Elastic transverse electron scattering form factors of $^{11}$Li exotic nucleus

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Abstract

The elastic transverse electron scattering form factors have been studied for the $^{11}$Li nucleus using the Two-Frequency Shell Model (TFSM) approach. The single-particle wave functions of harmonic-oscillator (HO) potential are used with two different oscillator parameters $b_{\text{core}}$ and $b_{\text{halo}}$. According to this model, the core nucleons of $^9$Li nucleus are assumed to move in the model space of $spspd pf$. The outer halo (2-neutron) in $^{11}$Li is assumed to move in the pure $1p_{1/2}$, $1d_{5/2}$, $2s_{1/2}$ orbit. The shell model calculations are carried out for core nucleons using the $spspd pf$-interaction. The elastic magnetic electron scattering of the stable $^7$Li and exotic $^{11}$Li nuclei are also investigated through Plane Wave Born Approximation (PWBA). It is found that the difference between the total form factors of unstable isotope ($^{11}$Li halo) and stable isotope $^7$Li is in magnitude. The measured value of the magnetic moment is also reproduced.
Application study of nano sensors to detection of oxidative of some heavy metal ions in blood medium using cyclic voltammetry

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Abstract

An electrochemical investigation of chemical species has been carried out by using cyclic voltammetry (CV) at different modified glassy carbon electrodes (GCE). The fabrication of modified electrodes of carbon nanotubes (CNT) as CNT/GCE, C60/GCE and activated carbon (AC) on GCE as AC/GCE were used working electrodes (nano sensors) in cyclic voltammetry (CV). One application of these electrodes is detection of oxidative compound in blood medium using CV technique. Electrodes response was obtained for the oxidation and reduction peaks of some heavy metal ions such as Mn$^{2+}$, Hg$^{2+}$, and Cd$^{2+}$ in blood medium at modified CNT/GCE, C60/GCE, and AC/GCE. A well-defined oxidation and reduction current peaks appeared at potential sites versus Ag/AgCl as reference electrode with a current enhancement and peak potential shift toward higher potential due to nano materials (CNT,C60 and AC) comparison with bar GCE. Besides that, the presence of CNT, C60 or AC on the GCE in blood media caused an increase of the oxidation and reduction current peaks of ions (current enhancement) compared to the use of unmodified electrodes.
Simulation of one finger robot gripper using solid works

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Abstract

In this paper a one finger robot hand is modeled and simulated for grasping task (5) kg weight; this was done using a CAD tool known as Solid Works program. The author examine a specific structure of a finger using many different materials and founding those which one guarantee the given deformation, causing displacement of each finger of the set by using the Solid Works static analysis.

The results approved by fabricated a model of gripper hand in the laboratory of Automation and Systems Research Center/ MOST.
Preparations of Nd:TiO$_2$ via Sol-Gel technique and study of its optical properties

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Abstract

Pure and Nd$^{3+}$ doped Nanotitania are successfully prepared by wet chemical synthesis method. Samples were analyzed by a variety of techniques, including X-ray diffraction, FTIR, absorption and emission spectrometer to investigate the optical properties of doped samples. Emission spectrum shows that energy levels manifolds $^4I_{9/2}$ and $^4I_{11/2}$ of Nd$^{3+}$ are effected by crystal field of TiO$_2$ and split into energy sublevels which it quietly difference to that known energy sublevels of Nd$^{3+}$ in YAG or glass. The absorption and emission spectrums to Nd:TiO$_2$ sample are close similar to absorption and emission spectrums of Nd:YAG crystal. This give a good indication in direction of preparation of Nd:TiO$_2$ as solid state Laser active medium via Sol-Gel technique.
The evaluation of left ventricle stiffness index in patients suffering from hypertension

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Abstract

Many diseases can produce cardiac overload, of these disease hypertension, valve disease congenital anomaly in addition to many other disease. One of the most common diseases causing left ventricle overload is hypertension. A long term hypertension can cause myocardium hypertrophy, changes in the cardiac contractility and reduced efficiency. The investigation will be carried out using conventional echocardiography techniques in addition to the tissue Doppler imaging (TDI) from which many noninvasive measurements can be readily obtained. The study will involve the effect of hypertension on the myocardium stiffness index through the measurement of early diastolic filling (E) and the early velocity of lateral mitral annulus (Ea) from which left ventricle filling pressure can be obtained. The aim of the study is to investigate the changes in the myocardium index of diastolic stiffness for patients suffering from systemic hypertension.
Preparation of (PVA-PVP-CoO) nanocomposites and study their electrical and optical properties

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Abstract

The aim of this paper is study of electrical and optical properties of (PVA-PVP-CoO) nanocomposites which have many applications such: solar cells, light emitting diodes, optoelectronic device…..etc. The nanocomposites were prepared by using casting technique. With different concentration of cobalt oxide nanoparticles are (0,2,4 and 6) wt.%. The optical properties of nanocomposites were measured in the wavelength range (200-800) nm. The results showed that the absorption coefficient, extinction coefficient, refractive index and real and imaginary dielectric constants of (PVA-PVP) are increasing with the increase of the cobalt oxide nanoparticles concentration. Also, the energy band gap of (PVA-PVP) is decreased with the increasing of the cobalt oxide nanoparticles concentration. The D.C electrical conductivity of (PVA-PVP) is increased with the increasing of the cobalt oxide nanoparticles concentration.
Dielectric and optical properties of (PVAc-PEG-TiO₂) nanocomposites

Bahaa H. Rabee, Majeed Ali Habeeb, Hussein Hakim, Ahmed Hashim

Abstract

In this work preparation of (PVAc-PEG-TiO₂) nanocomposites and study their dielectric and optical properties. The titanium dioxide nanoparticles were added to (PVAc-PEG) with different weight percentages are (0,3,6 and 9) wt.% The results show that the dielectric properties (dielectric constant, dielectric loss and A.C electrical conductivity) are increasing with the increase of the titanium dioxide nanoparticles concentrations. Also, the dielectric properties are changed with the increase of the frequency. The optical properties of (PVAc-PEG-TiO₂) nanocomposites were measured in the wavelength range (190-800) nm. Results show that the (absorption coefficient, extinction coefficient, refractive index and real and imaginary dielectric constants) of (PVAc-PEG) are increasing with the increasing of the weight percentages of titanium dioxide nanoparticles. The energy band gap of (PVAc-PEG) is decreased with the increase of the titanium dioxide nanoparticles concentrations.
Nanostructured polyaniline thin films prepared by plasma polymerization at atmospheric pressure

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Abstract

Plasma polymerization technique includes plasma (-state) polymerization is one of the most powerful methods for surface modification of polymeric materials. Plasma polymerized organic thin films have been received a great deal of interest because of their unique characteristics such as: pinhole-free, structurally cross-linked, insoluble and highly adhered. In this work nanostructures polyaniline (PANI) thin films were prepared by dielectric barrier discharge plasma jet polymerization technique. The dielectric barrier discharge plasma jet local mead for plasma polymerization. The effects of substrate position, working gas flow rate and annealing temperature on thin films properties were studied. The characterization of prepare PANI thin films were performed with the ultraviolet-visible spectroscopy (UV-VIS), Fourier transform infrared spectroscopy (FTIR), X-ray diffraction (XRD) and atomic force microscope (AFM). The AFM images show that the surface of the PANI thin films consist of grains with average grain size about 100 nm. Electrical and optical properties reveal the conductivity of the PANI thin films at room temperature are nearly \(0.68 \times 10^{-4} \text{ S.cm}^{-1}\) and the band gap with range of 2-2.8 eV depending on prepared conditions. This inexpensive process friendly for environment affords a new technique in the field of conducting polymers for coating large substrate areas.
Synthesis, characterization, and application of ZnO nanorod arrays in light emitting diode and gas sensing

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Abstract

We successfully synthesized vertically aligned zinc oxide (ZnO) nanorod arrays on different substrates using chemical bath deposition assisted by microwave-irradiation method. Polyvinyl alcohol (PVA)–Zn(OH)₂ nanocomposites were used as a novel seed material to seed the substrates prior to the growth of the ZnO nanorod arrays. X-ray diffraction and field-emission scanning electron microscopy are confirmed the high quality of the nanorods in addition to the narrow and high-intensity UV peak of the photoluminescence spectrum. The electroluminescence property of n-ZnO nanorod arrays/p-GaN substrate shows high UV intensity at forward bias voltage. In addition, hydrogen gas sensing of ZnO nanorod arrays grown on sapphire substrate revealed high response of 500% at room temperature.
Study of magnetic property for different types of prepared mesogenic organo – semiconductors

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Abstract

Synthesis and characterization were achieved for three mesogenic complexes of Schiff’s base (mesogenic legand) with ions of (Cu+2, Co+2, and Mn+2) as the following structure:

\[
\begin{align*}
\text{N} & \text{N} \\
\text{Di-Benzylidene Benzidine (DBB)} \\
\end{align*}
\]

The legand and their complexes have been characterized by a spectrophotometer Infrared (IR), Ultra violet (UV), polarizing microscope equipped with heating stage, and Differential scanning calorimeter (DSC), techniques were found to be nematic (enantiotropic). The magnetic sensitivity of these compounds has been investigated. Molar conductivity for the legand have shown that the free liquid crystal compound (twin dimmer) is non-electrolyte solution while their complexes are electrolyte, that means the negative ions are swimming out of coordinated ball, as the following: [DBB-Mn\(^{II}\)].Cl\(_2\).X; [DBB-Cu\(^{II}\)].Cl\(_2\).X; [DBB-Co\(^{II}\)].Cl\(_2\).X. The legand effect of complexation with (Cu\(^{+2}\), Co\(^{+2}\), and Mn\(^{+2}\)) on the (D.C) and (A.C) values have been clear when the (D.C) electrical conductivity ranged from \((10^{-12})\) to \((10^{-9})\) (ohm.cm)\(^{-1}\) lies in the usual range of organic semiconductors.\(^{14,15}\) The (A.C) electrical conductivity increases in the range of \((10^{-11})\) to \((10^{-6})\) (ohm.cm)\(^{-1}\). However, the measurements of magnetic sensitivity for the complexes are refer to have a paramagnetic property and have single electrons in outer electronic levels of the metal atoms, these compounds have the following trend: (DBB-Mn\(^{+2}\)) > (DBB-Cu\(^{+2}\)) > (DBB-Co\(^{+2}\)).
Charge density distributions and elastic electron scattering form factors of $^{48}Ti$ and $^{50,52,54}Cr$ nuclei

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Abstract

The ground state charge density distributions (CDD's) of $^{48}Ti$ and $^{50,52,54}Cr$ nuclei have been calculated using the wave function of the harmonic oscillator assuming that the occupation numbers of the states in real nuclei differ from the predictions of the simple shell model, where the sub-shell 2p is included with an occupation number of protons ($\alpha$).

The elastic electron scattering form factors of $^{48}Ti$ and $^{54,52,50}Cr$ nuclei have been calculated using the ground state charge density distributions.
Cycling trends in solar UV radiation over Zarka region in Jordan

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Abstract

Results of analysis of hourly measured temperatures, solar radiation intensity and B-band ultraviolet radiation intensity data in Zarka Jordan taken over the entire 2002 year are presented. The analysis emphasized on establishing correlations between these three physical quantities on one hand, and searching for any systematics or cyclic effects that may be contained within the measured fluctuations on the other hand. The use fast Fourier analysis method of data, revealed the presence of four such cycles at least.
Study the effect of Al and Al₂O₃ particles on thermal conductivity of EP composites

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**Abstract**

EP/ Al and EP/ Al₂O₃ composites were prepared as adhesives between two steel rods. Epoxy resin (EP) was used as a matrix with (Al, and, Al₂O₃) as fillers.

The preparation method includes preparing square panels of composites with different weight percentage of fillers (10, 20, 30, 40, and 50%). Standard specimens for thermal conductivity tests were prepared to measure thermal conductivity $K_{\text{exp}}$.

Experimental thermal conductivity results $K_{\text{exp}}$ for EP/metal composites show that $K_{\text{exp}}$ increase with increasing weight percentage in general for EP/ Al. $K_{\text{exp}}$ results for EP/ metal oxide composites show that thermal conductivity $K$ for EP/ Al₂O₃ composites show slight increasing with increasing weight percentage in general. The calculated thermal conductivity result $K_{\text{cal}}$ for both used models (Maxwell and Micro structure model) show that $K_{\text{cal}}$ for composites increase with increasing filler wt% some result agree well with the experimental result EP/Al, and EP/ Al₂O₃ except.
Probability of electron transfer rate constant at nanoscale metal/molecule interface system

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Abstract

Devices Nano technology largely relies on metal/ liquid interfaces, whose most important electronic transferring parameter are the probability of rate constant, reorganization energy, and temperature. The probability of electron transport in Au/ TCNQ molecule interface system has been calculated and the transmission through interface is examined. A theoretical study according to the quantum system has been adapted to study the electron transfer across Au and TCNQ molecule system. Rate constant of electron transfer are calculated based on the quantum expression and depending on the calculation of the reorganization energy, coupling coefficient, and temperature.

A Mat lab program has been used to calculate energy the reorganization, and rate constant of electron transfer by solving the suitable formulas. Our results data show that the probability of the rate constant for electron transfer $k_{et}$ increases with the increasing of the coupling coefficient and temperature, and decreasing of the reorganization energy $E_{re}$. 
Solvothermally growth of single-crystal CdS nanowires

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Abstract

Cadmium sulfide (CdS) nanowires (NWs) were prepared by the solvothermal method using ethylenediamine as a solvent. Two sets of CdS NWs were synthesized at 160 and 200 °C for various reaction durations (3.5, 7, and 24 h). Scanning/tunneling electron microscopy was used to examine the surface morphology of the grown NWs. Their dimensions are found to depend on the reaction temperature and duration. The CdS NWs grown at 200 °C for all durations are longer than those prepared at 160 °C, with diameters ranging from 15 nm to 40 nm. A three-armed structure is exhibited by all samples. The grown CdS NWs display a hexagonal wurtzite phase and grows along the <001> direction. The optical absorption of the grown NWs shows a sharp absorption edge with a blue shift, which indicates an expansion of the optical band gap. All prepared samples show two emission peaks in their photoluminescence spectra. The emission peak location depends on the reaction temperature and duration. The CdS NWs prepared at 160 °C show a sharp band–band emission compared with those prepared at 200 °C. Raman analysis indicates that the optical properties of the grown NWs are enhanced with increased temperature and reaction duration.
ZnO Nanoparticles: Synthesis and Crystal Structure Study

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Abstract

(Zn(NO₃)₂.6H₂O) and (NaOH) are used for synthesis ZnO nanostructures by one step reaction at 80°C. X-ray diffraction (XRD) pattern refers polycrystalline nature with a hexagonal structure. Rietveld refinement (curried out by fullprof software) of XRD patterns provide accurate values for the lattice parameter a=3.250353 ±0.00009Å, c=5.207006 ±0.00020Å where c/a ratio is 1.601981. The average crystalline size was calculated by Debye-Scherrer method about 30 nm. The effects of strain in X-ray line broadening of ZnO nanoparticles (NPs) were investigated by Williamson-Hall method revealed that the peak broadening is not only due to reduced coherently diffracting domain size but also due to a significant strain distribution. The extracted particle size is about 31.5 nm and internal lattice strain value was found to be 6*10⁻⁴.
The morphological and topographical studies were carried out by using scanning electron microscopy SEM, the average particle size is matched with that obtained by Debye-Scherrer and Williamson-Hall methods.

The effect of catalyst type and thickness on the morphology and the optical properties of silicon nanowires grown via PPECVD method

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Abstract

Silicon nanowires (SiNWs) were grown on indium tin oxide coated glass substrates by a pulsed plasma-enhanced chemical vapor deposition method (PPECVD) method using different metals as a catalyst. Tin (Sn), aluminum (Al), gold (Au), and zinc (Zn) metals with thickness of 10, 40 and 80 nm were used to catalyze SiNWs. The surface morphology of the prepared SiNWs was investigated by field emission scanning electron microscopy (FESEM) and transmission electron microscopy (TEM). The surface morphology study of the prepared wires showed that the modal wire diameter increased as the catalyst film thickness increased. The X-ray diffraction patterns of the prepared silicon nanowires showed that the crystallinity of the synthesized wires depend the type and thickness of the catalyst. The photoluminescence (PL) and Raman spectra of the grown SiNWs also were investigated. The Raman spectra of the prepared nanowires showed that the first order transverse band shifted toward lower frequencies compared with the c-Si band location.
Spray pyrolysed In$_2$S$_3$ thin films

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Abstract

In$_2$S$_3$ thin films were deposited using chemical spray pyrolysis - CSP technique with the help of automated spray system. InCl$_3$ and thiourea were used as the precursors in this study. In$_2$S$_3$, is a III–VI compound originating from the II–VI semiconductor by replacing group II metals by group III elements and exists in three crystallographic modifications $\alpha$, $\beta_-$ and $\gamma$ with $\beta$-In$_2$S$_3$ being the stable state with a tetragonal structure at room temperature. The optical properties of the indium sulfide films preparation by vary between the various studies. The band gap values were determined assuming a direct allowed transition extends from 2.0 eV up to 3.7 eV.
Characterizations of the films were then carried out to understand how the change in particular spray parameter influenced the structural, optical, electrical and compositional properties of the films formed.

**Structural and electrical properties of thermally evaporated Sn$_x$Se$_{1-x}$ thin films**

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**Abstract**

Tin Selenide Sn$_x$Se$_{1-x}$ thin films were prepared from the alloy compound material by thermal evaporation method, to study the effect of tin content ($x=0.1$, 0.5, and 0.7) and on its structural, and electrical properties. Thin films Sn$_x$Se$_{1-x}$ thicknesses of 300 nm, were grown on glass substrate held at room temperature. X-ray diffraction, D.C conductivity, and Hall Effect measurements, were used to characterize the thin films. The XRD studies reveal that Sn$_{0.5}$Se$_{0.5}$ and Sn$_{0.7}$Se$_{0.3}$ films are crystalline with orthorhombic structure, while Sn$_{0.1}$Se$_{0.9}$ films were crystalline with hexagonal structure. Microstructure parameters such as crystallite size, and dislocation density were calculated and found to depend upon deposition parameters. The plot of conductivity with reciprocal temperature suggests, there are two activation energies $E_a1$ and $E_a2$ for Sn$_x$Se$_{1-x}$ for all $x$ content values transport to one activation energy $E_a1$ at high tin content which decreases with increasing tin content .Hall Effect
measurements showed that the Sn_xSe_1-x thin films were n-type semiconductors at x=0.1 convert to p-type semiconductors at x=0.5 and 0.7.

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**Study of magnetic property for different types of prepared mesogenic organo – semiconductors**

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**Abstract**

The liquid crystal material – Schiff bases – (MBBA) (P-Methoxybenzylidene – P – Butylaniline) prepared by Kelker and Scheurle has been selected as an of the shows nematic bahaviour at room temperature. To the best of our knowledge, synthesis many types of Schiff bases, and its ions of metallic complexes (Cu^{2+}, Ni^{2+}, Co^{2+}, Cr^{3+}). The liquid crystal materials have been characterized by a Spectrophotometric Infrared, Ultraviolet and Polarizing microscope equipped with heating stage techniques.
As has been the study of the sensitivity magnetic properties of the liquid crystal material (MBBA), which is one of the compounds Schiff bases and complexes with metallic copper and nickel.

Classification of radioactive wastes from Russian Silo

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Abstract

The large quantities of radioactive waste (RW) in Iraq are of different origins. Some of the waste was produced in the former Iraqi Atomic Energy Commission (IAEC) – Nuclear Research Centre (NRC) laboratory activities in the fields of (physics, chemistry, agricultural and other nuclear activities) which certainly produce radioactive waste. The waste were properly collected, packed and disposed in a special concrete facility so called the Russian Silo, which was built in the early sixties of the last century. This facility is still intact and contains radioactive waste of the sixties, seventies and eighties. The log book and all documents of the radioactive waste were lost in the successive wars and looting in the 2003 events. The radioactive waste management is basically depends upon the inventory of the RW which in turns depends upon the proper classification of the RW, and accordingly the type of treatment and the end point of the RW (i.e. the type of disposal facility). The quantities of RW of other sites in Iraq might be well estimated because they can be easily measured and characterized while in the case of the Russian silo the RW were covered and it is very difficult to measure because of the heavy concrete shielding of the facility. In this research the Russian silo was re-equipped with 5 ton bridge crane to enable the removal of the concert plugs of the wells and cover the RW. The wells were numbered and a dose map for the top and the sides of the facility were drawn. The radiation dose rate for each well were measured.
before and after the removal of the concrete plugs, each well were identified for the radionuclide that is contaminating the waste, it has been used a very sophisticated, well advanced piece of equipment produced by ORTEC so called (hand held GeLi detector) with an overall efficiency (better than 42%). More than 95% of the concrete wells were a converted. It was noted the following:- 1-Most of RW are either combustible or compressible. 2-The most predominant contaminant are Cs-137 , Co-60 and Pa-234M, 3-Some of the well constituent were measured and identified and the concentration levels were around 5.04×10^4 Bg /kg. 4-The end point of the RW were identified as near surface disposal facility.

**Linear attenuation coefficient measurement of polymer composite**

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**Abstract**

Linear attenuation coefficient of polymer composite for beta particles and bremsstrahlung ray were investigated as a function of the absorber thickness and energy. The attenuation coefficient were obtained using a NaI(Tl) energy selective scintillation counter with ^{90}Sr^{90}Y beta source having an energy rang from (0.1-1.1) MeV. The results show that the composite material is a good shield for beta and gamma ray, so that one can used it a shield instead of Pb material only.
Investigation of Bremsstrahlung radiation absorption in polymer composites

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Abstract

The Z-dependence of external bremsstrahlung (EB) in polymer composite and Pb targets produced by beta particles of 90Sr beta emitters have been measured using a thick NaI(Tl) detector. It is found that the values of the Z dependence on the total bremsstrahlung (BS) and ordinary bremsstrahlung (OB) spectral photon distribution in thick metallic targets of Al (Z=13), polymer composite and Pb (Z=82), produced by complete absorption of continuous beta particles of $^{90}$Sr/$^{90}$Y having an energy range from (0.1-1.1) MeV. The contributions of PB into increases with increase in atomic number of the target expect the polymer composite. This indicates the importance of PB in the formation of BS produced by continuous beta particles. It is expected that, this study shall provide vital information about the nature of spectral photon distributions in thick metallic targets, produced by continuous beta particles. These results clearly shows that the spectral shape of OB and BS spectra are dependent on Z. the dependence of spectral shape of total bremsstrahlung (BS) and ordinary bremsstrahlung
(OB) spectra, produced by the continuous beta particles of 90Sr and the atomic number (Z) of the target material.

Theoretical study of the effect of oxygen subgroup on the electronic and spectroscopic properties of nano aazulene molecule: DFT calculations

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Abstract

The nano Oxygenl azulene molecules group in different positions were performed using DFT. Based on B3LYP with 6-31(d,p) basis set was used to investigate the effect of different position of Oxygenl (electron–with drawing groups) on the electronic and structural properties of Oxygenl azulene molecules. The optimized structure, total energies, electronic states, energy gaps, ionization potentials, electron affinities, chemical potential, global hardness, softness, global electrophilicity, dipole moment and dipole polarizability were calculated. The harmonic vibration frequencies calculated and analyzed. The results showed a decrease in gap energies and improve the electronic properties.
Synthesis and study the optical and structural properties for pure and Au colloidal embedded buckypaper

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Abstract

Short thin multi-wall carbon nanotubes (MWCNTs) of diameter 9.5 nm and length less than 1 µm, functionalized with 0.5% NH2 have been used to fabricate thick and dense freestanding films ‘Buckypapers’ by-membrane filtering. The resultants Buckypaper (BP) were characterized using UV-Vis spectrometer, Ramman spectra, AFM, SEM, and XRD. The optical and structural properties of pure BP and Au colloidal embedded BP were studied. The results show that the absorbance spectra for pure and doped BP highlight no significant change in the behavior, while its value for the doped BP is higher than that for pure BP. The energy gaps Eg for direct and indirect allowed transitions were determined. The refractive index, extinction coefficient, real and imaginary parts for dielectric constant have been determined and compared. The Raman spectra are dominated by two lines at about 1310 cm⁻¹ (D band) which has peak intensity higher than that of lines at about 1610 cm⁻¹ (G band), due to the defects. The surface morphology for films is studied from AFM and SEM images show that the films are grains, quite uniformity distributed for CNTs, and free from cracks. The root mean square (rms) of the films surface roughness was indicating a smooth surface of synthesis Bp. XRD results show that the structure for pure BP is polycrystalline, while for embedded Au colloidal BP this crystalline decreased. The intrinsic properties of Bp make them very useful for a broad range of applications: radio frequency filters, cold-field cathode emitters, etc. The flexibility and structural integrity of Bp has been also used for the production of artificial muscles or of filtration devices exploiting the assembly of pores among the tubes.
Analytical investigation of the seasonal ionospheric propagation parameters variation over Iraqi area

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Abstract

In this paper, an analytical study for the behavior of the ionospheric parameters (Maximum Usable Frequency (MUF) and Optimum Traffic Frequency (FOT)) has been performed between transmitter station (Baghdad) and numerous receiver stations which are spread over Iraqi area. The ionospheric parameters dataset has been generated using ICEPAC communication model for the seasonal times of the years (2009-2011) of the solar cycle 24. The results of this study showed that the correlation between the ionospheric parameters and the geographical location coordinates (longitude & Latitude) of receiver stations can be represented by a linear surface equation. Depending on this correlated relationship, a simplified ionospheric model has been suggested. The predicted ionospheric parameters values using the suggested empirical model show a good fitting with theoretical values that calculated using some selected international models.
Synthesis of Aluminum and Boron co-doped ZnO nanostructure films on Glass Substrate

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Abstract

In this study, undoped and Aluminum and Boron co-doped ZnO (AZB) thin films were deposited at 450 °C on glass substrates by Spray Pyrolysis method in (150±5 nm). Characterization techniques of XRD, SEM and UV-visible spectra measurements were performed to investigate the effects of Aluminum and Boron co-doping on the structural and optical properties of ZnO thin films. The structure of AZB nanostructure films has been found to exhibit the hexagonal wurtzite structure. The increase of AZB concentration caused to decrease the grain size, bandgap for AZB (2 at %) and increase the transmittance for AZB (2, 4, 6 at %) in a visible region. The structural details and microstructure were obtained from X-ray diffraction and scanning electron microscope (SEM).
Synthesis of indium oxide nanostructure by hydrothermal method

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Abstract

In this work, indium oxide (In$_2$O$_3$) nanostructure was successfully synthesis by hydrothermal method at a reaction temperature 200 $^\circ$C for 3 hour. The structure and morphology of as prepared samples were characterized by X-ray diffraction (XRD) and field emission scanning electron microscopy (FE-SEM). The structural analysis shows a highly crystalline of indium oxide with a cubic phase and the average grain size is (16.11 nm). The optical properties of In$_2$O$_3$ nanostructures were studies by using UV-visible Spectrophotometer. The energy gap was calculated, it was found to be (3.66 eV)
Chemical method to prepare Nano layers ZnO thick films

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Abstract

ZnO Nano layers structures have been synthesis by using a simple chemical method. Hydra zinc nitrate, oleic acid, ethanol was used as a starting materials for the chemical reaction< also NaOH used to control. The Reaction took place at room temperature under stirrer. the prepared ZnO powder is collected and mixed with PVA to make a proper paste, then the paste was dropped wisely in 1 cm square pattern to make thick films. Afterwards, the films are annealed at 500 C˚ for an hour. The morphology, crystalinity and structural properties are studied by X-ray diffraction, the experimental pattern of the films show very fine peaks indicate a good crystallization, also the morphology of the films studied by atomic force microscope and field emission scanning electron microscope.
Polyaniline and polyaniline/carbon nanotubes composite for hydrogen Sensing at room temperature

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Abstract

Here we report on the synthesis of polyaniline / carbon nanotubes (PANI/CNTs) composite and its application in the development of a hydrogen (H₂) gas sensor at room temperature. The multiwall Carbon nanotubes(CNTs) of 0.25wt %, 0.5wt % and 1wt% was added to 0.1 M distilled aniline under reflex procedure with 0.3 H₂SO₄ for fabricating PANI/CNTs composite. Using an electrochemical (EC) synthetic. A cyclic potential ranged from -100 mV to 1500 mV was applied with six repetitions on working electrodes stainless steel (SUS 304) which were dipped in these solutions at scan rate of 30mV s⁻¹ at room temperature. The developed material was characterized by scanning electron microscopy (SEM), and X-ray diffraction (XRD) . The SEM study revealed that the PANI in the composite has nanofibrillar morphology. For H₂ gas sensing, PANI and PANI/CNTs nanofibers obtained by EC process were deposited onto gold interdigitated electrode IDE (Au electrode) by spin coating .These sensors were inspected with 1%, 2%, 3% , and 4% H₂:air mixing at 298K. The present result showed that the PANI/1 wt% CNTs sensor was the best among all other sensors at a temperature 298K with all concentrations. The characteristic features of this sensor were better sensitivity and shorter both response and recovery times.
Evidence and systematics of climate change In Iraq

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Abstract

Linear regression analysis of monthly temperatures and precipitations data for a period starting from the end of the nineteenth until recently at several locations in Iraq are and global carbon dioxide (CO₂) atmospheric concentrations are carried out. The locations involve the cities of Baghdad, Basra, Mosul and Karkuk The analysis shows significant occurrence of climate change. This is manifested as increasing trends in mean monthly temperatures coupled with decreasing trends of total yearly and monthly rain fall in almost all regions in Iraq. The linear correlation coefficients proved to be seasonal variables for both data sets Extrapolation to future predictions agree well with Intergovernmental Panel for Climate Change 2007 (IPCC2007) report on green house effect warnings.
Relative intensity distribution in the rotational structure for $B^1\Sigma - A^1\Pi$ and $B^1\Sigma - X^1\Sigma$ electronic systems of BeO molecule

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Abstract

Theoretical spectroscopic study of Beryllium Oxide has been carried out, Boltzmann distribution of P, Q and R branches in the range of (1≤J≤15) at temperature 4200K for (0-0) band for electronic transitions $B^1\Sigma - A^1\Pi$ and $B^1\Sigma - X^1\Sigma$. The Boltzmann distribution of these branches has a maximum values at equal J approximately while the values of relative population are different. For the $B^1\Sigma^+ - X^1\Sigma^+$ transition the branch's lines extend towards lower wavenumber. This is because ($B_\nu'-B_\nu$) value is negative, i.e. $B_\nu'<B_\nu$. For $B^1\Sigma - A^1\Pi$ transition branch's lines extend towards higher wave number. This is because ($B_\nu'-B_\nu$) value is positive, i.e. $B_\nu'>B_\nu$. 
Mechanical properties of epoxy/Al$_2$O$_3$ nanocomposites

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Abstract

Epoxy/Al$_2$O$_3$ nanocomposites with different weight percentage of Al$_2$O$_3$ nanoparticles (1, 2, 3, 4, 5, and 7\%wt.) with average particle size smaller than 50 nm were prepared. Three point bending test was used to determine mechanical properties. Flexural strength was enhanced 42\% at 4\%wt. of Al$_2$O$_3$ nanoparticles comparing with unfilled epoxy and then begins to decrease at 5 and 7\%wt. of Al$_2$O$_3$ nanoparticles. Young modulus increased with increasing the weight percentage of Al$_2$O$_3$ nanoparticles reaches 187\% comparing with unfilled epoxy at 7\%wt. of Al$_2$O$_3$ nanoparticles contains. Brittle fracture still appears from force-deflection curves obtained from epoxy/Al$_2$O$_3$ nanocomposites. Field Emission Scanning Electron Microscope (FE-SEM) images show the morphologies of fracture surface which showed that the smooth of the surface decreased with appeared tortuous crack and increased respectively with increased weight percentage of particle contains in epoxy nanocomposite that resist the deformation.
Physical studies of some biodegradable polymers
prepared by condensation polymerization

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Abstract:

In this study, some biodegradable polymers were prepared. The biodegradation of the prepared polymers and copolymers were studied by two methods, weight loss % and intrinsic viscosity measurements. Poly (ethylene sebacate) polymer were prepared by condensation polymerization of sebacoyl chloride monomer with ethylene glycol monomer, and poly (sebacic anhydride) was prepared in a new method by condensation polymerization of sebacic acid monomer with sebacoyl chloride monomer. All polymers were purified, and then characterized by infrared spectroscopy. Biodegradation studies of all prepared polymers and copolymers were carried out by pressing the polymer samples in the form of disc weighing 0.2 g and about 1 cm in diameter. In vitro biodegradability studies was carried using wt% loss at constant body temperature (37°C) in human plasma pH=7.4, and determination of intrinsic viscosity for the solution of degradable polymers and copolymers. The results revealed that some biodegradation needed more than four months to complete degradation. Biocompatibility tests were carried out to represent in vivo biodegradation using human blood which is called Cellular Cytotoxicity Method. All polymers and copolymers prepared showed no toxicity compared to the reference control and to toxicity of sebacoyl chloride.
Effect of Cd substitution on dielectric and magnetic properties of the synthesis ferrite \((\text{Ni Zn})_{1-x} \text{Cd}_x \text{Fe}_2\text{O}_4\)

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Abstract

The dielectric and magnetic properties of Cd incorporated (Ni–Zn) spinel ferrites have been investigated \((\text{Ni Zn})_{1-x} \text{Cd}_x \text{Fe}_2\text{O}_4\). The three types of ferrites have been prepared by co-perceptions technique. The prepared ferrites were sintering at 850°C. While had emphasized the Crystallize Synthesis accurately and Sort by these Synthesis by using the Technique (X.R.D) it is mixed to Formed the final synthesis. \((\text{Ni Zn})_{1-x} \text{Cd}_x \text{Fe}_2\text{O}_4\) with \(0.0 \leq X \leq 0.5\) sintered at \(1100 \degree C\) for \(4h\). The electrical characteristics for these samples included the measure of D.C current as electrical resistivity \((\rho)\) and A.C current as The real part of dielectric constant was calculated \((\varepsilon)\), loses factor (tan \(\delta\)) was measured over same frequency range (20Hz - 3MHz) to calculated the imaginary part of dielectric constant and also the magnetic properties was measured by the same equipment, (initial permeability \(\mu\)) was calculate after measuring the inductors \((L)\).
Effect of Formaldehyde and Nanoparticles on Biodegradability of PVA/Corn Starch Blend Films

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Abstract

Corn Starch (CS)/polyvinyl alcohol (PVA) blend and CS/PVA nanocomposites films were prepared by solution casting method by changing the content of formaldehyde and the addition of different nanoparticles type (TiO₂, SiO₂, and ZnO).

Fourier transform infrared spectroscopy (FTIR) was used to evaluate the structure of the PVA, CS, and PVA/CS films. FTIR of the films explores the CS was linked with PVA by chemical binding the crosslinking reaction results in an improvement of compatibility of the PVA/CS blend films.

The biodegradation of the films as weight loss has been investigated under the influence of enzymatic solution immersion, soil burial, and water immersion. Also the mechanical properties (tensile strength and elongation at break) were studied.

The weight loss of the tested films decreased with the increasing of formaldehyde content. The results of the investigation of the physical properties for the nanocomposites films indicated that compared with films without added nanoparticles, the mechanical properties, water resistance were enhanced up by the addition of nanoparticles.
Effects of molding pressure on the properties of High-voltage porcelain insulators

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Abstract

The effect of molding pressure (12, 25, 35, 50, 65, 75 MPa) on the properties of 80% kaolin + 20% soda-lime glass (bottle glass) high voltage insulators prepared by powder processing technique of semi-dry uniaxial pressing sintered at 1100°C were investigated. Both water absorption % and apparent porosity showed zero value at molding pressure 25-35 MPa. The apparent density showed a maximum at a formation pressure of 35 MPa. Vickers microhardness showed higher values of 5.4 GPa at molding pressure of 35 MPa. The diametrical compression increased not linear with the moulding pressure to the value of 45 MPa at molding pressure 35 MPa. The dielectric breakdown voltage increased with the molding pressure to reach steady state when it exceeds 35 MPa. The molding pressure of 35 MPa was found to be the optimum for the preparation of high voltage porcelains because of the formation of mullite and elimination of cracking and end-capping.
Fabrication and characteristics of CdO nanostructure ultraviolet photoconductive detector

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Abstract

The Properties of photoconductive ultraviolet detector fabricated on CdO nanofilms were presented. The Cadmium Oxide (CdO) semiconducting transparent nanostructure film is deposited on glass and porous silicon substrates by spray pyrolysis. The structural and optical properties of the grown films are presented. The crystalline structure was studied by X-ray diffraction. The direct band gap of CdO nanofilm was found to be 3.4eV, comparing with that of the bulk CdO. The deposited CdO film was coated by nanosheet of polyamind polymer to improve the photoresponsivity of the detector.
Enhancement optical characteristics of doping ZnS thin films

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Abstract

High quality for optical characteristics of doped ZnS thin films at 10% weight of Pb atoms were prepared by thermal evaporation method at room temperature onto glass substrates at 200 nm thickness. ZnS powder and ZnS:Pb films have polycrystalline structure as indicated by X-ray diffraction pattern. From the results of optical characteristics, it was noticed that the doped thin film of ZnS by Pb atoms can be used as window layer in solar cell devices because of its transmittance increases very clearly after doping and hence this increases the optical energy gap for film structure with doped by Pb atoms. From the results, the refractive index for doped films of ZnS by Pb atom is nearly constant with the variation of wavelength range (200-1100) nm and this is very important property for the light absorbance in solar cells.
Determine the effect of deformation in level density parameter of heavy nuclei

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Abstract

The possible effect of the collective motion in the heavy nuclei has been investigated in the framework of Nilson model. This effect has been searched realistically by calculating the level density which plays a significant role in the description of the reaction cross sections in the statistical nuclear theory. The nuclear level density parameters of some deformed radioisotopes of (even-even) target nuclei (Dy, W, OS) have been calculated, taking into consideration the collective motion for excitation modes of the observed nuclear spectra near the neutron binding energy. The method employed in the present work assumes equidistant spacing of the collective coupled state bands of the considered isotopes. The present calculated results for first excited rotational band have been compared with the accumulated values from the literature for s-wave neutron resonance data, and established in good agreement with those data.
Preparation of ITO thin film by sol-gel method

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Abstract

Highly transparent and conductive thin films (ITO) have been prepared on glass substrate using the simple spray pyrolysis method. The (ITO) deposited at substrate temperature (400 °C) their thickness was approximately (150 nm), and at different doping ratios (5,10,15,20) of Sn Wt.% annealed at (500-550 °C) for one hour. The structural, optical and electrical properties for all films were studied. The X-ray diffraction data showed that all films have polycrystalline nature cubic for (ITO) with major reflex along (222) plane. The absorbance and transmittance spectra data for the films were recorded at room temperature in the wavelength range (200-1100 nm), which were used to determine the optical properties of the films. All films are highly transparent (greater than 91%) in visible region of electromagnetic spectrum, the direct band gap was in the range (3.6-3.88) eV.
Study the solvent effect on the low temperature spectra of benzoanthracene molecules

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Abstract

In the present work, the low temperature spectroscopy of benzoanthracene molecule, which is prepared in liquid phase at constant concentration, has been studied. The temperature range is starting from room temperature down to liquid nitrogen temperature (77K). Different solvents, polar and nonpolar, have been used to prepare benzoanthracene solutions in order to study the solvent effect on the absorption and fluorescence spectra of this molecule. Some of the spectroscopic parameters have been determined from these spectra as functions of solvent polarity and temperature. The results show that the spectra of benzoanthracene solution with nonane as solvent are sharp and structured at 77K.
X-ray diffraction pattern corrections by canceling the effect of $K_{\alpha 2}$ and instrument broadening mathematically

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Abstract

In this research the intensity distribution for X-ray diffraction pattern (XRD) peaks has been studied. A correction equation for subtract the effect of $K_{\alpha 2}$ from XRD pattern and a correction calibration curve for canceling the effect of instrument broadening on full width half maximum (FWHM) were performed by using Si grains with known grain size.
Urbach energy and dispersion parameters of indium doped ZnO thin films

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Abstract

The characterization of ZnO and ZnO:In thin films were confirmed by spray pyrolysis technique, the films were deposited onto glass substrate at a temperature of 450°C. Optical absorption measurements were also studied by UV-VIS technique in the wavelength range 300-900 nm were used to calculate the optical constants. The changes in dispersion and Urbach parameters were investigated as a function of In content. The optical energy gap decreased and the wide band tails increased in width from 616 to 844 eV as the In content increased from 0wt.% to 3wt.%. The single–oscillator parameters were determined also the change in dispersion was investigated before and after doping.
The synthesis, structural, optical properties and photocatalyst applications of Mn$^{2+}$ doped ZnS nanoparticles

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Abstract

ZnS nanoparticles were prepared by a simple microwave irradiation method under mild condition. The starting materials for the synthesis of ZnS:Mn$^{2+}$ nanoparticles were zinc acetate (R & M Chemical), thioacetamide as a sulfur source, manganese chloride as zinc, sulfur and manganese sources respectively and ethylene glycol as a solvent. All chemicals were analytical grade products and used without further purification. The nanocrystals of ZnS:Mn$^{2+}$ with cubic structure were characterized by X-ray powder diffraction (XRD), the morphology of the film is measured by atomic force microscopy (AFM), scanning electron microscopy (SEM), UV-Visible absorption spectroscopy analysis shows that the absorption peak of the as-prepared ZnS sample (300 nm) displays a blue-shift comparing to the bulk ZnS (335 nm). Photoluminescence spectra of the samples revealed a broad peak centered at 404 nm, which were related to excitonic emission. Photocatalytic degradation of (MB) dye catalyzed by synthesized nanoparticles was studied under solar radiation, photocatalytic degradation increased with increasing time exposure to solar light.
Characterizations of CdS thin film prepared by chemical drop method

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Abstract

A simple technique has been utilized to grow cadmium sulfide (CdS) nanosize by microwave assistance oven. The obtained nanoparticles powder was formed as thin films by chemical drop method. The as prepared and the annealing one at 200 ⁰C thin films were characterized by x-ray diffraction, UV-VIS spectrometry, AFM and some dielectric properties. The results indicated that high purity of nanosized CdS was successfully obtained with hexagonal crystalline structure with particles size estimated to be 35nm using x-ray line broadening. The optical band gap of the as prepared and annealing one varied from 3.29 to 3.69eV, that might be for the formation of (CdS)n cluster with n = 3 and 4. The AFM results show homogenized grains after annealing at 200 ⁰C with surface roughness of 3.83nm. Best values of dielectric were obtained for annealing sample.
Synthesis of Tl$_2$Ba$_2$Ca$_2$Cu$_3$O$_{10+\delta}$ superconductors with partial substitution of Tl by Hg and Bi

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Abstract

Bulk polycrystalline samples of high temperature superconductor of the type 2223 have been prepared by a two–step solid state reaction method. Substituting Hg with $x=0.4$ for Tl$_2$-xHg$_x$Ba$_2$Ca$_2$Cu$_3$O$_{10+\delta}$ give the best values of $T_c=128$K. On the other hand it is found that substituting Bi with $x=0$-1 for Tl$_2$-xBi$_x$Ba$_2$Ca$_2$Cu$_3$O$_{10+\delta}$ degrades the superconducting properties. The x-ray data of all the superconducting samples showed a tetragonal structure with a high ratio of Tl-2223 superconducting phase. Scanning electron microscopy (SEM) has been used to identify the morphology of the superconducting phase.
Plasma diagnostics of low pressure He glow discharges at different discharge voltages

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Abstract

In this paper, low pressure plasma of helium gas was generated between a flat planar anode and cathode electrodes. A cylindrical probe was constructed and employed to analyze plasma parameters in dc-glow discharges. Electrons and ions currents of He plasma have been measured at different discharges voltages and currents. Langmuir probe results at working pressure of 0.5 mbar indicate the electron temperature decreases and density increases as applied voltage increases which related to increase of discharge current.
Photovoltaic structures using thermally evaporated tin sulfide thin films

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Abstract

Thin films of tin sulfide (SnS) were prepared by thermal evaporation technique on glass substrates with different thicknesses (100, 200 and 300nm) at ambient temperature. Tin sulfide forms in two crystalline structures depending on preparing conditions used: orthorhombic, SnS (OR), and zinc-blende, SnS (ZB). The prepared films possess n-type electrical conductivity for low thickness convert to p-type electrical conductivity and as thickness increases, have band gaps between 2.1 and 1.6 eV. The photovoltaic structure: CdS/SnS (OR+ZB) shows an open circuit voltage ($V_{OC}$) of 400 mV, a short circuit current density ($J_{SC}$) of 0.061 mA/cm$^2$, fill factor of 0.812 and conversion efficiency of 1.49% under 106mW/cm$^2$ illumination intensity. We present an evaluation for improvement in the light generated current density when the two types of SnS absorber films are used. The results given above were obtained with SnS (OR+ZB) film of 0.3 $\mu$m in thickness.
Capacitance–voltage (C–V) and current–voltage (I–V) characteristics of Al/CdS/Cd$_{1-x}$Zn$_x$Te/Al structure

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Abstract

C-V characteristics for Al/CdS/Cd$_{1-x}$Zn$_x$Te/Al structure deposited at 423K and annealed at 473K were studied at the frequency $10^5$ Hz. These characteristics showed that the measured built-in potential and carrier density decreased three order of magnitude, with increasing zinc content from $1.41 \times 10^{14}$ to $1.88 \times 10^{11}$ cm$^{-3}$ for annealed samples and from $4.45 \times 10^{13}$ to $1.5 \times 10^{10}$ cm$^{-3}$ for samples annealed at 473K. The I-V characteristics for Al/CdS/Cd$_{1-x}$Zn$_x$Te/Al structure deposited at 423K showed that the junction behavior is a good diode and the forward current changes nearly exponentially. The effect of illumination on the junction properties has been studied and showed that ($\eta$), the ideality factor increased from 2.57 to 5.24, for $x=0.0$ (pure CdTe), while $\eta$ showed a non-systematic variation with $x$ for residual $x$ values.
Evaluation of stress related vegetation indices (STVI) for calculating the changes in vegetable cover for a vegetated environment in west Iraq

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Abstract

Remote sensing provide the best means to monitoring change in vegetation over a wide range of temporal scales over large areas. In this study, the vegetation index which has been applied known as the Stress Related Vegetation Index (STVI) on in the area around the Euphrates river and part of Al-Habbaniyah lake which located at western side of the river in Ramadi city, Al-Anbar province at Iraq to study the vegetation cover changes and detect the areas of changes, using two satellite sensors multispectral images such as TM and ALI, after geometric correction procedure to rectifying these images. The STVI-4 index result was the best than other vegetation indices (STVI-1 and STVI-3) to discriminate the vegetable cover distribution. The differencing image and statistical characteristics have been implemented to delineate and calculate the areas of changes in agriculture land.
Effect of annealing temperature on optical properties of CdO films prepared by dc planar magnetron sputtering

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3 Department of Physics, Collage of Science, University of Ti Qar

Abstract

CdO films have been produced on glass substrates by DC planar magnetron sputtering technique in Ar and O2 gases 1:4 and distance 6cm between cathode and anode and thickness 174 nm. It is observed from optical properties that the films possess transmittance 80% in visible and near infrared region of spectrum and direct band gap values in the range 2.31-2.4 eV.
Different methods to characterize surface roughness by using laser Speckle technique

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Abstract

In this work results from an optical technique (laser speckle technique) for measuring surface roughness using the statistical properties of speckle pattern from the point of view of computer texture analysis. The speckle pattern images are taken by a very simple configuration of setup consisting of a laser and CCD camera to build four calibration relationships to cover wide range of measurement with same laser speckle technique. The first one based on contrast of the speckle intensity, the second on analysis speckle binary image, the third on size of speckle spot, and the latest on the energy feature characterization of the gray level co-occurrence matrices of the speckle pattern. By these calibration relationships surface roughness of an object surface can be evaluated from single speckle pattern image taken from the surface.
Effects of improved dispersion technique on the thermal behaviour of MWNTs reinforced copper matrix nanocomposites

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Abstract

This work presents a new dispersion and fabrication technique of Multiwalled Carbon Nanotubes (MWNTs) reinforced copper (Cu) matrix nanocomposites. A combination of nanoscale dispersion method of functionalized MWNTs in a low viscose media of dissolved paraffin wax under ultrasonication treatment followed by powder injection molding (PIM) technique was carried out. MWNTs contents were varied from 0 to 10 vol. %. Information about the functionalization processes, evidences on the existence of the functional groups and microstructural analysis of the fabricated nanocomposites were determined. The results showed that the impurities of the pristine MWNTs such as Fe, Ni catalyst and the amorphous carbon have been significantly removed after purification process. Meanwhile, Field Emission Electron Microscope and Transmission Electron Microscope observations showed an excellent homogeneous dispersion of MWNTs in Cu matrix and led to a strong interfacial bonding between Cu particles and individual MWNT. The experimentally measured thermal conductivity was compared with the theoretically predicted models. Highest value of 581 W/m.K was recorded at 10 vol.% MWNTs. This value corresponds to an increase of 76\% and 16.2\% over that of sintered pure Cu and theoretically predicted results.
Magnetorheological valve nonlinear static function estimation using finite element method

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Abstract

Describing nonlinearity function is trivial task in developing dynamic model of nonlinear system. MRF hydraulic system has to be considered nonlinear due to hysteresis and saturation effect of magnetization phenomenon. This paper focusing on developing a static nonlinearity function of MRF hydraulic valve using finite element approach, thus it can be utilized in identification of Hammerstein block model. Firstly, the magnetic flux in the fluid channel had to be simulated with varying the current input in FEMM software. Then the result had to be plotted in Matlab software and curvefitting algorithm based on previous regression analysis. For the result, the relationship between magnetic flux and current input can be presented by 4th order polynomial with reliability up to 98%. The significant of this model are it can be used directly as a static nonlinear function in Hammerstein block model and indirectly the identification process become faster.
Finite element analysis of field distribution and performance of squirrel cage induction motor with fault

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**Abstract**

This paper develops the foundations of a technique for diagnosis and characterization of effects of broken rotor bars in squirrel-cage induction motors based on the time-stepping coupled finite-element method FEM. These studies are performed by using the model to compute healthy case, and two adjacent broken bars fault performance data, which contains time variations of torque with broken bars, stator current waveform airgap flux density and the distribution of magnetic field. From these data the faulty signatures are extracted. Furthermore, this method, which could help to develop diagnostics of broken rotor bars and performance evaluation of induction motors, has great potential in future applications.
Optimization of field programmable gate array design flow based transceiver SDR

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Abstract

This study presents, the optimization of Field Programmable Gate Array (FPGA) based Software Defined Radio (SDR) transceiver. To permits all digital communication systems for easy adopted with further complicated coding and modulation techniques, the SDR mode have to be used which is particularly meeting the increasing demands of the wireless communication and mobile industry. However, in this study, the shortest and efficient paths to design an FPGA using MATLAB, Xilinx System Generator, Model Sim, Synplify Pro and ISE (Integrated Software Environments) software tools is introduced. The floating point design in MATLAB has been moved to fixed point values using the most attractive and friendly Xilinx DSP system generator software a model based approach associated with assistance software from Mathworks and Synplicity. The carrier and symbol timing recovery is designed. Result obtained shows an important utilization in Look Up Table (LUT) and Slices in FPGA design.
Implementing kinect sensor for building 3D maps of indoor environments

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Abstract

This paper describes modern technique of mapping. This work involved two cases study; in both cases mobile robot navigated manually and used Kinect sensor for built map of indoor environment. pioneer 3-dx is the robot used in this projects that is programmed by using the Advanced Robotics Interface for Applications (ARIA) that program with C++ package ( Visual C++.Net ), and ARNetworking software is used for setup Wireless TCP/IP Ethernet-to-Serial connection between robot and PC. The programs that are used for kinect sensor are Open NI/NITE to make it work with pc and also we used Skanect software for building 3d map for environment.