ROI Analysis with LVis

It is possible to do a simple analysis of regions-of-interest (ROI's) with LVis. Although LVis is usually used as a GUI for ORTEC's GammaVision software, GammaVision is not needed for ROI analyses and LVis can calculate the results on its own. To do that, it is only necessary to install ORTEC's hardware driver package "Connections". A ROI measurement is saved as an LVM file very similar to the LVM files used when working with GammaVision. In fact, it is possible to combine a GammaVision analysis and a ROI analysis in one LVM file. If an acquisition will be evaluated with GammaVision, ROI analysis or both is decided when creating a counting routine (defining a parameter set).

IMAGE MISSING

It is possible to change or add one type of analysis to existing LVM files by clicking in the left top corner of an LVM file and choosing "Settings".

IMAGE MISSING

The ROI analysis is organized on two specific tabs. First, the "ROIs" tab, where the ROIs are defined based on their energies, nuclides can be linked to ROIs and respective efficiency factors can be set. In addition, it is possible to define limits that should trigger a warning when exceeded eg for food monitoring applications.

IMAGE MISSING

There are basically two methods of ROI analyses possible: First, net ROI count-rate determination by subtracting a background ROI count-rate obtained from a background or blank spectrum, and second, the trapezoidal method where the background in the ROI is determined by averaging the count rate in the channels above and below the ROI. A detailed description of the mathematics for both methods is described in the following chapter. The selection of either method is based on the selection of a "Background spectrum" on the ROIs tab. If a background spectrum is selected, the "background subtraction method" is enabled, if not, the trapezoidal method will be used. The second tab organizing the ROI analysis is the ROI results tab that summarizes all the details of the ROI analysis results.

IMAGE MISSING

The use of LVis for the procession of samples (acquisition, analysis & reporting) is basically the same as it is for nuclide specific gamma analysis using GammaVision. There are detector specific ROI parameter sets (= counting routines) as well as routines for QA checks and calibrations. There are

however some unique specifics when using LVis for ROI analysis without having GammaVision installed! First, it is not possible to do an automated energy, FWHM or efficiency calibration. This can only be done manually. In addition, it is not possible to do an energy/resolution QA check. However, a check of the efficiency will indicate energy drifts as well. For the analysis of samples on ROI parameter sets in LVis, only one method exists for the calculation of Confidence Levels and the MDA which is based on the ISO11929 norm.

The following chapters describe the use of the ROI analysis in LVis in detail.

THE ROI ANALYSIS IN DETAIL – THE MATHEMATICS

Gross ROI Counts

$$G = \Sigma_{i=l}^h c_i$$

with - $$G$$ Gross counts - \(c_i\) Number of counts in channel \(i\) - \(l\) Channel number on left (low energy) side of ROI (ROI start channel) - \(h\) Channel number on right (high energy) side of ROI (ROI end channel)

Item one Item two Item three

> Item one
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