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InP photovoltaic cells with nanometric layers

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The high stability of InP photovoltaic cells (PVC) to the influence of corpuscular radiation, the steadiness of their photovoltaic parameters to the temperature variation and their high efficiency are determining their timeliness in photo-energetics [1, 2].

nInP-p°InP-p^+InP homostructures having a CdS antireflectant layer and nCdS-p°InP-p^+InP heterojunctions were obtaine for PVC fabrication. The p^+InP substrates were cutted from the Zn doped to the concentration of $p=(1\ldots3)\cdot10^{18}$ cm^{-3} Czochralski grown bulk having crystallographic orientation in (100) direction and disoriented by 3…5° to (100) plane.The intermediate p°InP layer of submicron thickness was repeatedly deposited by HVPE method at 650°C. The growth of Te doped n^+InPlayer was carried out by using the same technlogical procedure of HVPE method. The n^+CdS„window" layer of nanometric thickness both for homojunction case as well as for heterojunction case was deposited by cvasi-closed space method at 710°C in a H_2 flow. The Ohmic contacts: to the n^+CdS frontal layer an In layer in the form of a grating deposited by thermal evaporation in vacuum; to p^+InP – an Ag+5%Zn alloy followed by a heat treatment in H_2 at 200°C, and 400°C respectively.

The load depndencies for PVC obtained on the basics of n^+CdS-n^+InP-p°InP-p^+InP homostructure and of n^+CdS-p°InP-p^+InP hetrostructure at the illumination flow of 100 $mW\cdot cm^{-2}$ (computer unity KEITHLEY 4200-SCS) were studied. One should observe that the using of the modified intermediate layer fabrication allowed to obtain an efficiency of 17.3% for CF based on n^+CdS-p°InP-p^+InP which is an efficiency by 3,8 % higher than of 13,8% of a PVC with a n^+CdS-n^+InP-p°InP-p^+InP homojunction. This is due to the most efficient visible spectrum using in gthe case of n^+CdS-p°InP-p^+InP proved by the photosensitivity comparison of these two structures.

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2. *Botnariuc V.M., Gorchiak L.V., Grigorieva G.M., Kagan M.M. et al.* Radiation egradation of solar cells base don InP-CdS heterojonction. In: Solar Energ.Mat., 1990, p.359-365.