MD.103.	
Title	**Technology to prepare the single-crystals layers for thermoelectric applications (microcoolers).**
Authors	Albina Nikolaeva, Leonid Konopko, Pavel Bodiul, Igor Gherghisan, Tatiana Coromislichenco, Gheorge Para
Institution	**Ghitu Institute of Electronic Engineering and Nanotechnologies, Chisinau MD-2028, Moldova Republic of**
Patent no.	**MD 1366 Z 2020.03.31**
Description	**Procedeu de obţinere a peliculelor monocristaline subţiri**

EN

The primary purpose of the given presentation was to develop new reliable and reproducible engineering techniques to prepare low-dimensional structures (single-crystals layers) of bismuth telluride and semiconductor bismuth–antimony topological insulator (TI) *n*-and *p*-type for thermoelectric applications (microcoolers).

Single crystals of Bi_2Te_3 layers (1–20 μm) were prepared using the mechanical exfoliation method by cleaving a thin layer from bulk crystalline Bi_2Te_3 and $Bi_{1-x}Sb_x$ samples. Using a mechanical cleavage process, thin layers were separated from the crystalline bulk. The process was repeated several times to obtain layers with different thickness. To peel $Bi_{1-x}Sb_x$ layers off using an adhesive tape, the bulk sample was cooled to 70 K to increase the interatomic distance and thereby to provide a decrease in the interaction (Van der Waals) forces $P = m/d^2$ (patent). Using *p*- and *n*-type layers as *n*- and *p*-legs of a thermoelement, $\Delta T = 4°C$ was obtained at 300 K on a cross section of 1×10^{-4} cm^2. The use of a segmentation method (increasing the cross section as high as to a value of 5×10^{-4} cm^2) made it possible to obtain $\Delta T = 8°C$.

It is known that an increase in the temperature of the micro- sensor by 10°C leads to a twofold decrease the sensor durability.

Our experimental samples the thermoelectric micro-coolers with efficient cooling capacity, small areas, short response time and with reproducible engineering techniques are in high demand on the telecommunication markets of the future.

Class no. 14