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Cairo University**



The National Laser Institute



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Name : Prof . Yehia Badr

Dep. : Laser Sciences and Interactions



Title : Size-dependent spectroscopic, optical, and electrical properties of PbSe nanoparticles

Y. Badr and M. A. Mahmoud

Journal : Cryst. Res. Technol 41, No. 7 658 – 663 (2006)

ISSN : 0232-1300

Impact Factor : 0.83

Abstract :

Stable crystalline Lead Selenide nanoparticles (PbSe NPs) were prepared with a cubic (sphalerite) phase in polyvinyl alcohol (PVA) matrix. Moreover, XRD was used to characterize the PbSe NPs in PVA. The size were controlled by Pb:Se ions ratio in which the particle size was found to be inversely proportional to this ratio up to 16:1. FT-Raman and FT-IR measurements indicated the decrease of crystallization of PVA due to doping with PbSe NPs as indicated by the appearance of a peak at 1124 cm⁻¹ that increases by size reduction of PbSe NPs. The Photoluminescence and electrical measurements monitored the interaction of PbSe NPs with PVA which increased by decreasing the particle size.

Key Words :

PbSe: nanoparticles: properties



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Title : **Manifestation of the silver nanoparticles incorporated into the poly vinyl alcohol matrices**

Y. BADR and M. A. MAHMOUD

Journal : **Mater SCI 41 3947-3953 (2006)**

ISSN : 0022-2461

Impact Factor : 0.901

Abstract :

Electrical and optical properties of the silver nanoparticles (Ag NPs) incorporated into the polyvinyl alcohol (PVA) matrices were investigated as a function of Ag NPs. The intensities of FT-Raman bands have a maximum corresponding to the Ag NP amount about 3.6 mg.. The PVA doped with different amounts of Ag NPs shows UV-Visible peaks, were red shifted by Ag NPs increase, while their intensities according well with the FT-Raman spectra. The UV-Visible spectra for the 3.6 mg Ag NPs doped in PVA presented a small red shift and band intensity decrease by increasing temperature. C © 2006 Springer Science+ Business Media, Inc.



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Name : Prof . Yehia Badr

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Title : Effects of Sm³⁺/Yb³⁺ co-doping and temperature on the Raman, IR spectra and structure of [TeO₂-GeO₂-K₂O-Sm₂O₃/Yb₂O₃] glasses

I. Shaltouta and Y. Badrb

Journal : Physica B 381 187–193 (2006)

ISSN : 0921-4526

Impact Factor : 0.796

Abstract :

Effects of Sm³⁺/Yb³⁺ co-doping on Raman scattering, IR absorption, temperature dependence of the Raman spectra up to 210 °C and the structure of two glass systems of the composition (80TeO₂-10GeO₂-8K₂O-2Sm₂O₃/Yb₂O₃) is discussed. It was found that the addition of Yb³⁺ to the glass very strongly enhances the intensities of the antistokes' Raman bands at 155, 375, 557 and 828 cm⁻¹ and quenches both the intensities of the stokes' vibration modes of the TeO₄ units in the range of 120–770 cm⁻¹ and the intensities of the OH stretching vibration modes in the range of 2600–3300 cm⁻¹. Sm₂O₃/Yb₂O₃ rare earth co-doping has a great influence on removing and/or changing the nature of the OH groups. The appearance and splitting of the stretching vibration modes of the OH groups at lower frequencies (2770, 2970 cm⁻¹) for the Sm³⁺ singly doped glass sample, compared to the band at 3200 cm⁻¹ for the Sm³⁺/Yb³⁺ co-doped glass sample, suggested that the OH groups are more strongly bonded and incorporated with the glass matrix for the singly doped glass. Heating the sample up continuously weakens the hydrogen bonding of the OH groups to the glass matrix leading to creation of NBO and breakdown of the connectivity of the OH groups to the TeO₄, TeO₃₊₁ and TeO₃ structural units. Raman bands at 286, 477, 666 and 769 cm⁻¹ were assigned to its respective vibrations of TeO₇, TeO₄ species, the (Te-O-Te) bending vibrations of the TeO₄ trigonal bipyramids (tbps), the axial symmetric stretching vibration modes (Teax-O)s with bridging oxygen BO atoms and to the (Te-O)nbo non-bridging stretching vibration modes of the TeO₃₊₁ and/or TeO₃ pyramids.

Key Words :

Raman spectra; IR; Structure; Tellurite glasses; Rare earth doping; Temperature dependence



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Key Words :

Raman spectra; IR; Structure; Tellurite glasses; Rare earth doping; Temperature dependence



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Name : Prof . Yehia Badr

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Title : Effect of PVA surrounding medium on ZnSe nanoparticles:
Size, optical, and electrical properties

Y. Badr and M.A. Mahmoud

Journal : Spectrochimica Acta Part A (65) 584-590 (2006)

ISSN : 1386-1425

Impact Factor : 1.29

Abstract :

Polyvinyl alcohol (PVA) matrix was used to confine the particle size of ZnSe nanocrystallites as well as the variation of zinc (Zn) to selenium (Se) ion ratio which showed a remarkable decrease on the particle size as this ratio increased. The particle size decrease was monitored from the UV-vis absorption measurement as well as photoluminescence which suffered a blue shift with particle size decrease. The particle size was characterized with the aid of X-ray diffraction (XRD). The Raman spectra showed that, as the particle size increases, the peak position of the line centers (LO) mode were found to be red shifted from 239 to 234 cm^{-1} , accompanied by an increase in the full-width at half-maximum (FWHM). The electrical measurements and FT-IR spectra (overtone and normal) band vibration were used to study the effect of ZnSe NPs size on the PVA matrix.

Key Words :

ZnSe NPs; Raman spectra; IR spectra; PVA



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Name : Prof . Yehia Badr

Dep. : Laser Sciences and Interactions



Title : Effect of silver nanowires on the surface-enhanced Raman spectra (SERS) of the RNA bases

Y. Badr and M.A. Mahmoud

Journal : Spectrochimica Acta Part A (63) 639-645 (2006)

ISSN : 1386-1425

Impact Factor : 1.29

Abstract :

RNA bases have a great importance in the biological and genetics applications. The surface-enhanced Raman scattering (SERS) was used to study the orientation and adsorption structure of RNA bases adsorbed on the surface of silver nanowires (Ag NWs). The Ag NWs were prepared and its UV-vis spectra were recorded. The RNA bases oriented perpendicularly on the surface of Ag NWs, as the coverage area decreases. Consequently, the in-plane bands were enhanced according to the SERS selection rule. Many bands were red shifted due to the chemisorption of RNA bases on the Ag NWs surface. New bands corresponding to the base-surface bond were appeared in the SERS spectra.

Key Words :

Silver nanowires; Surface-enhanced Raman spectra; RNA bases



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Name : Prof . Yehia Badr

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Title : Enhancement of the Optical Properties of Poly Vinyl Alcohol by Doping with Silver Nanoparticles

Y. Badr and M. A. Mahmoud

Journal : Applied Polymer Science 99 3608-3614 (2006)

ISSN : 0021-8995

Impact Factor : 1.07

Abstract :

Poly vinyl alcohol (PVA) incorporated with different weight percent of Silver nanoparticles (Ag NPs) were prepared. The enhancement factors for each band in the Raman spectra were calculated and the degree of enhancement were found to be increased as the percent of Ag NPs increases up to 0.3%, and thereafter it decreases. Some bands were red shifted while others were blue shifted. The overtones FTIR bands and photoacoustic spectra were recorded and show the same behavior as those bands. The X-ray diffraction pattern and Raman and photoacoustic spectra showed that PVA has a high degree of crystallinity. The UV-vis spectra of the same samples were red shifted and increase in their intensities up to 0.3% Ag NPs, thereafter the band intensities of the peak corresponding to Ag NPs were diminished.

Key Words :

photoacoustic spectra; Raman spectra; PVA; silver nanoparticles



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Name : Prof . Yehia Badr

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Title : On 308 nm photofragmentation of the silver nanoparticles

Y. Badr , M.G. Abd El Wahed and M.A. Mahmoud

Journal : Applied Surface Science 253 2502-2507 (2006)

ISSN : 0169-4332

Impact Factor : 1.26

Abstract :

Silver nanoparticles (Ag NPs) were prepared by different chemical methods possessing different sizes 32, 82, and 205 nm. The influence the size of Ag NPs was demonstrated by the absorption and fluorescence spectra, the maximum absorption of Ag NPs increases as the particle size increases. When Ag NPs irradiated with 308 nm excimer laser; the maximum absorption and the full width at half maximum decreased as the number of pulses increased up to 100,000 pulse; due to the size reduction. The fluorescence spectra of Ag NPs and irradiated Ag NPs with 308 nm excimer laser were recorded after excitation at 441.5 nm He–Cd laser, showing a red shift increasing as the particle size is increased.

Key Words :

Photodegradation; Laser fluorescence; Silver nanoparticles