Virtual Institute of Physics

Errata

The editor would like to announce the retraction of this paper from this journal for the reason of research misconduct.

This article was identified as having intentional plagiarism issues regarding it's content, by rewriting someone else's work without attribution.

The editorial staff of the journal would like to apologize for the misunderstanding and technical error that led to the publication of the article in this journal.

Managing Editor

Dr. Iosif - Daniel Şimăndan

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Retracted article: Optimization of chemical bath deposited CdSSe thin films

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CdSSe nanoparticles were organized by chemical process at ambient conditions. XRD analysis confirmed that CdSSe NPs. The UV-VIS absorption spectra for CdSSe nanoparticles shown .The range of the absorption edge lies between 650 nm to 420 nm, which is apronounced blue shift from 712 nm of the bulk CdSSe indicating that particles in nanoscale. There is a blue shift compared with the bulk CdSSe because of the quantum confinement effect. The Photoluminescence emission spectra of CdSSe nanoparticles at the different excitation wavelength are show.

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Keywords: CdSSe, nanoparticles, Thin films

1. Introduction

The development of nanostructured semiconductor materials over many decades, as well as their possession of unique and distinctive properties, has led to their use in many different applications [1]. Among various semiconductor materials, cadmium selenide (CdSSe) is an important direct-band semiconductor with band gap (Eg) pf 1.74 eV, having unique optical properties resulting from quantum confinement effect and wide tuning of bandgap with particle size [2]. This semiconductor has several crystal structures, the first of which is the hexagonal (wurtzite type), which is obtained by high temperature preparation methods, while the other is the cubic structure (zinc-blende type), which is obtained by low temperature preparation methods. The hexagonal state is the stable phase while the sphalerite cubic is the metastable state [3].

Many methods and techniques were used to deposited CdSSe thin film like electrodeposition [4] solvothermal [5] chemical bath deposition (CBD) thermal evaporation technique [6,7].

Though, among these methods, spin coating technique is desirable for the deposition of nanostructured thin films as it is easy to prepare, low cost, and appropriate for large area preparation. Since the properties and efficiency of materials are enhanced when employed in their nanocrystalline forms, research interest has grown immensely in areas of obtaining CdSSe in their Nano particulate sizes. One of the recent trends in nanomaterials research is the control of particle shape, by manipulating the precursor concentration, temperature of reaction, and capping environment, which are factors that affect the morphology and size of the nanoparticles [8]. excellent photoelectrical characteristics and make it a promising material for applications in many fields, such as photo detectors, FETs, field emitters, solar cells, LEDs, memory devices, biosensors, and biomedical imaging [9].

2. Experimental

A thin film schottky diodes with the structure Glass/FTO/CdSSe-TSC/Ag and Al/CdSSe-TSC/Ag have been fabricated in which CdSSe layer was deposited on top of the FTO coated glass substrate and Al substrate.

The size and morphology of CdSSe nanoparticles have been examined by scanning

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electron microscopy, transmission electron microscopy (TEM) and atomic force microscopy(AFM). The image of the CdSSe NPs. From TEM test showing in Fig. 1, display spherical mono dispersed particles of 20-90 nm with an average diameter about 44 nm. It is clear from FESEM and AFM images that the thin film surface is smooth and has spherically shaped grains. The surface is covered with uniformly size grains. No cracks or holes are observed in the thin films .The mean grain sizes of films were about 40 nm.

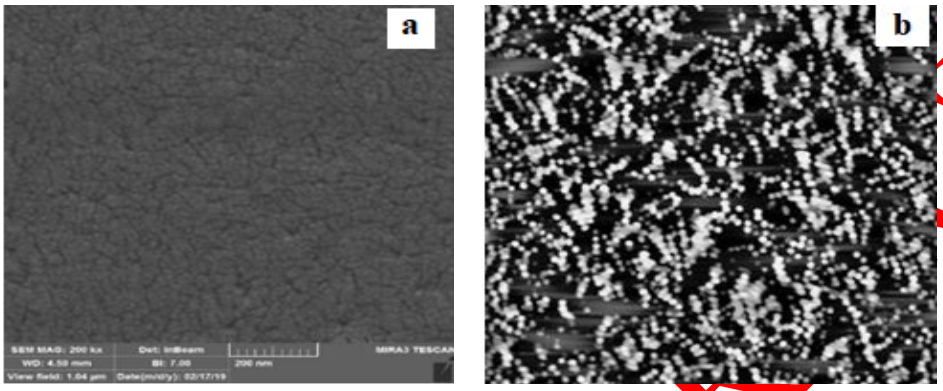

Fig. 1. TEM micrograph (a) AFM micrograph (b) of CdSSe NPs.

The X-ray diffract gram for thin film of CdSSe capping with TSC is shown in Fig. 6. The peaks obtained in the Figure has been compared with the typical configuration of the cubic structure of CdSSe (J.CPDS 19-0191). The forms of XRD point toward that the film of CdSSe consist of particles in nano-scale [10]. The peak intensity at 2θ=25.46 which is corresponding with the planes (111) is higher than the other peaks, which confirms the growth of thin films along this plane. There are no detection of peaks resultant from impurities that suggestion the great purity of produced matter. The intensity of the peaks is quite an indication of the well crystalline nature of the prepared nanoparticles [11].

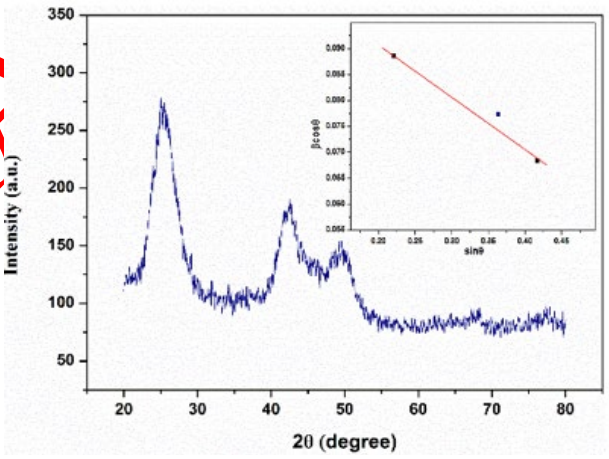

Fig. 2. X-ray diffraction pattern of CdSSe NPs.

UV-VIS absorption spectra for CdSSe nanoparticles shown in Fig. 5, The range of the absorption edge lies between 650 nm to 420 nm, which is a pronounced blue shift from 712 nm of the bulk CdSSe, indicating that particles in nanoscale.

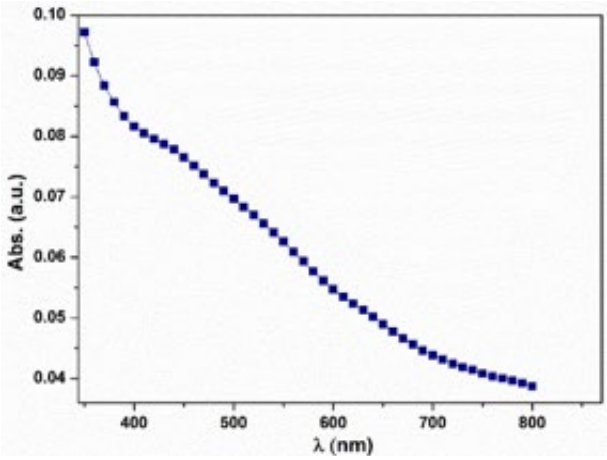

Fig. 3. Absorption spectra of CdSSe nanoparticles.

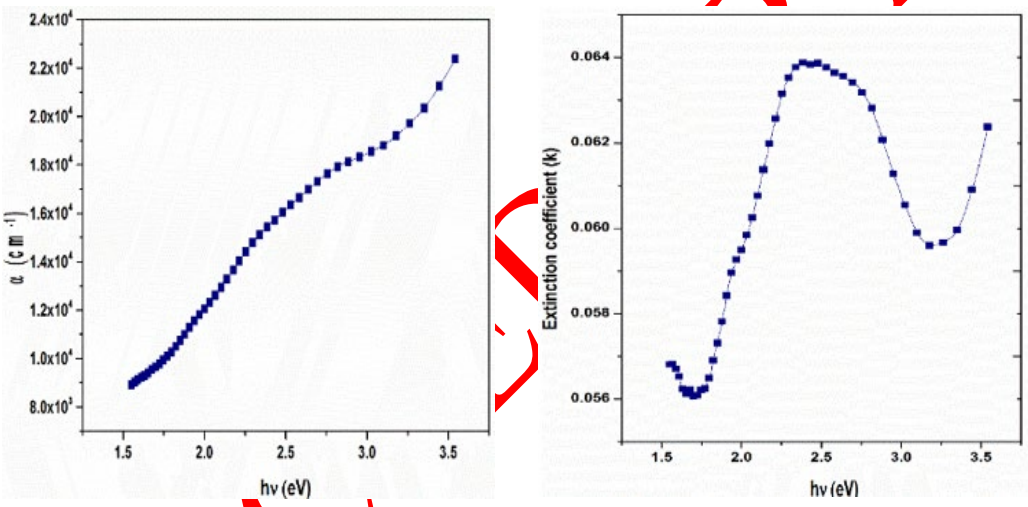

Fig. 4. Absorption and extinction coefficient of CdSSe nanoparticles.

Fig. 5 shows the plot of $(\alpha h\upsilon)^2$ vs. $h\upsilon$ for CdSSe thin film. From the plot of the figure,

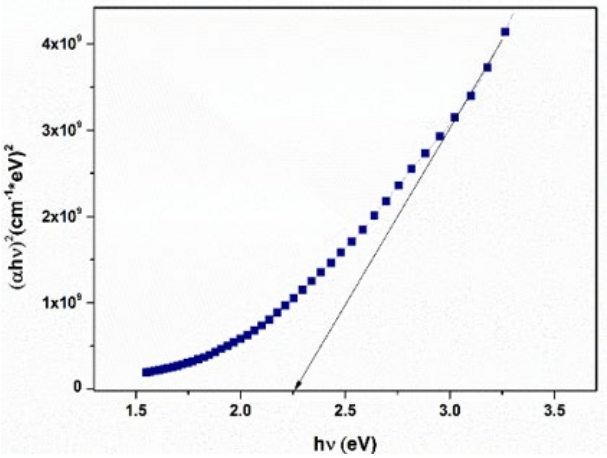

Fig. 5. The energy band gap of CdSSe nanoparticles.

The value of Eg is found to be 2.25 which is more as compared to bulk CdSSe (1.7 eV) due toquantum confinement effect.

Photoluminescence (PL) is a very public emission spectroscopy characterization method for studying the properties of nanomaterials since it is simple and direct. Fig. 6 show the Photoluminescence emission spectra of CdSSe nanoparticles at the different excitation wavelength. It is clear from the figure that the emission peaks of all three excitation wavelength nearby the green, at 548 nm. From PL peak, The band gap of CdSSe nanoparticle are founded equal to 2.13eV. There is a blue shift compared with the bulk CdSSe (712 nm) because of the quantum confinement effect.

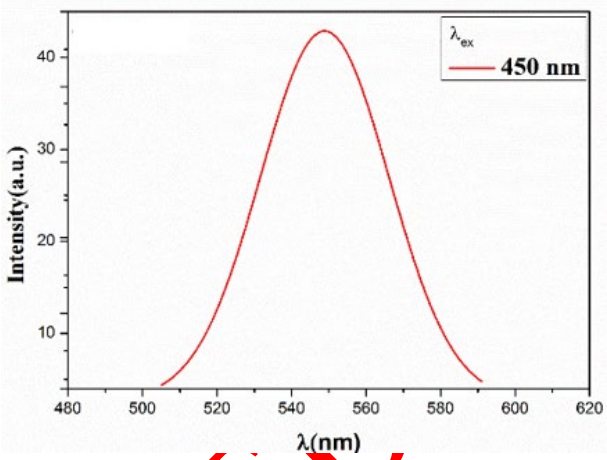

Fig. 6. Photoluminescence spectrum of CdSSe-TSC, at excitation wavelength equal to 450 nm.

3. Conclusion

From the obtained results of the present work, we conclude the following: TEM and AFM micrograph of CdSSe NPs. The surface is covered with uniformly size grains. Particles of 20-90 nm with an average diameter about 44 nm. XRD analysis confirmed that CdSSe NPs. The UV-VIS absorption spectra for CdSSe nanoparticles are shown .The range of the absorption edge lies between 650 nm to 420 nm, which is apronounced blue shift from 712 nm of the bulk CdSSe indicating that particles in nanoscale.

The band gap of CdSSe nanoparticle are founded equal to 2.13eV. There is a blue shift compared with the bulk CdSSe because of the quantum confinement effect. The photoluminescence emission spectra of CdSSe nanoparticles at the different excitation wavelength are show. It is clear from the figure that the emission peaks of all three excitation wavelength nearby the green, at 548 nm.

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