

DEVELOPMENT OF STRIP AND PIXEL DETECTORS BASED ON CdZnTe

Gazizov I.M.¹, Letov A.G.¹, Olnev A.A.¹,
Smirnov A.A.¹, Stegailov V.I.², Tyutyunnikov S.I.²

¹ Institute in Physical and Technical Problems, Dubna, Moscow region, Russia;

² Joint Institute for Nuclear Research, Dubna, Russia

E-mail: stegajlov2013@yandex.ru

We used CdZnTe crystals from Redlen Technologies with the size $10 \times 10 \times 5 \text{ mm}^3$ to create detectors. Pixel structures of $6 \times 6 \times 5 \text{ mm}^3$ and $4 \times 4 \times 3 \text{ mm}^3$ were manufactured. A detector $6 \times 6 \times 5 \text{ mm}^3$ has a pitch $1100 \mu\text{m}$, a pixel count of 16 and a square pixel size $1000 \mu\text{m}^2$. Two types of stripe detection structures were made, all structures had a pitch $500 \mu\text{m}$, a number of strips – 16, a strip width is $400 \mu\text{m}$. Structures also have guard rings.

The results of a study of the spectrometrical characteristics of the detector single crystals CdZnTe obtained from materials of Redlen Technologies are presented in table.

Sample number	Type of detector	Instrumental resolution (keV) at energy:			
		81 keV	122 keV	356 keV	662 keV
1	pixel $4 \times 4 \times 3 \text{ mm}^3$	5.8	13.5	–	32.5
2	pixel $4 \times 4 \times 3 \text{ mm}^3$	4.6	6.1	9.2	–
3	pixel $4 \times 4 \times 3 \text{ mm}^3$	–	7.1	–	31.5
4	pixel $6 \times 6 \times 5 \text{ mm}^3$	4.6	5.5	12.2	30.8
5	pixel $6 \times 6 \times 5 \text{ mm}^3$	4.8	10.0	18.2	59
6	strip $10 \times 10 \times 5 \text{ mm}^3$	5.4	7.1	–	24.5
7	strip $10 \times 10 \times 5 \text{ mm}^3$	4.7	6.8	9.2	13.8
8	strip $10 \times 10 \times 5 \text{ mm}^3$	–	6.9	–	21.1
9	strip $10 \times 10 \times 5 \text{ mm}^3$	–	6.7	–	30.9

The results of these investigations are of interest for monitoring nuclear materials using compact devices with high energy resolution that do not require cooling.

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