- Our experiments have emphasized the importance of the Mo buffer layer, that the interface at $CuInGaS_2$ is in danger of creating a parasite interlayer of MoS_2 at increase of the substrate temperature.

The formation of this parasite interlayer of MoS_2 drastically affects electronic properties of the photovoltaic device/solar cell. This is another technical reason that we chose Kapton as substrate with a stable thermal reaction. It was made the deposit in the proposed process flow sequence for the experimental model of solar cell as follows: Mo layer thickness of 700 nm was deposited with the sputtering rate (0.7÷1) Å/sec; active CIGS layer maximum thickness of 1500 nm was made with a sputtering rate of 1.5 Å/sec; photoactive ZnS was deposit with a sputtering rate of (6.5÷7) Å/sec. at total thickness of 50 Å; i-ZnO at maximum thickness of 500 nm and n-ZnO: at thickness of 800 nm were made with a sputtering rate of (0.5÷1) Å/sec. Deposition of modular elements of the experimental model of solar cell was made on Kapton support by radio frequency magnetron sputtering technology- ion beam assisted in inert gas –argon- of 99.99% purity. Developing of experimental demonstrative and functional model aims to achieve an optimized quantum efficiency and conversion efficiency in the range 14% ÷ 20% [5].

4. Conclusions

(1) Target active material CuInGa-Se_2/S_2 (CIGS) is produced in INFLPR laboratories and is deposited in controlled thickness in very thin layer of Mo interface. Stringent control of dopant concentration of Ga (7÷19)% is achieved after "making" the target, with successive measurements on X-ray diffraction complex equipment. In figure 7 is presented sample diffractometry with identifying the diffraction lines.

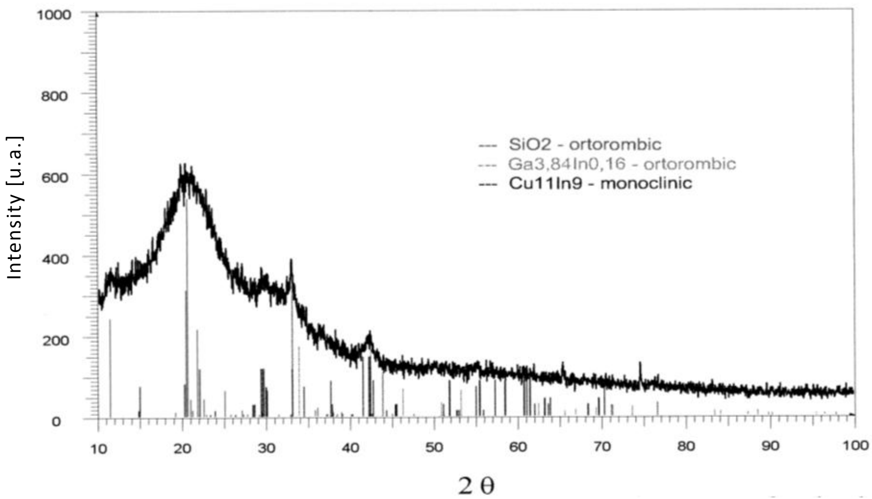

Fig. 7. Spectrum of the sample composite target $CuInGaS_2$ for the experimental model.

Phasal composition of samples analyzed is:

SiO_2 - majority phase, amorphous;

$Ga_{3,84}In_{0,16}$ - minority phase, crystallized in the system orthorhombic;

$Cu_{11}In_9$ - minority phase, crystallized in the monoclinic system.

Specific thickness of layers of Mo, CIGS, ZnS, ZnO, Au is measured in situ and the control range is between 20 nm and up to 2000 nm.

(2)No occurrence of sulfur in crystalline structures, but a large part of the sample is in amorphous form.

(3) Reporting the peak areas corresponding sites in total area phases arise as a phase of $Ga_{3,84}In_{0,16}$ percent occur in approximately 2.6% in the sample, resulting that the percentage of Ga (found in a crystalline structure) of the sample is 2.5% [9].

(4) It is known, taking into account the latest information technology in the field of literature, the procedure of radio frequency magnetron sputtering, ion beam assisted average energy, it must be commercially viable as a variant [8].

The process completed and adopted as technology at this stage of decision is pure and clean.

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