NKS GammaUser 2014

EFFTRAN Validation II

Tim Vidmar

SCK.CEN, Belgian Nuclear Research Centre, Boeretang 200, Mol, Belgium

Tim.Vidmar@sckcen.be

6-8 October, 2014   STUK, Helsinki, Finland

<1>

Copyright notice

Slides 3 to end are the intellectual property of Tim Vidmar from the SCK.CEN, Belgian Nuclear Research Centre.

<2>

Efficiency transfer between extended samples

- Same calibrated water solution in all samples
- Sample size from 50x5 mm to 100x40 mm
- Cs-137, Co-60, Y-88, Am-241, Co-57, Cr-51, Sn-113
- High-energy detector
- Careful manual evaluation of peak areas
- Coincidence summing correction factors computed with GEANT3

<3>

Parameter	Value
Crystal type	p
Crystal material	Ge
Crystal diameter (including the side dead layer)	60.5
Crystal length (including the top dead layer)	58.8
Crystal rounding (bulletization)	0
Top dead layer thickness	1
Side dead layer thickness	1
Central cavity diameter	10
Central cavity depth	45
Window diameter	80
Window thickness	1
Window material	Al
Crystal-to-window distance	5
Housing thickness	1
Housing material	Al

<4>

Sample	m [g]	d [mm]	h [mm]
A	10.0	50	5.0
B	14.0	60	4.9
C	33.6	60	11.7
D	55.5	60	19.3
E	65.2	90	10.1
F	128.3	90	19.9
G	240.9	90	37.3
I	387.2	111	39.4

<5>

E [keV]	B/A	C/B	D/C	E/D	F/E	G/F	I/G
60	5.4	-2.2	0.2	1.9	-2.2	-0.6	2.0
88	2.1	-2.5	0.5	1.5	-2.8	-1.2	1.0
122	1.5	0.4	-1.2	-0.1	0.1	-1.7	0.8
166	2.1	0.7	-1.3	-0.8	-0.3	-1.6	2.1
320	1.4	0.3	-1.4	-0.1	0.0	-1.2	0.5
392	0.7	0.7	-1.2	-0.3	-0.2	-2.0	0.3
662	1.3	0.2	-0.8	-1.0	-0.3	-1.6	0.6
898	1.9	1.6	-2.6	-1.1	1.9	-3.6	0.6
1173	2.2	0.5	-1.3	-1.7	0.8	-1.2	1.5
1333	0.3	1.5	-0.3	0.6	-0.8	-1.5	0.0
1836	1.1	0.5	-0.1	-1.6	1.6	-2.9	1.2

<6>

Results

- Match between the measured and calculated efficiencies within a couple of per cent
- Another study shows EFFTRAN results in general equivalent to those of other ET codes

<7>