COMPOSITION OF Ag-In-Se LAYERS DEPOSITED ON PES/PVC SURFACE

Lina Jatautė[1*], Valentina Krylova[1], Nijolė Dukštienė[1], Martynas Lelis[2]

[1]Department of Physical and Inorganic Chemistry, Kaunas University of Technology, Lithuania
[2]Lithuanian Energy Institute, Lithuania
lina.sciupakovaite@ktu.edu

Different international directives on the energy performance of buildings stipulate that in a near future all new buildings must be nearly zero-energy buildings [1]. As architectural textiles are usually used to cover extensive out door parts of buildings, the development of the functional properties of these substances by integrating element modules converting solar energy into electricity is a highly promising activity allowing profitable use of the available space and the construction of energetically efficient buildings. The Ag-In-Se materials, especially the ternary compound $AgInSe_2$ has become a candidate as an absorbing layer for solar cells technologies because of its high absorption coefficient [2], good radiation stability [3] and the value of band gap energy ranging from 0.8 to 2.73 [4].

In this work, PES/PVC-Ag-In-Se composites obtained at room temperature by three-step assembly synthesis route. Firstly, for change physical surface properties the PES/PVC mechanical roughened and treated with etching solution. In the second step, a chemical bath deposition method employed for preparation of PES/PVC-Se precursors at room temperature using H_2SeO_3 and Na_2SO_3 solutions. Further, this PES/PVC-Se serves as proxies for silver-indium selenide formation. The formation of silver-indium selenide was attained by exposing the PES/PVC-Se precursors into an $AgNO_3$ and $In(NO_3)_3$ solutions for different time. The reaction system depends on the heterogeneous reaction between Ag^+ and In^{3+} ions and Se on PES/PVC surface. The obtained composites were characterized by X- ray photoelectron spectroscopy (XPS) and X-ray fluorescence analysis (XRF).

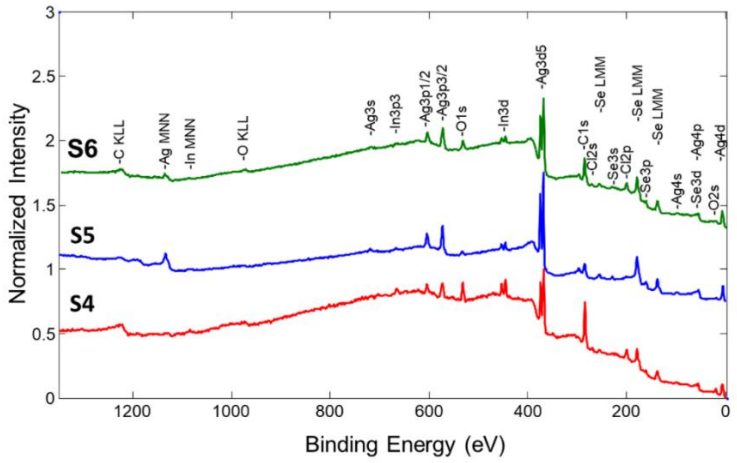

Fig. 1. XPS survey spectra of samples S4, S5 and S6

As expected XPS data indicated presence of Ag, Se and In.

Table 1. Elemental composition of the samples based on XRF data.

Sample	Elemental concentration, at. %						
	Ag	In	Se	Cl	Ti	Ca	Other (C, H, O, Si, Al…)
Pre-treated PES/PVC	0.00	0.00	0.00	48.10	5.86	4.42	41.62
S4	0.84	0.06	0.59	48.60	5.22	2.29	42.40
S5	1.10	0.09	0.68	43.90	4.77	2.02	47.44
S6	1.30	0.15	1.45	45.90	4.38	1.75	45.07

With increasing deposition time of the Ag-In-Se layers, the atomic percentages of the Ag, In and Se increases.

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