

4.2. Obtaining the integral spectra

PROCEDURE

1. Place ^{137}Cs source at an appropriate shelf according to its activity.
2. Set the counting time to 30 seconds.
3. Set the high voltage to 700 V.
4. Press to the “integral mode” button on the front side of the device.
5. Change the baseline value from 0% to 100% in steps of 5 and in each step acquire a count for 30 seconds. Find the division that you obtained the maximum count and in this division change the baseline in steps of 1 and fill the Table 2 with these results.
6. Repeat the steps 1-5 for also the source ^{54}Mn and obtain the integral spectra at this energy.

Table 2. Integral spectra for ^{137}Cs ve ^{54}Mn standard sources

^{137}Cs		^{54}Mn	
Baseline	Count	Baseline	Count
0		0	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
35		35	
40		40	
45		45	
50		50	
55		55	
60		60	
65		65	
70		70	
75		75	
80		80	
85		85	
90		90	
95		95	
100		100	

EVALUATION

1. Plot the baseline- count graph (integral spectra) and interpret your results.
2. Plot ^{137}Cs and ^{54}Mn integral spectra on to each other and interpret on your graph. Is there any difference between the two source spectra? Write your comments if Exists.

4.3. Obtaining the differential spectra

METHOD

1. Place ^{137}Cs source at an appropriate shelf according to its activity.
2. Set the counting time to 30 seconds.
3. Set the high voltage to 700 V.
4. Press again to the “integral mode” button on the front side of the device in order to make it inactive.
5. Change the baseline value from 0% to 100% in steps of 5 and in each step acquire a count for 30 seconds. Find the division that you obtained the maximum count and in this division change the baseline in steps of 1 and fill the Table 3 with these results.
6. Repeat the steps 1-5 for also the source ^{54}Mn and obtain the differential spectra at this energy.

Table 3. Differential Spectra for ^{137}Cs ve ^{54}Mn

^{137}Cs		^{54}Mn	
Baseline	Count	Baseline	Count
0		0	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
35		35	
40		40	
45		45	
50		50	
55		55	
60		60	
65		65	
70		70	
75		75	
80		80	
85		85	
90		90	
95		95	
100		100	

7. Plot the energy calibration curve at this given gain settings (Coarse gain=8, Fine gain=1) with the use of the results of these two energies 661.66 keV(^{137}Cs) and 834.8 keV(^{54}Mn)
8. Repeat the steps 1-6 with the sources with unknown photon energies and calculate this energy from the calibration curve.

EVALUATION

1. Plot the baseline- count graph (differential spectra) and interpret your results.
2. Plot ^{137}Cs and ^{54}Mn integral spectra in the same graph and interpret your spectra.

Explain the relationship and differences between integral and differential spectra. Which parts of the integral spectra corresponds which parts of differential spectra? Plot both curves(integral and differential on the same graph for each source and interpret your graphs.