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Letter

Spectral Characteristics of CdS Polymer Composites

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Abstract: Most of scientists were interested composite materials which are products of nanotechnology. Speaking of composite materials, chemical composition and structure of two or more different phase of consolidation is understood. From composite materials of research polymeric composition the materials got on the basis of matrix and then yet more. At the present work, have been investigated spectral characteristics, load line DC volt-ampere characteristics of polymer composites CdS and the spectral distribution photosensitivity.

Keywords: The Polymeric Dielectrics, Polymer Composites, Load Line Volt-Ampere Characteristics, Spectral Characteristics, Photolithography, Spectral Distribution of Photosensitivity

1. Introduction

The different materials hybridization for to get new material properties always became the object of interest of researchers. So, most of the time purchased materials, does not reflect the qualities necessary for the experience. These materials are different than the other composites for the physical, chemical, electrical and optical properties. Lately, new properties composite materials are purchased by placing semiconductor nanoparticles in polymer matrix [1-5]. Semiconductor nanoparticles placing in polymer matrix there are new properties of polymers, physical, chemical properties are change. And this conditions these materials for the use in various industries. And for this simple improvement of technologies and methods of obtaining such materials, the new discovery is one of the important issues [6-10].

2. Experiment

As a research object we have chosen CdS polymer composites. In composites consisting of polymer and CdS for determine the mechanisms of formation of photo resistive effect been investigated experimentally for CdS different the volume of the share dependence of photocurrents of light falling on this wavelength.

3. Results and Discussions

The research shown that, regardless of the volume of the share of CdS the maximum price of photocurrents from examples of the wavelength of light price corresponds to 700 nm (Fig. 1).

Specified in the form another important result of CdS based composite of strength of the current the light falling wavelength dependence on in a small share of CdS changing very little [10]. But in composites the share price in the amount of 50% of the CdS dependence between λ and photocurrent is high enough. It should be noted that the fierce currents dependence on λ, that is $I=f(\lambda)$ is experimental character and is independent of the size of the stake of CdS in composites [5]. Similar results were observed acquired for composites for load line volt-ampere characteristics (Fig. 2).

Figure 2 seems, dependence $J=f(U)$ sharply lower with the growing tension and then stabilized. A high density polyethylene 50 percent for CdS composite $J=f(U)$ the tension it is sharper and in practice is also suitable for use for example in photolithography.

Photolithography –is the process a picture of certain shapes and sizes dielectric or metal layer over the purchase other words is the methods “of the mask” stand on materials. “Mask” is made with the help of photo templates. Photo cliché consisted from the thick glass layer, covered with one of the faces non transparent thin layer. Of this over the non-transparent layer is taken we want a “mask”, which required by the transparency through (features) the hole. Photolithography is used in microelectronics small than segments of 1 micron in width. Prepared topology of the chip, which is growing size of 500 times before the process. Then the scheme pictures are being reduced 10 times, 100 times and finally before obtaining the required size.

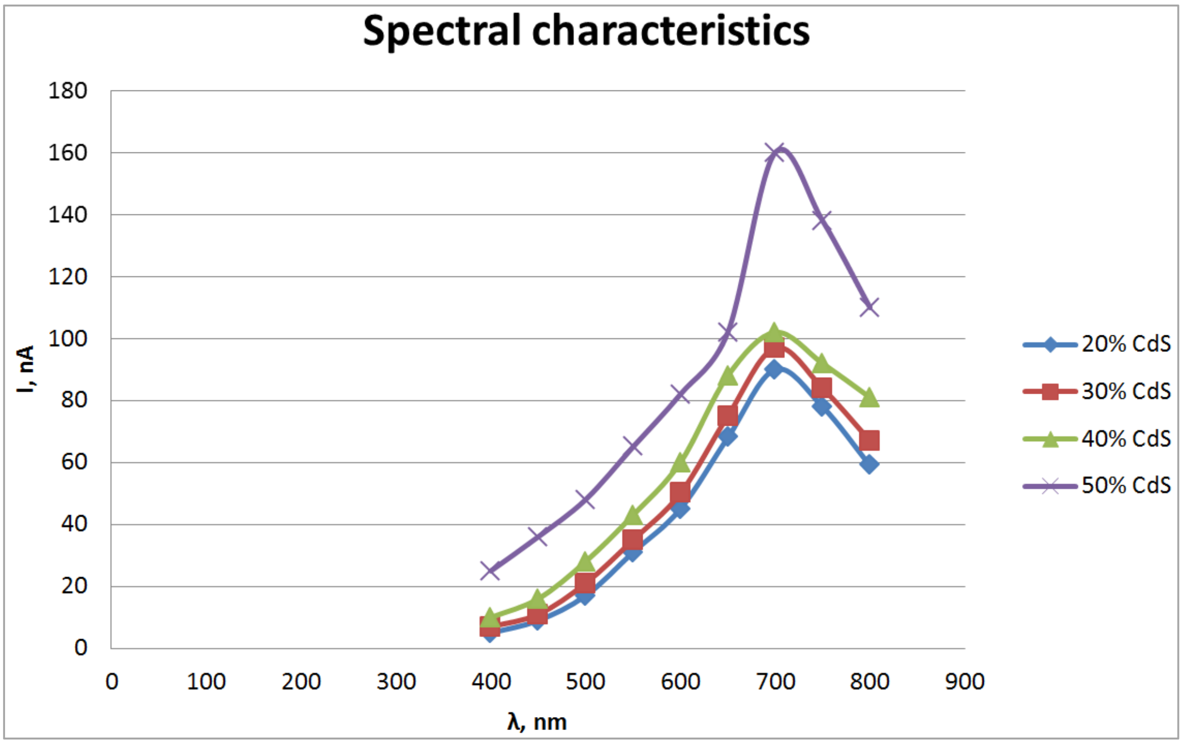

Figure 1. *Spectral characteristics of High- density polyethylene and CdS containing samples: ✕ -50% CdS +50% polyethylene; ▲- 40% CdS +60% polyethylene; ■ - 30% CdS +70% polyethylene; ♦ - 20% CdS +80% polyethylene.*

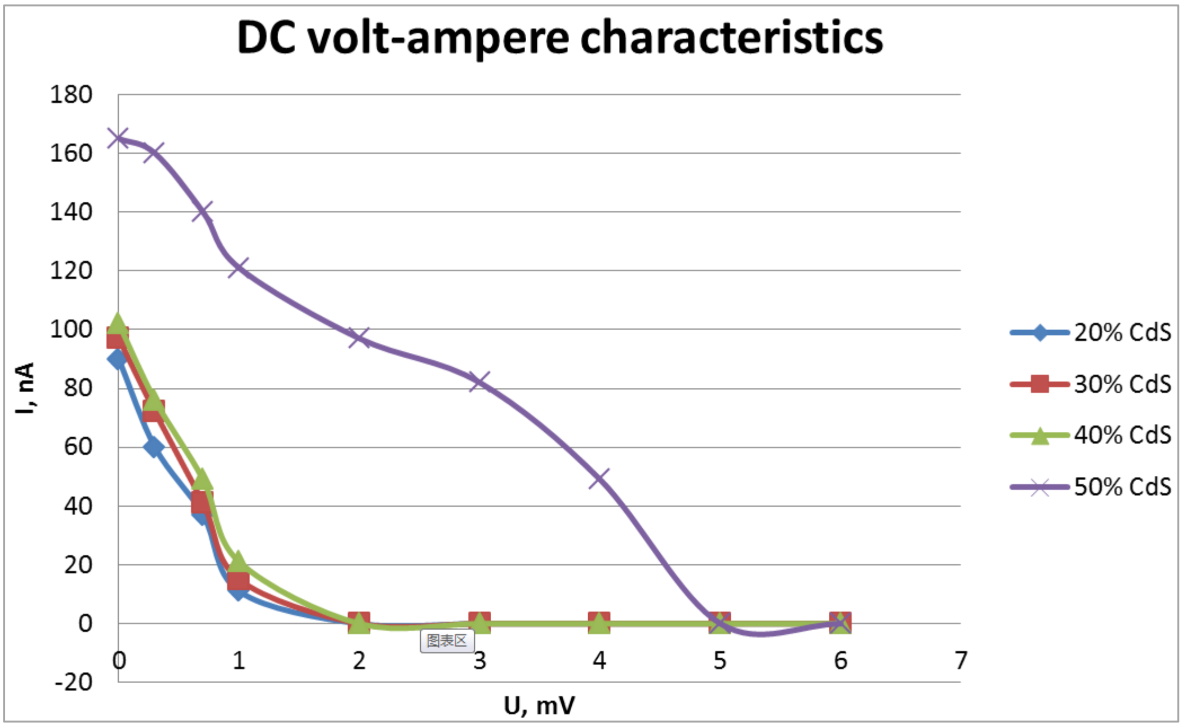

Figure 2. *Load line DC volt-ampere characteristics of High- density polyethylene and CdS containing samples: ✕ -50% CdS +50% polyethylene; ▲- 40% CdS +60% polyethylene; ■ - 30% CdS +70% polyethylene; ♦ - 20% CdS +80% polyethylene.*

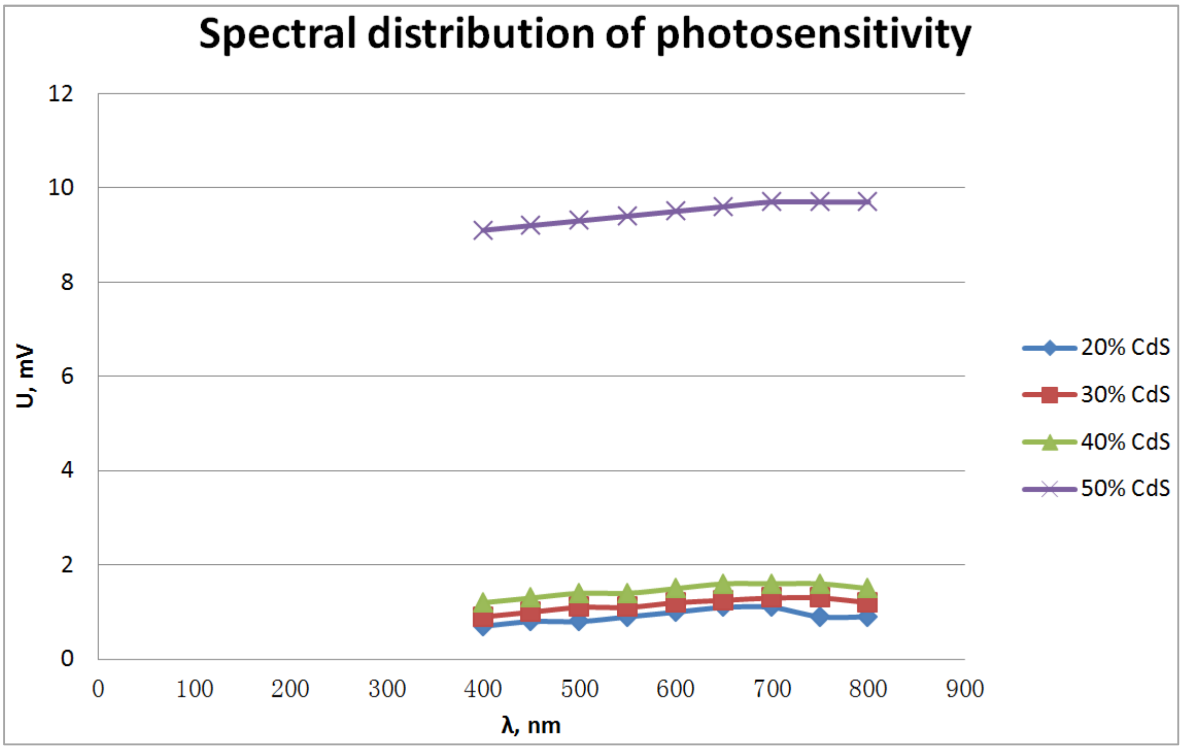

Figure 3. *Spectral distribution of photosensitivity of High- density polyethylene and CdS containing samples:* × *-50% CdS +50% polyethylene;* ▲*- 40% CdS +60% polyethylene;* ■ *- 30% CdS +70% polyethylene;* ♦ *- 20% CdS +80% polyethylene.*

The spectral sensitivity of composites depending on the wavelength of light such a change is due under the influence of the polymer phase (Fig 3). It shows that the effect of sensitization of composites.

Lets to mention that, integral photo sensitivity of organic photoelectric materials is less and/or photo sensitivity falls to short wavelength part of the spectrum. That's why, expand of specter for photo resistor and increase of integral photo sensitivity has great importance [11-15].

The belowmentioned main concepts are used during learning of sencibilization of photoelectric sensitivity in organic semiconductor materials:

a) Spectral sencibilization is formation of new strips on photoelectric sensitivity specter. So, we can imagine that photoelectric sensitivity specter of CdS will coincide with CdS specter [15]. But new maksimums become form in specter beginning from 60% share volume of CdS in composite and photo sensitivity specter of composite sliding to the big wavelength side [16-17].
b) Chemical sencibilization is increase in the expense of structural effects formed on special photoelectric sensitivity of used components in investigated composites. These effected were observed in our research, so if we before will subject polymer and CdS phases to electric discharges and composite will be formed on the basis of them, then photo sensitivity specter of composite become expand. It can be explained with creation of electron donor and electron acceptor groups in polymer molecular that subject to electric discharges.
c) Spectral-chemical sencibilization is change of either special photo sensitivity specter or creation of new strips in those specters in result of some influences of new composite to components [17-18]. Such type of sencibilization is observed in either simple composite or composites that subject to electric discharges.
d) Structure sencibilization, that's to say is change of photo sensitivity of photo composite or specter of photo sensitivity in result of change of phase structure of components of composite. The probability of being of this effect for photo composites is more, so, either chemical structure or extreme molecular structure will change during dispersion with photo sensitivity CdS parts of polymer phase.

4. Summary

We studied spectral characteristics, load line DC volt-ampere characteristics of polymer composites CdS and the spectral distribution photosensitivity. So, it was determined in result of experiments that maximum value of photo current is suitable to 700 nm value of wavelength of light non-depending on volume share od CdS in polymer CdS composite and dependence on wavelength of light of current violence of CdS based composite less changes in small volume shares of CdS.

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