

# Nanocomposites and Nanomaterials

## Solar cells based on heterostructures n-CdS/porous-Si/p-Si

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The paper presents the results of investigation of thin CdS films obtained by the surface chemical deposition method. As a substrate, porous silicon plates were used.

Nanoporous silicon was obtained by electrochemical etching of single crystal Si wafer with crystallographic orientation of the surface (100) p-type conductivity with a specific resistance 6 mOhm•cm.

For chemical surface deposition of CdS films used freshly prepared 0,015 M aqueous solution of cadmium chloride CdCl<sub>2</sub>, 1,5 M solution thiourea CH<sub>4</sub>N<sub>2</sub>S, 14,28 M solution of ammonium hydroxide NH<sub>4</sub>OH. Because of the low solubility Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> prolonged heating and mixing for several hours is required. Electrolyte final pH was adjusted to 12. Linings, coated them prepared solution, heated to a temperature of 80° C for 5 minutes.

The cross-sectional structures obtained n-CdS/porous-Si/p-Si and chemical composition of the obtained films was studied using scanning electron microscope JSM-6490 with permission x60000. Using X-ray microanalysis was determined the chemical composition of the films.

The following results:

1. CdS layer thickness is uniform and varies from 10 to 30 microns. CdS films with n-type conductivity.

2. Research impurity concentration distribution in depth showed that the volume of CdS films of carbon and oxygen content is reduced by half, the concentration of other impurities not significantly changed.

Formation of ohmic contacts to the silicon substrate and CdS film was performed by indium solder followed by forming an electric pulse.

Measured light current-voltage characteristics obtained hetero structures. Determined efficiency solar cells produced.