528 E1

Use of anti Compton spectrometer in uranium analysis

Gamma ray spectrometry is an important tool in determination of uranium in any type of sample. Detection limit of uranium in the sample depends mainly on the background of the Compton continuum of the gamma ray spectrum. The background of the Compton continuum obscures the identification of week photo peaks and also increases the uncertainty in the identified photo peaks. The reduction of the Compton continuum therefore reduces the limits of detection and also improves the accuracy of the measurements. One way of reducing the Compton continuum is by surrounding the main detector with guard detector and operating it in anti coincidence mode. How ever the use of Compton suppression can also give rise to the reduction of intensity in the photo peak if the gamma ray is emitted in coincidence with another gamma ray.

The extent of Compton reduction and the photo peak retention in the complex gamma ray spectrum obtained from a U mineral was investigated by accumulating spectra with and without the anti Compton shield. From the results it was evident that intensities of some analytical lines in the gamma ray spectrum, including the commonly used analytical line 609 keV (214Bi) is reduced as a result of the suppressor system. How ever the intensities of some

photo peaks remained intact, especially the photo peak at 1001 keV which could be used for direct analysis of 238U. The performance of the system for different immersion depths of the Ge detector was also tested and the results are reported.