry laboratories analyze environmental samples with low radionuclide content. The determination of low level activities is challenged by the problem of high background signals which can mask the events from a sample or increases the uncertainty of peaks that are found. A primary contributor to the background is terrestrial radiation resulting from naturally occurring radiological materials. Another source of background is caused by highly penetrating cosmic rays passing through the shielding and interacting with the detector producing a characteristic continuum response in a spectral histogram. A third source is the result of partial absorption of the full gamma-ray energy due to Compton scatter and escape of an event within the detector. Mirion Technologies (Canberra) Inc. has introduced a Cosmic Veto system allowing users to readily retrofit shielded HPGe systems in order to gain the benefits of cosmic background reduction. Additionally, Compton Suppression system which reduces the effects of Compton escape has been enhanced. Both systems leverage modern digital signal processing allowing users to easily configure and operate these systems. These digital systems acquire not only the vetoed spectra, but also the unsuppressed data, which allows for quality assurance and defensible results. The performance of these systems will be presented.

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