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Efficiency Transfer – Experimental verification

Tim Vidmar



Jozef Stefan Institute, Ljubljana, Slovenia



Study

- ❑ Water solution samples with known activities: Am-241, Cd-109, Ce-139, Sn-113, Co-57, Cr-51, Sr-85, Co-60 and Y-88
- ❑ Point source measurements
- ❑ Transfer from point source and between different extended samples
- ❑ **Efficiency transfer between extended sources.**

Tim Vidmar, Branko Vodenik, Marijan Nečemer, Applied Radiation and Isotopes, *in press*.



Standard solutions

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

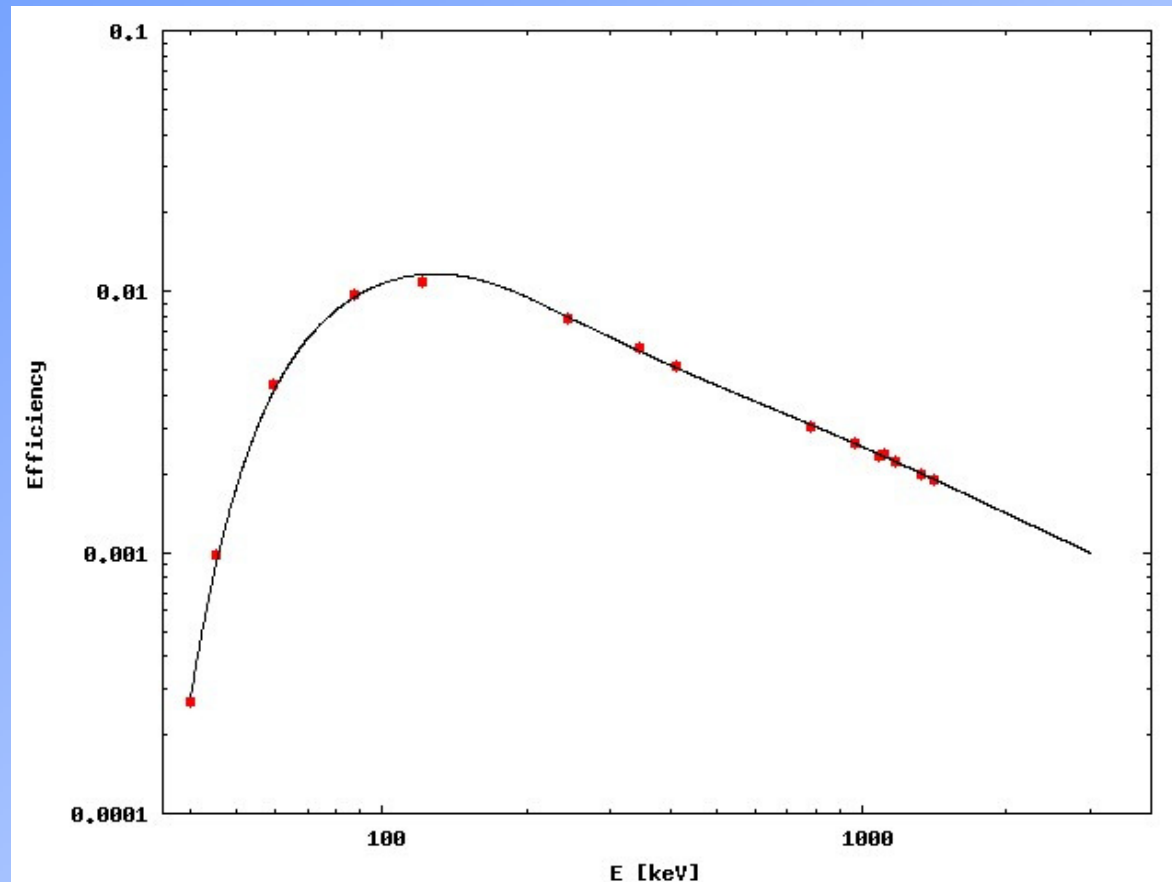


Detector Data

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



Point source measurements





Transfer from point source

E [keV]	A	B	C	D	E	F	G	I
60	5.5	11.2	8.8	9.0	11.2	8.8	8.0	10.0
88	12.7	15.1	12.2	12.8	14.5	11.3	9.9	11.1
122	17.2	19.0	19.5	18.0	18.0	18.0	16.0	17.0
166	14.2	16.6	17.4	15.9	15.0	14.6	12.7	15.1
320	8.9	10.5	10.8	9.2	9.2	9.2	7.8	8.3
392	11.0	11.8	12.6	11.3	10.9	10.7	8.6	8.9
662	8.9	10.2	10.5	9.7	8.6	8.3	6.6	7.1
898	8.1	10.2	11.9	9.0	7.8	9.8	5.9	6.6
1173	4.9	7.2	7.8	6.4	4.6	5.4	4.1	5.7
1333	5.9	6.2	7.8	7.4	8.0	7.2	5.6	5.6
1836	7.3	8.6	9.1	9.0	7.2	8.9	5.7	7.2



Transfer between extended samples

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