



Synthesis of CdS Nanocrystals by Raman Spectroscopy

KEYWORDS

Nanocrystals, Biological Sensors, Raman Spectroscopy, Chemical method.

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ABSTRACT

CdS nanocrystals are synthesized by chemical reaction route thylenediamine as a complexing agent. These synthesized CdS nanocrystals were characterized by micro Raman Spectroscopy. The Raman spectra of synthesized CdS nanocrystals were recorded by micro Raman techniques. The Raman peaks are obtained at 298, 599 and 895 cm^{-1} corresponding to 1 LO (longitudinal optical), 2 LO, and 3 LO optical phonons, respectively. These Raman peaks are well matched with characteristics CdS nanocrystals

INTRODUCTION:

Semiconductor materials which are nanocrystalline in nature, have attracted considerable attention due to their technique properties, which are not present in bulk materials [1]. Cadmium Sulphide (CdS) have been extensively studied due to its potential applications such as biological sensors, field effect transistors, light emitting diodes, photocatalysis, solar cells etc. Many synthetic methods have been employed to prepare CdS nanocrystals including soft chemical reaction, solid-state reaction, sol-gel process, sonochemical preparation, microwave heating, photoetching and reverse micelle. In this communication, we report a method to produce CdS nanocrystals by using chemical reaction route using ethylenediamine as a complexing agent. These synthesized CdS nanocrystals have been characterized by micro Raman spectroscopy [2].

EXPERIMENT:

SYNTHESIS OF CdS NANOCRYSTALS:

All chemicals, cadmium acetate dehydrate () and ethylenediamine were of analytical grade and used as received without further purification. Double distilled water and ethanol was used for washing the particles. A typical procedure for the CdS nanocrystals synthesis is as follows: appropriate amount of analytically pure was dissolved into a deaerated 45 mol. % aqueous solution of ethylenediamine in a flask at room temperature. Then under vigorous stirring, analytical pure was quickly added to this solution, and a milk-white sol was formed soon. Next, the resultant milk-white sol was heated to 120°C, and kept on stirring at this temperature for about 8 hours until milk white reaction mixture gradually turned to a yellow colour. The final product was then collected and washed with distilled water and ethanol [3].

CHARACTERIZATION OF CdS NANOCRYSTALS BY RAMAN SPECTROSCOPY:

The optical properties of the synthesized CdS nanocrystals were observed by the Raman Scattering measurements. All Raman data of CdS were collected from a micro-Raman spectrometer with Argon ion (514 nm) excitation laser with output laser power 20 mw. The no. of grating in the Raman Spectrometer was 1800 lines/mm for visible laser. We used 50X objective and exposure time 10s at the time of measurements. The spectrum was acquired between the range 100 and 1000/ cm^{-1} .

Figure (a) shows the micro-Raman spectrum of the CdS

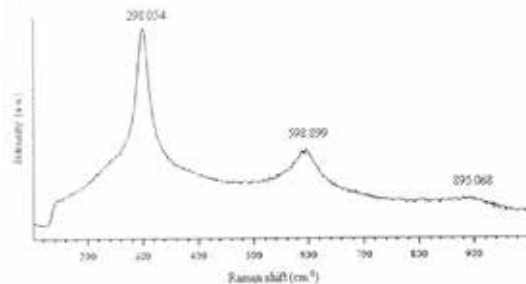


Fig. (a) Raman Spectrum of CdS nanocrystal

CONCLUSION:

CdS nanocrystals were synthesized by using chemical reaction route using ethylenediamine as a complexing agent. These particles were characterized by Raman Spectroscopy. The Raman peaks are obtained at 298, 599 and 895/ cm^{-1} corresponding to 1 LO, 2 LO and 3 LO (Longitudinal optical) optical phonons, respectively.

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