Dependence of spectroscopic and electrical properties on the size of cadmium sulfide nanoparticles

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Abstract

Cadmium sulfide (CdS) nanoparticles with different sizes were synthesized using chemical precipitation method. The change of particle size, morphologies and crystal structures with the molar ratio of cadmium to sulfide salt was obtained from transmission electron microscopy (TEM) and X-ray diffraction pattern results. It should be noted that, the CdS nanoparticles were formed with different size, normal distribution and cubic phase. The effect of particle sizes on the optical properties was confirmed from UV-visible and fluorescence spectroscopic data. The optical band gap decreases from 2.9 to 2.51 eV with increasing the particle size from 5 to 9.25 nm due to the change of the molar ratio of CdCl2 to Na2S from (16:1) to (1:16). The electrical results obtained show that, DC conductivity increase with decreasing the particle sizes. The conduction mechanisms were discussed at low and high applied voltage. All samples have semiconducting behavior and can be used in the field of light emitting diodes.

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Dependence of structural, vibrational spectroscopy and optical properties on the particle sizes of CdS/polyaniline core/shell nanocomposites

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Abstract

Cadmium sulfide/polyaniline (CdS/PANI) nanocomposites were prepared by polymerization of aniline on the CdS nanoparticles using facile synthetic steps. Transmission Electron Microscope (TEM) confirmed that CdS/PANI nanocomposites were synthesized in the form of core/shell structure. According to the patterns of X-ray diffraction (XRD), the particle sizes of the cored CdS were changed with the change of CdCl2 to Na2S molar ratio. Fourier transform infrared (FTIR) spectra revealed that. CdCl2 to Na2S was used to control the polymerization process of aniline. The oxidation degree of PANI was increased with increasing CdCl2 to Na2S. The UV-visible spectra of CdS/PANI core/shell nanocomposite was contained the absorption of the PANI shell as well as the CdS nanoparticles core at certain ratios of CdCl2 and Na2S.

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CdS/PANI nanocomposite; TEM; XRD; FTIR; UV-visible spectroscopy

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Characterization of In Situ Prepared Nano-Hydroxyapatite/Polyacrylic Acid (HAp/PAAc) Biocomposites Author(s): El-Bahy, GS (El-Bahy, G. S.)[1] ; Abdelrazek, EM (Abdelrazek, E. M.)[2] ; Allam, MA (Allam, M. A.)[1] ; Hezma, AM (Hezma, A. M.)[1]

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Abstract

Nanoparticles hydroxyapatite (HAp) was prepared via an in situ biomimetic process with polyacrylic acid (PAAc) as a host polymeric material. Fourier transform infrared spectroscopy, transmission electron microscopy, scanning electron microscopy, X-ray diffraction, thermogravimetric analysis, and differential scanning calorimetry were used to test the physical and chemical characteristics of biocomposites. The formation of HAp is confirmed by energy dispersion X-ray analysis. Chemical binding between inorganic HAp and PAAc was investigated and discussed. HAp formation was initiated through the interaction of Ca(2+) ions with the negative side groups of the polymer surface. The results showed that the biocomposites were formed with good homogeneity and thermal stability. Nanoparticles of HAp were uniformly distributed in the polymeric matrices. The resulting new materials are hoped to be applicable in the biomedical fields. (C) 2011 Wiley Periodicals, Inc. J Appl Polym Sci 122: 3270-3276, 2011

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Structural, optical and some physical properties of PVDF films filled with LiBr/MnCl2 mixed fillers

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Abstract

Films of polyvinylidene fluoride (PVDF) filled with (X)LiBr(20-X)MnCl2 mixture, where X=0, 1, 2, 8, 16 and 20 wt%, were prepared by casting method and studied by ultraviolet/visible optical absorption (UV), differential scanning calorimetry (DSC), X-ray diffraction (XRD), infrared transmission (IR) and electron spin resonance (ESR). The optical absorption spectra suggested the presence of an optical gap (E-g) which depends on filler concentration (W) and arises due to the variation in crystallinity within the polymer matrix. Melting and degradation temperatures were identified using DSC. XRD implied a semicrystalline structure (containing alpha- and beta-PVDF phases for all films). Conjugated double bonds and the role of dimethylformamide with a PVDF chain were detected by IR spectra. The ESR analysis revealed the existence of both isolated and aggregated Mn2+ ions within the PVDF matrix. Published by Elsevier B.V.

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Effect of heparin calcium different concentrations on some physical properties and structure in polyacrylamide matrix

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Abstract

Films of polyacrylamide (PAAm) doped with different concentrations of heparin calcium, from 0.0 to 8 wt%, have been prepared by casting method. Studies were carried out utilizing X-ray, FT-IR, UV/VIS, DSC and DC electrical conduction to characterize the structural, optical and thermal properties of the films. Results revealed that the structural and chemical characterizations of PAAm films are affected by the addition of heparin calcium content. XRD spectra revealed that the amorphous phases increase with increase in filling levels of heparin (FLs). FT-IR analysis revealed that incorporation of heparin calcium leads to a small modification in the spectra of films. The optical absorption spectra in the UV/VIS region revealed structural variation increases with increase in concentration, which is reflected in the form of decrease in the energy band gap E(g). Significant changes of DSC curves of the films suggest that strong interaction established between heparin calcium and PAAm molecules. The DC electric conduction data were interpreted on the basis of an intrachain one-dimensional interpolaron hopping model of Kuivalainen.

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KeyWords Plus: HUMAN-PLASMA; POLY(VINYL ALCOHOL); GLYCOSAMINOGLYCANS; FILMS; ANTICOAGULANT; PATIENT

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