

Some Peculiarities of Hybrid Organic-Inorganic Silicon-Based Solar Cells Formation

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The new solar cell hybrid architecture by a chemical deposition of the organic layer from aqueous solution of heterocyclic amines onto the patterned *Si* substrate has been developed. The hybrids were fabricated at room temperature during from 0.3 hour up to 170 hours. Aqueous solutions of the thiamine diphosphide (cocarboxylaze hydrochloride) (TD) and the metamizole sodium (analgin) (MS) were used.

The chemical deposition it is found to form morphology evolution from pyramid like to the spherulite formation and separate organic crystals. The morphology, current-voltage and spectral characteristics were studied. Organic layers of thiamine diphosphide and metamizole sodium modified the morphology, chemical composition and physical properties of porous patterned substrates. This modification does not depend on solution chemistry and is determined by deposition time, i.e. layer thickness. For thin organic layers ($\leq 100 \mu\text{m}$) the layer contour is the same as substrate and terrace-step-kink (TSK) growth mechanism is realized. For more thick layers (up to some micrometers) self organized assemblies are formed but with preference of pre-pattern substrate. On the interface of TD layer – porous patterned substrate the barrier is formed and PV characteristic is observed.

Chemical solution deposition at room temperature is newly simple technological process useful for realization of hybrid organic-inorganic structures. The further progress in this field strongly depends on control of ligand incorporation.

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2. T.Ya. Gorbach, V.P.Kostylyov, V.G. Melakh, N.M.Roshchina, P. S. Smertenko, G.Wisz. Formation of self-organized organic-inorganic hybrids // *Proceedings of Ukrainian Material Research Society.* – 2015 (in press)