

5.2.22-01/11/15 Fine structure of the α -spectrum of ^{241}Am 

Set-up of experiment P2522215 with MCA

What you can learn about ...

- Energy level diagram (decay diagram)
- Transition probability
- Excited nuclear states
- γ -emission
- Connection between the fine structure of the α -spectrum and the accompanying γ -spectrum

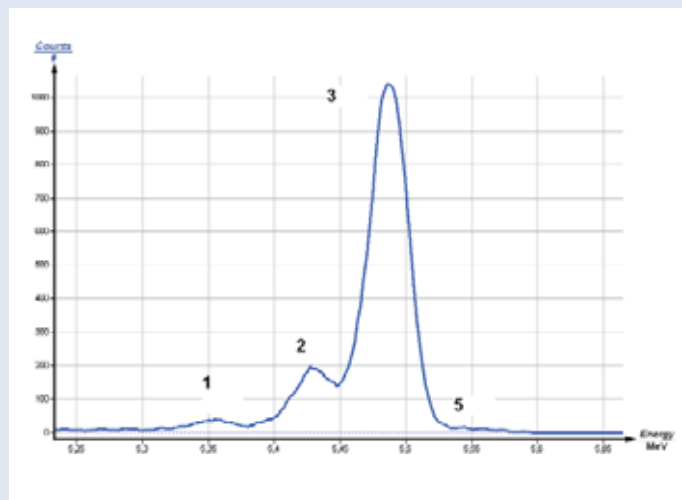
Principle:

The α -spectrum of an open ^{241}Am -emitter is measured with a semiconductor α -detector, maximum use being made in this case of the resolution capacity of the pulse height analyzer. Use is made for this purpose of the "Zoom" function, which is an additional amplification stage having in the effect that only that proportion of the pulses exceeding the threshold voltage of 5 V undergoes further processing. The pulse peaks above this threshold are amplified 5 times and restricted to a maximum of 10 V.

What you need:

Experiment P2522215 with MCA			
Experiment P2522211 with Cobra3			
Experiment P2522201 with xyt recorder			
Multi-Channel-Analyzer	13726.99	1	
Software Multi-Channel-Analyzer	14452.61	1	
Alpha- and Photodetector*	09099.00	1	1
Americium-241 source, 3.7 kBq	09090.03	1	1
Container for nuclear physics experiments	09103.00	1	1
Pre-amplifier for alpha detector	09100.10	1	1
Pulse height analyser	13725.93	1	1
XYt recorder	11416.97	1	
Hand held measuring instrument Pressure, RS 232	07136.00	1	1
Pressure sensor, 1.0...1300 hPa	07136.01	1	1
Diaphragm pump, two stage, 220V	08163.93	1	1
Rubber tubing/vacuum, $d = 6$ mm	39286.00	3	3
Tubing connect., Y-shape, $d = 8-9$ mm	47518.03	1	1
Oscilloscope 30 MHz, 2 channels	11459.95	1	1
Pinchcock, width 20 mm	43631.20	1	1
Screened cable, BNC, $l = 750$ mm	07542.11	4	3
Connecting cable, 4 mm plug, 32 A, red, $l = 75$ cm	07362.01	2	2
Connecting cable, 4 mm plug, 32 A, blue, $l = 75$ cm	07362.04	2	2
Data cable 2 x SUB-D, plug/socket, 9 pole	14602.00	1	1
Cobra3 BASIC-UNIT	12150.00	1	
Software Cobra3 Universal recorder	14504.61	1	
Power supply 12V/2A	12151.99	1	
PC, Windows® 95 or higher			
* Alternatively:			
Alpha detector	09100.00	1	1
Cable connector BNC, 75 Ω	07542.09	1	1

Complete Equipment Set, Manual on CD-ROM included
 Fine structure of the α -spectrum
 of ^{241}Am P25222 01/11/15



Measured Alpha-spectrum of Am-241.

Tasks:

1. The spectrum of an open ^{241}Am -emitter is recorded with the *xyt*-recorder at the maximum resolution capacity of the measurement layout, using automatic window movement. The energy of the two peaks preceding the principal peak is calculated. The principal peak, corresponding to a particle energy of 5.486 MeV, is used for calibration purposes.
2. The resolution capacity of the measurement layout is measured from the half-life width of the principal peak.