a 2010 0068

The invention relates to solar radiation-to-electric energy conversion technique, in particular to the design of contacts and the chemical composition of materials used in the manufacture of conductive and semiconductor elements of the photoelectric converter.

The semiconductor photoelectric converter comprises a semiconductor layer, on the front surface of which are applied metal current-collecting contacts and a layer of organosilicon adhesive, and on the back surface is applied a solder layer. The semiconductor layer is made of silicon nanocrystals, the crystallographic planes of which are oriented in one direction. The tin-lead solder comprises antimony in an amount of 3…4% of the alloy weight. The current-collecting contacts are made of iron-cobalt or iron-cadmium galvanic alloy, and the protective coating of organosilicon adhesive of a thickness of 0.17…0.2 mm is applied on all surfaces of the converter.

The method for manufacturing the semiconductor photoelectric converter consists in that silicon nanocrystals are oriented by rotating an external electrostatic field source around the semiconductor layer and is experimentally determined the angle under which is fixed the external electrostatic field source. It is melt the film of tin-lead solder, doped with antimony, are deposited the solder oriented silicon nanocrystals while concomitantly alloying one part of nanocrystals with antimony and the solder is cooled. The obtained plate is immersed in a plating bath with electrolyte and is carried out the anodic treatment of the front surface of the semiconductor layer for 25 s at a current density amplitude of 55…60 A/dm^2. It is fixed a stencil to the cleaned from oxides and impurities front surface of the obtained plate, is cathodically connected the plate to a periodic current source with reverse amplitude and width adjustable pulse and at a ratio of the cathode and anode current pulse amplitudes equal to 6:1, for 3 min is increased the density of the direct pulse from 0 to 40 A/dm^2 and is deposited the galvanic alloy during 12…20 min at the prescribed current ratio. The resulting photoelectric converter is washed with distilled water at a temperature of ~330K, dried, immersed in organosilicon adhesive, removed from the container with the adhesive and dried for 10 minutes in a drying room at a temperature of 360K.

Claims: 2