

Calibration of a gamma spectrometer for radiochemical measurements



Laboratory / Team	Institute of Nuclear Physics, Orsay (IPNO) – physics and radiochemistry of nuclear energy - Back-end of the Nuclear Cycle and Scenarios Team (PACS) http://ipnwww.in2p3.fr/Physique-et-Radiochimie-de-l-energie-Nucleaire
Contact	Claire Le Naour: lenaour@ipno.in2p3.fr
Main topics	Nuclear instrumentation in radiochemistry
Objectives/context	Gamma spectrometry is a non-destructive technique for analyzing radioactive samples that needs no prior chemical treatment. It enables identification and quantification of gamma emitters present in a mixture. In radiochemistry, this technique is especially suitable for analytical monitoring during the purification of radionuclides or the carrying out of experiments focused on the chemistry of actinides and fission products. The objective of the course is to calibrate a Germanium HP detector.
Equipment / resources / tools / software used	Gamma spectrometer and associated instrumentation (high voltage power supply, amplifier, ADC, MCA) Acquisition software: Gamma Vision Use of sealed and unsealed sources
Level / Duration / Period Number of trainees	L3 or M1 / 1 to 3 months / November 2015 - 15 July 2016 1 student / training period - certificate of fitness to work under ionizing radiation mandatory
Course description / main tasks	
<ul style="list-style-type: none"> • Energy and efficiency calibration of High-purity Germanium detector (GeHP) using sealed radioactive sources. • Rigorous activity calculations for determining the number of atoms present in the calibration sources. • Study of the influence of detector-source distance on the detector's response. • Use of unsealed sources prepared from a calibration solution to understand the influence of the source geometry on the measurements. • Analysis of radioactive samples. 	
Skills acquired on completion of the course	
<ul style="list-style-type: none"> • Knowledge of different modes of disintegration, radioactive decay, activity calculation. • Gamma spectrometry: principles, calibration, analysis of mixtures. • Spectrum analysis. • Knowledge of regulations associated with work in a controlled area. 	