Branches
Rabigh Branch
Faculty of Sciences and Arts
Abstract

Specimens of the fishes Acanthopagrus bifasciatus Forsskal (Sparidae) and Siganus rivulatus Forsskal (Siganidae) were caught in the Red Sea off the coast of Rabigh, Saudi Arabia. Four (25%) and 24 (80%) of these fishes, respectively, were found to harbour intestinal helminths. Acanthopagrus bifasciatus was parasitised by Neowardula brayi gen. nov., sp. nov. (Trematoda: Mesometridae Poche, 1926) and S. rivulatus by Sclerocollum saudii sp. nov. (Acanthocephala: Cavisomidae Meyer, 1932). Neowardula brayi gen. nov. is similar to Wardula Poche, 1926, but clearly differs from it and from the other four genera of the family Mesometridae Poche, 1926 in having a ventral surface anterior to the intestinal bifurcation greatly modified into a well-developed, relatively deep pouch encircling the genital pore and constantly diagonal testes. Sclerocollum saudii sp. nov. is similar to S. rubrimaris Schmidt et Paprena, 1978 (type species), but clearly differs in having a proboscis only armed with 10 rows of hooks, smaller proboscis hooks, lemnisci much longer than proboscis receptacle and much smaller egg size. The developmental stages of this acanthocephalan (cystacanths, juveniles and immature worms) are also described and figured.

Keywords: Digenea; Mesometridae; Neowardula brayi gen. nov.; Acanthocephala; Cavisomidae; Sclerocollum saudii sp. nov. Fishes; Red Sea
Abstract

To date, Myxidium elmatboulii Ali, Abdel-Baki et Sakran, 2006 (Myxozoa, Myxosporea) is the only species of the genus known from the Red Sea, and was originally described as a coelozoic parasite in the gall bladder of the belonid fish, Tylosurus choram. A Myxidium sp. closely similar to M. elmatboulii is described herein for the first time as a histozoic parasite in the ovary of the one-spot snapper fish, Lutjanus monostigma (Teleostei, Lutjanidae) from the Red Sea coast of Saudi Arabia. The infected ovary was morphologically abnormal, with two protruding digitiform black cysts at its distal end, densely packed with mature plasmodia suspended in a mucoid liquid. Histological examination revealed that the cysts were extended deeply within the ovary, and each was surrounded by a capsule consisting of a relatively thick layer of fibrous connective tissues of host origin (host tissue reaction), and followed internally by a distinct black layer composed of melanomacrophages encircling the parasite mass; this layer clearly indicates the ability of this myxosporean parasite to induce a strong immune inflammatory response in the ovary of L. monostigma. Many small or developing cysts with the same characteristics were seen scattered in the connective tissue between the ovarian follicles. Plasmodia or spores of the parasite were not seen within the oocytes or within its developmental stages. The cysts occupied a considerable part of the ovary, and some areas of the ovarian tissues appeared to be vacuolated or degenerated. Thus, the typical ovarian structure of L. monostigma was greatly affected and lost its normal architecture. Therefore, the infection caused by this Myxidium sp. is presumed to negatively affect the reproductive capacity of the fish host.

Keywords: Myxosporea; Myxozoa; Myxidium; Pathological lesions; Ovary fish; Red Sea
Abstract

The reaction of RuX₃ (X = F, Cl, Br) with arylazoimine (PhN=NC(OCH₃)=NPh Az) and (4,4′-di-tert-butyl-2,2-bipyridine dtb) in refluxing ethanol affords a trans-[Ru(Az)(dtb)X-2]. These complexes have been characterized through spectroscopic (IR, UV/Vis and NMR) and electrochemical (CV) techniques. The complex trans-[Ru(Az)(dtb)Cl-2] has been X-ray crystallographically characterized. The crystals belong to the rhombohedral space group R (3) over bar. The two chlorine atoms are trans to each other. The 4,4′-di-tert-butyl-2,2-bipyridine ligand is bent and the Az ligand rings are rotated due to inter-ligands steric interactions between H atoms of opposite pyridyl units across the Ru center. These complexes display a cyclic voltammetric one-electron metal oxidation peak in acetonitrile near 1.2 V versus NHE. The electronic absorption spectra of these complexes show a strong band in the visible region which is assigned to a (Ru(II)-to-azomethine) MLCT transition based on TD DFT calculations.

Keywords: Ru(II) polypyridyl; Crystal structure; pi-Back bonding; Electrochemistry; DFT calculations
Abstract

The total structure factor, S(K), have been obtained for the chalcogenide Ge20Se80-xTex (where x = 0, 10, 20, and 30 at. %) glasses using x-ray diffraction in the wave vector interval 0.28 <= K <= 6.87 angstrom(-1). The appearance of the first sharp diffraction peak in the structure factor indicates the presence of the intermediate range order. The radii of the first-and second-coordination shells (r(1), r(2)) are increased linearly with Te addition. The large covalent radius of Te atom in compare with that of Se atom was behind the above linear increase. The first coordination number shows insignificant changes with Te content. The obtained values of r(1)/r(2) ratio and the corresponding bond angle (Theta) indicate that the structural units inside the present alloys are Ge(Se-1/2)(4) tetrahedra connected by chains of the chalcogen atoms. Raman spectra confirm the above conclusion and in the same time exclude the existence of Ge(Te-1/2)(4) tetrahedra. Based on the chemical ordered network mode, Te-Te bonds are responsible for the different behavior of Te-rich (30 at. %) glass from others.

Keywords: Ge-Se glasses; Structure correlation; Chalcogenide glasses; Gexse1-x glasses; Alloys; Diffraction; Scattering; Rigidity; Films; Peak
Abstract

Amorphous GexSe100-x (with x=10, 20 and 40 at%) alloys were prepared using the melt-quench technique. Two-dimensional Monte Carlo of the total pair distribution functions (MCGR) have been found and used to assemble the three-dimensional atomic configurations using the reverse Monte Carlo (RMC) method. The simulations are useful to compute the partial pair distribution functions $g(\text{Ge-Ge})(\text{rmc})(r)$, $g(\text{Ge-Se})(\text{rmc})(r)$, $g(\text{Se-Ge})(\text{rmc})(r)$ and the partial structure factors $S_{\text{Ge-Ge}}(\text{rmc})(r)$, $S_{\text{Ge-Se}}(\text{rmc})(r)$, $S_{\text{Se-Ge}}(\text{rmc})(r)$ of the studied glasses. The partial pair pair distribution functions indicate that the basic building units are GeSe4 and Ge2Se6 tetrahedral units in the Se-rich and Ge-rich glasses, respectively. Some of these tetrahedral units are connected by the homopolar units as confirmed by the bond angle distribution functions. The partial structure factors have shown that not only the homopolar Ge-Ge bonds, but also Se-Se bonds are behind the appearance of the first sharp diffraction peak (FSDP) in the total structure factor.

Keywords: X-ray diffraction; Chalcogenide glasses; Reverse Monte Carlo; Short-range order; Medium-range order
Abstract

Bulk chalcogenide Ge20Se80-xTex (where x = 0, 10, 20 and 30 at.%) glasses were prepared using the melt-quench technique. The total structure factors of these alloys are obtained from the X-ray scattering data in the momentum transfer interval 0.61 <= K <= 16.45 angstrom(-1). From reverse Monte Carlo (RMC) simulations of the X-ray scattering data, the short and intermediate-range order parameters are obtained. The simulations are useful to compute the partial pair distribution functions, g(ij)(r), and the partial structure factors, S-ij(K). In Te-rich glass, the first sharp diffraction peak (FSDP) appears as a shoulder, instead of a peak for others, confirms that Se-Se bonds in addition to Ge-Ge bonds are responsible for the intermediate-range order inside these glasses. The partial coordination numbers and the bond angle distributions within the first coordination shell have been calculated. The ratio of the first to second peak positions (r(1)/r(2)) and the corresponding bond angle (Theta) have confirmed that the Ge(Se-1/2)4 tetrahedra, connected by Se-Se chains, can be considered as the main building units inside the investigated glasses.

Keywords: Chalcogenide; Glasses; X-ray diffraction; RMC simulation
Faculty of Computing and Information Technology
Abstract

In our paper color image segmentation using DMRF model with edge penalty function as image model and for color model using RGB and OHTA (I/sub 1/,l/sub 2/,I/sub 3/) color model. In our paper we are proposing Hybrid algorithm based on DMRF model and The image segmentation problem is formulated as a pixel labeling problem and the pixel labels are estimated using Maximum a Posterior (MAP) criterion. The MAP estimate of the labels are obtained by the proposed hybrid algorithm converges to the solution faster than that of Simulated Annealing (SA) algorithm. The DMRF with edge preserving attribute yields better segmentation result with local edge boundary. It is also found that Exponential function improved the result to some extend. The paper is divided in six section in second section we explain the model use for Hybrid Algorithm.

Keywords: Image color analysis; image segmentation; Markov processes; Maximum likelihood estimation
Abstract

This paper analyses in detail various aspects of currently available Relational Database Management Systems (RDBMS) and investigates why the performance of RDBMS suffers even on the most powerful hardware when they support OLAP, Data Mining and Decision Support Systems. A large number of data models and algorithms have been presented during the past decade to improve RDBMS performance under heavy workloads. We argue if the problems presented here will be taken care of in the future architectures of relational databases then RDBMS would be at least the moderate platform for OLAP, Data mining and Decision Support Systems.

Keywords: Data mining; Decision support systems; Relational databases
Khulais Branch
Faculty of Sciences and Arts
Abstract

A series of four new copper(II) complexes [Cu(H2L)(L1)] 1, [Cu(H2L)(PMDT)] 2, [Cu(H2L)(Dien)] 3 and [Cu(H2L)(L2)] 4 have been synthesized by template condensation (H2L=thiodiglycolic acid, L1=N-[(1)-(4-methylphenyl)ethylidene]benzohydrazide, PMDT=N,N,N',N',N''-pentamethyldiethylene-triamine, Dien=diethylenetriamine L2=N-[(1)-pyridin-2-ylmethylidene]benzohydrazide). The bonding and stereochemistry of the complexes have been characterized by molar conductance, elemental analysis, magnetic susceptibility, infrared, UV-visible, electron paramagnetic resonance structural studies and electrochemical studies. g-Values were calculated for all complexes in polycrystalline form as well as in DMSO solution. The magnetic and spectral data indicate square pyramidal geometry for 1 and octahedral geometry for 2-4 complexes. Cyclic voltammograms for all the complexes are similar and involve two irreversible redox processes. Their biological properties have also been studied. The thio complexes show more antibacterial activity than the controlled one. The antibacterial activities of the compounds have also been tested against Escherichia coli with different concentrations.

Keywords: Copper(II) complexes; Antibacterial activities; SOD activity; EPR; CV
El Kamel Branch
Faculty of Sciences and Arts
Abstract

Ternary 1:1:1 complexes of Pd(II) with dipicolinic acid (DPA) or iminodiacetic acid (IDA) as primary ligands and some selected mono- and dicarboxylic amino acids (glycine, alpha-alanine, leucine, valine, phenylalanine, tryptophan, methionine, histidine, aspartic acid, and glutamic acid), aromatic carboxylic acids (salicylic and phthalic), and aliphatic carboxylic acids (succinic, oxalic, malic, maleic, malonic, and tartaric) as secondary ligands have been investigated by using the potentiometric technique at T = 30 degrees C and I = 0.1 mol.dm(-3). The ternary complexes are formed in a stepwise mechanism. Confirmation of the ternary complexes in solution has been carried out using conductometric measurements.

Keywords: Cytotoxic activity; PT(II) complexes; Amino-acides; PD(II); Agents
Abstract

The oxidation of [Cr-III(HNTA)(Hist)(H2O)](-) and [Cr-III(HNTA)(Asp)(H2O)](-) (NTA = nitrilotriacetate, Hist = l-histidinate and Asp = dl-aspartate) by periodate in aqueous medium has been studied spectrophotometrically between 15.0 and 35.0 A degrees C under pseudo-first-order conditions, [IO4 (-)] a parts per thousand << [complex]. The rate increases over the pH range 3.40-4.45 in both cases, but the two complexes give different rate laws. It is proposed that electron transfer proceeds through an inner-sphere mechanism via coordination of IO4 (-) to chromium(III). A common mechanism for the oxidation of some chromium(III) complexes by periodate is proposed, and this is supported by an excellent isokinetic relationship between Delta H* and Delta S* values for these reactions.

Keywords: Inner-sphere oxidation; Chromium; Sodium; Acid
Publications of Faculty of Sciences and Arts (Rabigh Branch)
Abstract

The present study investigated the use of lipopolysaccharide (LPS), exopolysaccharide (EPS) and mutant strain as subunit vaccines against intra-peritoneal (I/P) challenge of Serratia marcescens W225 in mouse model referring to E. coli as standard. There were only small differences among these antigen preparations with respect to their ability to elicit the secretions of IgM, their activity in protection against lethal doses challenge, or their toxicity in mice through the follow up of liver enzymes, urea and weight changes. The remarkable difference between different antigens was recorded in their degree of protection. The results indicated that capsular or EPS and mutant strain (S. marcescens W1765) antigens (vaccines) confer the highest protective immunization. To study the immune response we estimated antibody titers and evaluated the protection, by calculating the relative percent survival (RPS) after intra-peritoneal (I/P) injection and bath challenge of the pathogen. The physical-chemical characterization of EPS and LPS fractions used was done through the use of UV-spectra, IR, H-NMR and SDS-PAGE by silver staining to detect individual LPS subunits.

Keywords: Serratia Marcescens; Vaccines; Exopolysaccharide; Lipopolysaccharide
Abstract

The Ru(II) complexes cis-[Ru(L)Cl(2)] (C1-C3) of novel tetradeutate NSNN ligands (L) (where L is C(5)H(4)N-CH(2)-S-C(6)H(4)N=C(COCH(3))-N=N-C(6)H(4)X, and X is H (L1), CH(3) (L2) and Br (L3)), were synthesized and characterized by spectroscopy (IR, UV/vis and NMR), cyclic voltammetry and crystallography. The tetradeutate ligands were isolated as the amidrazones H(2)L (where H(2)L is C(5)H(4)N-CH(2)-S-C(6)H(4)NH-C(COCH(3))=N-NH-C(6)H(4)X and X is H (H(2)L1), CH(3) (H(2)L2) and Br (H(2)L3)) as shown by crystallography of H(2)L1, but oxidize to azoimines during the formation of the Ru(II) complexes. A crystallographic analysis of C1 showed that the Ru(II) centre is in a distorted octahedral coordination sphere in which the tetradeutate ligand occupies three equatorial sites and one axial site (two azoimine nitrogens and a thin sulfur in the equatorial plane and an axial pyridine nitrogen) and two chlorides occupying axial and equatorial coordination sites. The Ru(II) oxidation state is greatly stabilized by the novel tetradeutate ligand, showing Ru(III/II) couples ranging from 1.43 to 1.51 V. The absorption spectrum of C1 in acetonitrile was modelled by time-dependent density functional theory.

Keywords: Ruthenium; Complexes; NSNN Ligands; X-Ray Structures; Electrochemistry; DFT Calculation
Abstract

Geometry optimization for a cis-[Ru(II)(dppe)LCl(2)] (1-8) \{L =

C(6)H(5)N=NC(OCH(3))=NAr, Ar = 2,4,6-trimethylphenyl (L(1)), 2,5-dimethylphenyl (L(2)),
4-tolyl (L(3)), phenyl (L(4)), 4-methoxyphenyl (L(5)), 4-chlorophenyl (L(6)) 4-nitrophenyl
(L(7)), 2,5-dichlorophenyl (L(8)); dppe = Ph(2)P(CH(2))(2)PPh(2)} was effected using the
GAUSSIAN 03 protocol at density functional theory (DFT) B3LYP level with 6-31G*/lanl2dz
mixed basis. In addition, the complex cis-[Ru(II)(dppe)L(3)Cl(2)] (3) has been further
characterized by X-ray diffraction analysis. It was found that the optimized structure using 6-
31G*/lanl2dz has a large agreement with the X-ray data. DFT calculations show that upon
solvation both Highest Occupied Molecular Orbital (HOMO) and Lowest Unoccupied
Molecular Orbital (LUMO) molecular orbitals are stabilized and their energy gap is increased.
TD-DFT calculations show that the intense broad band centered at lambda(max) similar to 506
nm is assigned to "mixed metal-ligand-to-ligand charge-transfer" (MMLLCT) while the weak
low energy band centered on similar to 840 nm is assigned to the pure MLCT transition. The
low intensity for the low energy MLCT transition can be explained by the large mixing between
the azoimine (L) and (Ru(d pi)) orbital.

Keywords: Ruthenium; Azoimine; X-ray structure; DFT calculations; Basis set; UV-Vis
Five ruthenium complexes of the general type trans-[Ru(II)(btd)(Azo)Cl(2)] (\{Azo = PhN = NC(COMe) = NC(6)HY, where Y = H (a), Me (b), OMe (c), Cl (d) or Br (e)\} and btd = 4,4'-bi-1,2,3-thiadiazole) have been prepared by the reaction of RuCl(3) with the ligands in the presence of LiCl. These complexes have been characterized by spectroscopic (IR, UV-Vis, and NMR) and electrochemical techniques. In addition, the complex trans[Ru(II) (btd)(L5)Cl(2)] (complex 5) has been characterized by X-ray diffraction analysis. The electrochemical parameter for the pi-excessive ligand (btd) is reported. The absorption spectrum of complex 5 in acetonitrile has been modeled by time-dependent density functional theory.

**Keywords:** Density; Potentials; Oxidation; Exchange
Quantum chemical and topological descriptors of lauric hydrazide and its salts were correlated with their corrosion inhibition efficiencies in steel, aluminum, copper and zinc in an aqueous acidic environment. The quantum chemical parameters were obtained using B3LYP/6-31G** optimization. Using linear regression analysis, equations were derived to calculate corrosion inhibition efficiency in lauric hydrazide salts. The inclusion of quantum parameters, having both charge indices and topological indices, affects the inhibition efficiency of studied compounds resulting in high correlation coefficient factors for the obtained equations. The obtained linear equations were applied to predict the corrosion inhibition efficiency of some related structures to lauric hydrazide salts. It was found that these inhibitors must be linear molecules containing multiple bonds, phenyl rings, and functional groups possessing O and/or N atoms in order to achieve improved corrosion inhibition efficiency.

Keywords: Aluminium; Copper; Steel; Zinc; Modelling studies; Acid inhibition
Abstract

The adsorption equilibria of proton accepting and donating analytes on porous silica beads applicable as stationary chromatographic phases were investigated by UV/vis absorption spectroscopy. Fluorescence spectroscopy was utilized to characterize the nature of the species formed at the silica surfaces after adsorption. In order to control the equilibria and states of adsorption the active silanol surface centers were partly shielded by adsorbed water or by two types of polymeric coatings, (i) polymerized 1,4-divinylbenzene (DVB) with loadings of 200 mg and 500 mg DVB/g silica, respectively, (ii) polymerized N,N'-diallyl-L-tartardiamide bis-(4-tertbutylbenzoate) (TBB) with a loading of 135 mg TBB/g silica. Acridine orange, 1,2,7,8-dibenzacridine, 3,4,5,6-dibenzacridine, and lumichrome were used as fluorescent analytes with proton accepting or donating nitrogen centers. The fluorescence anisotropies show that the adsorbed species at the uncoated silica surface are highly immobilized. Coating considerably reduces the equilibrium constants of adsorption. polymerized N,N'-diallyl-L-tartardiamide bis-(4-tertbutylbenzoate) works much better than polymerized 1,4-divinylbenzene. In the latter case a large amount of polymer is necessary in order to produce a significant effect.

Keywords: Silica surface; Polymer coating; Adsorption equilibrium; Aza-aromatic adsorptives; Fluorescence anisotropy
Dielectric properties and ac electrical conductivity of Acrylonitrile Butadiene Rubber-poly(vinyl chloride)/Graphite Composite were studied at different frequencies ($10^2$-$10^6$ Hz) in the temperature range (298-423 K). The results show that the dielectric constant ($\epsilon'$), dielectric loss ($\epsilon''$), ac electrical conductivity ($\sigma_{ac}$) and the electric modulus are strongly dependent on the frequency and temperature. The dielectric constant $\epsilon'$ increases with temperature and decreases with frequency, whereas the dielectric loss $\epsilon''$ displays a broad maximum peak whose position shifts with temperature to a higher frequency region. Cole-Cole diagrams have been used to investigate the frequency dependence of the complex impedance at different temperature and graphite loading. Interfacial or Maxwell-Wagner-Sillars relaxation process was revealed in the frequency range and temperature interval of the measurements, which was found to follow the Havriliak-Negami approach for the distribution of relaxation times. At constant temperature, the frequency dependence of ac conductivity was found to fit with the established equation $\sigma_{ac}(\omega) = A \omega^S$ quite well. The values of $S$ for the investigated samples lie between 0.88 and 0.11. The conduction mechanism of ac conduction was discussed by comparing the behavior of the frequency exponent $S(T)$ with different theoretical models. It was found that the correlated barrier hopping (C.B.H.) is the dominant conduction mechanism.

**Keywords:** Dielectric Properties; Composites; Poly(Vinyl Chloride); Charge Transport
Abstract

The influence of soil pH, moisture, temperature and indigenous microorganisms on the survival of Bacillus thuringiensis (local isolate) in different soil types was investigated. The pathogenicity of this isolate was determined using Spodoptera littoralis (Biosd.) larvae. The highest reduction in the number of spores present as CFU, in soils having different pH values was during the first two weeks post treatments, and then almost stabilized for the next weeks. The important factor affecting spore survival was the soil pH (soil type). The highest and lowest reductions in the spore numbers were shown with soils at pH (5:1) and pH (7.2) respectively. The pathogenicity fell rapidly until reached <5 % after 8 weeks post treatment which may be due to that, the crystals were degraded far more rapidly than spores. There were no important effects on spore numbers under various moistening degrees, different temperatures or the indigenous microorganisms of all soil types.

Keywords: Bacillus Thuringiensis; Survival; Efficacy; Soil Properties
Abstract

We performed density functional theory calculations using the full-potential linearized augmented plane wave method and generalized gradient approximation to investigate the interaction of hydrogen with Fe surface layers in the Fe/M(0 0 1) system, where M=Cu, Ag. The adsorption of hydrogen is found to be preferable at bridge sites in both H/Fe(0 0 1) and H/Fe/Ag(0 0 1), whereas the preferred sites are the fourfold site above the surface layer in the H/Fe/Cu(0 0 1) system. The adsorption energies are enhanced due to Cu and Ag substrates as compared to Fe(0 0 1) substrates. The local density of states at the Fermi level and the magnetic moments are reduced due to the presence of H for the different systems.

Keywords: Adsorption; Hydrogen; Iron; Surface; Dft; Structure; Magnetism
Abstract

Quantum chemical and topological descriptors of some organophosphorus compounds (OP) were correlated with their toxicity LD(50) as a dermal. The quantum chemical parameters were obtained using B3LYP/LANL2DZdp-ECP optimization. Using linear regression analysis, equations were derived to calculate the theoretical LD(50) of the studied compounds. The inclusion of quantum parameters, having both charge indices and topological indices, affects the toxicity of the studied compounds resulting in high correlation coefficient factors for the obtained equations. Two of the new four firstly supposed descriptors give higher correlation coefficients namely the Heteroatom Corrected Extended Connectivity Randic index ((1)X(HCEC)) and the Density Randic index ((1)X(Den)). The obtained linear equations were applied to predict the toxicity of some related structures. It was found that the sulfur atoms in these compounds must be replaced by oxygen atoms to achieve improved toxicity.

Keywords: Quantum; Topological; Descriptors; Organophosphorus; Risk Assessment; QSTR
Abstract

The optical properties including electronic absorption spectrum, emission spectrum, fluorescence quantum yield, and dipole moment of electronic transition of 7-diethylaminocoumarin (DEAC) laser dye have been measured in different solvents. Both electronic absorption and fluorescence spectra are red shifted as the polarity of the medium increases, indicating that the dipole moment of molecule increases on excitation. The fluorescence quantum yield of DEAC decreases as the polarity of solvent increases, a result of the role of solvent polarity in stabilization of the twisting of the intramolecular charge transfer (TICT) in excited state, which is a non-emissive state, as well as hydrogen bonding with the hetero-atom of dye. The emission spectrum of DEAC has also been measured in cationic (CTAC) and anionic (SOS) micelles, the intensity increases as the concentration of surfactant increases, and an abrupt change in emission intensity is observed at critical micelle concentration (CMC) of surfactant. 2 x 10(-3) mol dm(-3) of DEAC gives laser emission in the blue region on pumping with nitrogen laser (lambda(ex) = 337.1 nm). The laser parameters such as tuning range, gain coefficient (alpha), emission cross section (sigma(e)), and half-life energy have been calculated in different solvents, namely acetone, dioxane, ethanol, and dimethyforamide (DMF). The photoreactivity of DEAC has been studied in CCl(4) at a wavelength of 366 nm. The values of photochemical yield (phi(c)) and rate constant (k) are determined. The interaction of organic acceptors such as picric acid (PA), tetracyanoethylene (TCNE), and 7,7,8,8-tetracyanoquinone-dimethane (TCNQ) with DEAC is also studied using fluorescence measurements in acetonitrile (CH(3)CN); from fluorescence quenching study we assume the possible electron transfer from excited donor DEAC to organic acceptor forming non-emissive exciplex.

Keywords: DEAC- laser dye TCNQ PA E. absorption; Emission; Fluorescence and dipolemoment
Abstract

Charge-state distributions in violent ion-atom collisions were investigated using a novel combination of traditional Rutherford backscattering spectrometry (RBS), time-of-flight (TOF) coincidence, and position-imaging techniques. The combination is termed Coincident Rutherford Backscattering Spectrometry (CRBS). A special apparatus was built in which the backscattered and recoil ions are time and charge state correlated. CRBS measurements for 0.5 and 0.6 MeV He(+) - Ar collisions are presented. From the recoil ion-projectile ion coincidence measurements of the charge state distributions, it was observed that backscattered projectile ions of the same charge state correlate with different recoil ion charge states and vice versa, indicating that any particular charge state may result from different reaction channels. Moreover, the Ar recoil-ion and He projectile-ion correlation exhibits a strong dependence on the projectile beam energy. An energy deposition model was attempted to account for some of the recoil ion charge state distributions. The model qualitatively accounts for the distributions and confirms that energy loss of a backscattered projectile due to its interaction with the target electrons is very small compared to that due to its interaction with the target nucleus.

Keywords: Rutherford backscattering; Coincidence; Charge state; Correlation
Abstract

We have prepared composite materials composed of ferromagnetic and ferroelectric compounds having the general formula (1-x)(Pr(0.6)Sr(0.4)MnO(3))/x(BaTiO(3)), with x is the molar ratio (x = 0.0, 0.03, 0.05, 0.10 and 0.30) using conventional ceramic double sintering process. We report the structural, magnetic and magnetocaloric properties of all samples. The presence of the two phases of Pr(0.6)Sr(0.4)MnO(3) (PSMO) and BaTiO(3) (BTO) was confirmed by X-ray diffraction (XRD) technique and the structural analysis. Magnetic measurements of magnetization versus temperature and magnetic applied field were performed. The temperature dependence of magnetization reveals that the composite samples show paramagnetic to ferromagnetic phase transition (PM-FM) when the temperature decreases. These samples have the same Curie temperature as the parent PSMO compound (T(c) approximate to 273 K). The magnetic entropy change |ΔS(M)| was deduced from the M(H) data by the Maxwell relation. Close to T(c), a large change in magnetic entropy has been observed in all samples. The maximum value of the magnetic entropy vertical bar Delta S(M)(max)vertical bar decreases from 2.88 J kg(-1) K(-1) for x = 0-1.86 J kg(-1) K(-1) for x = 0.3 for an applied magnetic field of 2 T. At this value of magnetic field the relative cooling power (RCP) decreases equally from 63 J kg(-1) for the parent sample to 38.3 J kg(-1) for x = 0.3. The temperature dependence of the Landau coefficients has been deduced using the Landau expansion of the magnetic free energy, indicating the second order nature of the magnetic transition.

Keywords: Ferromagnetic; Ferroelectric; Magnetic Entropy; Landau Expansion
We prove some existence of positive solutions to the semilinear elliptic system
\[
\Delta u = \lambda p(x)g(v) \quad \Delta v = \mu g(x)f(u)
\]
in the half space \( \mathbb{R}^+(n), n \geq 2 \), subject to some Dirichlet conditions, where \( \lambda \) and \( \mu \) are nonnegative parameters. The functions \( f, g \) are nonnegative continuous monotone on \((0, \infty)\) and the potentials \( p, q \) are nonnegative and satisfy some hypotheses related to the Kato class \( K(\infty)(\mathbb{R}^+(n)) \).

**Keywords:** Green Function; Kato Class; Elliptic Systems; Positive Solutions
Publications of Faculty of Engineering (Rabigh Branch)
The effect of particles size and shape on erosion rates and erosion mechanisms of 5117 steels are investigated using slurry whirling-arm ring. Six different sized silica sand particles are used as erodent. These particles are characterized in terms of their average diameter, aspect ratio, and circularity factor. The measured average diameter varies from 112.7 μm to 516.4 μm. The wear tests are carried out at impact velocity of 15 m/s and 30 deg and 90 deg impact angles using a sand-water mixture of 1 wt % concentration. Analysis of erosion rates shows that there exists threshold energy of impacting particles at which a transition in erosion rate is noticed for sizes of 200 μm. It is also observed that the erosion rate increases with the increase in shape factors (aspect ratio and circularity factor). The surface morphology of the eroded surface at impact of 30 deg shows that below 200 μm m, the erosion mechanism is indentation and material extrusion and above 200 μm m, the erosion mechanism is ploughing.

**Keywords**: Particle; Slurry; Erosion; 5117 Steels
In the present work, the topographical images of cavitation erosion surfaces at water and oil-in-water (o/w) emulsions were quantified using fractal analysis. The oil-in-water emulsion concentrations were 2, 5 and 10 wt. %, which are in the popular range used in hydraulic systems. The study showed that the variation of fractal dimension calculated from slope of linearized power spectral density for water and o/w emulsions can be used to characterize the cavitation intensity in similar manner to the weight loss. Both the fractal dimension and the weight loss decrease with adding oil to water. It was also found that the variation of fractal dimension versus concentration of oil-in-water emulsions has a general trend that does not depend on magnification factor. The cavitation erosion behavior and mechanism for water and o/w emulsions has been studied. It was found that the predominant failure mode was fatigue for water and o/w emulsions.

Keywords: Cavitation Erosion; Fractal; SEM Image; SUS 304 Stainless Steel; Oil-In-Water (O/W) Emulsion
Abstract

Enigmatic dunitic veins and veinlets crosscutting a podiform chromitite ore body discovered in Wadi Rajmi, northern Oman ophiolite, display a peculiar characteristic of being almost or completely spinel-free. Olivines show an evolution trend from the spinel-free dunites (Fo(93-94) and 0.4 wt% NiO) to the spinel-bearing dunites (Fo(91-93) and 0.2-0.3 wt% NiO). The Cr/(Cr + Al) of chromian spinel grains increases from 0.6 to 0.8, accompanied by a slight increase in Fe(3+) ratio, and the Fo content of olivine decreases in the spinel-bearing dunites. A high-Mg magma, initially undersaturated with chromian spinel, precipitated the spinel-free dunites. Once the spinel saturation of the melt was attained by fractionation, the spinel-bearing dunites precipitated. The initial magma was possibly komatiitic in nature, which was produced at an early stage of detachment of the oceanic lithosphere that formed the Oman ophiolite.

Keywords: Oman Ophiolite; Podiform Chromitite; Spinel-Free Dunite; Chromian Spinel; Komatiitic Melt
Abstract

The wear behavior of deformed magnesium alloy AZ61 under dry conditions was evaluated. Two types of AZ61 alloy were used, extruded and rolled samples, to investigate the effect of deformation process on the wear behavior. The experiments were performed using a pin-on-ring type wear apparatus against a stainless-steel counterface under applied stresses in the range of 3-7 MPa, and within a sliding velocity range of 0.2-1.8 m/s. The topographical images of the eroded surfaces at different sliding velocity for extruded and rolled samples were quantified using fractal analysis. The results revealed that for all applied stress, the wear rates increased with increasing the sliding velocity of both samples. The wear rate of the rolled samples is greater than that of the extruded samples at the stress range from 3 to 5 MPa. However, when the stress is increased to 7 MPa the wear rate of the rolled samples is lower than that of the extruded samples. The variation of fractal value of slope of linearized power spectral density (PSD) with the sliding velocity is largely similar to the relationship between the wear rate and the sliding velocity.

Keywords: Dry Sliding Wear; Magnesium Alloy Az61; Large Strain Deformation; Second Phase Precipitate; Fractal
Abstract

Solar ponds provide the most convenient and least expensive option for heat storage for daily and seasonal cycles. This is particularly important for a desalination facility, if steady and constant water production is required. If, in addition to high storage capacity, other favorable conditions exist, the salt gradient solar ponds (SGSPs) are expected to be able to carry the entire load of a large-scale flash desalination plants without dependence upon supplementary sources. This paper presents a performance investigation of a SGSP coupled with desalination plant under Jordanian climatic conditions. This is particularly convenient in the Dead Sea region characterized by high solar radiation intensities, high ambient temperature most of the year, and by the availability of high concentration brine. It was found that a 3000 m² solar pond installed near the Dead Sea is able to provide an annual average production rate of 4.3 L min⁻¹ distilled water compared with 3.3 L min⁻¹ that would be produced by El Paso solar pond, which has the same surface area. Based on this study, solar ponds appear to be a feasible and an appropriate technology for water desalination near the Dead Sea in Jordan.

Keywords: Salt Gradient Solar Pond; Solar Desalination; Thermal Extraction Rate; Thermal Efficiency; Production Rate; Performance Ratio
Publications of Faculty of Medicine
(Rabigh Branch)
Abstract

Mesenchymal stem cells or stroma cells (MSCs) were recently proven to play various therapeutic roles when used in clinical trials to control various inflammatory, neoplastic and immunologic diseases in children. Clinical trials show some promising results, particularly in diseases where conventional therapy is still ineffective. However, experimental studies sometimes show conflicting results. This review aims to assess the current therapeutic role of MSCs in the control of several pediatric diseases and elaborate on their future applications by reviewing published studies. A review of published studies on this subject based on Pubmed and Medical Subject Heading databases, with search for all relevant articles focusing on results of clinical trials to evaluate the clinical applications of MSCs. The review includes documentation of positive as well as negative applications of MSCs focused on pediatric diseases. MSCs have important immunosuppressive and antifibrotic effects that need to be employed to help patients with diseases for which no conventional management has proven to be effective. They may be also be used as an adjuvant to conventional therapeutic modalities to consolidate recovery. This review sheds light on the significance of the use of MSCs for the treatment of various pediatric diseases and focuses on promising applications. Most of the reported studies agree about the favorable use of MSCs in various diseases; however, more clinical trials, involving larger numbers of patients, need to be conducted in order to refine the outcome of the therapeutic methods and establish standardized protocols.

Keywords: Bone Marrow Mesenchymal Stem Cells; Tissue Regeneration; Hematologic Diseases
Publications of Faculty of Computing and Information Technology (Rabigh Branch)
Almost all subspace clustering algorithms proposed so far are designed for numeric datasets. In this paper, we present a k-means type clustering algorithm that finds clusters in data subspaces in mixed numeric and categorical datasets. In this method, we compute attributes contribution to different clusters. We propose a new cost function for a k-means type algorithm. One of the advantages of this algorithm is its complexity which is linear with respect to the number of the data points. This algorithm is also useful in describing the cluster formation in terms of attributes contribution to different clusters. The algorithm is tested on various synthetic and real datasets to show its effectiveness. The clustering results are explained by using attributes weights in the clusters. The clustering results are also compared with published results.

Keywords: Clustering; Subspace Clustering; Mixed Data; Categorical Data
Publications of Faculty of Sciences and Arts (Alkamil Branch)
Abstract

A new and efficient conjugate addition of trimethyl and triethyl phosphites to 3-omega-azidoacetylcoumarin (1) has been studied. The reaction proceeded smoothly at r. t. furnishing 1,2,3,4-triazaphosphole coumarin derivatives 4a,b in similar to 75% yields. Linear substituted triazoles 10a,b were also obtained from the reactions of 1 with alpha-keto ylides, acetyl- and benzoylemethylene triphenylphosphoranes. Contrary to these results, Wittig reaction was occurred when 1 was allowed to react with a-alkoxyacarbonylmethylene- and cyanomethylenetriphenylphosphoranes 7c-e as well as with methylidene-and benzyldienetriphenylphosphoranes 8a,b resulting in the formation of the corresponding olefins either as an intermediate 14b or as final products 11a-c.

Keywords: Phosphonyl Carbanions; Wittig Reaction; Reagents; Esters; Ylides
Publications of Faculty of Sciences and Arts (Khuluis Branch)
Abstract

Different compositions of Bi(5)Ge(x)Se(65-x) (x = 30, 35, 40 and 45 at %) thin films were deposited onto cleaned glass substrates by thermal evaporation method. The structural characterization revealed that, the as-prepared films of x = 30, 35 and 40 at. % are in amorphous state but there are few tiny crystalline peaks of relatively low intensity for the film with x = 45 at. %. The chemical composition of the as-prepared Bi(5)Ge(x)Se(65-x) films has been checked using energy dispersive X-ray spectroscopy (EDX). The optical properties for the as-deposited Bi(5)Ge(x)Se(65-x) thin films have been studied. The additions of Ge content were found to affect the optical constants (refractive index, n and the extinction coefficient, k). Tauc's relation for the allowed indirect transition is successfully describing the mechanism of the optical absorption. It was found that, the optical energy gap (E(g)) decreases with the increase in Ge content. These obtained results were discussed in terms of the chemical bond approach proposed by Bicermo and Ovshinsky. The composition dependence of the refractive index was discussed in terms of the single oscillator model.

**Keywords:** Chalcogenide Semiconductors Optical Properties; Amorphous Films; Refractive Index
Abstract

Different compositions of Se(100-x)(SbSn)(x) (0 <= x <= 14 at.%) glasses were prepared by the well-known melt quench technique. Thin films of these glasses were prepared by thermal evaporation onto ultrasonic cleaned glass substrate. Transmittance spectra of these films were measured in the wavelength range 400-2500 nm by using Jasco double beam spectrophotometer. A straightforward analysis proposed by Swanepoel, based on the maxima and minima of the transmittance spectra, allows to accurate determination of the film thickness and the complex index of refraction. Increasing SbSn content at the expense of Se atoms is found to affect the refractive index and the extinction coefficient of these films. The refractive indexes were discussed in terms of the single-oscillator Wemple-DiDomenico model. The compositional dependence of the optical band gap for the Se(100-x)(SbSn)(x) (0 <= x <= 14 at.%) thin films is discussed in terms of the chemical-bond approach.

Keywords: Optical Properties; Amorphous Films; Refractive Index; Polarizability
Abstract

This review deals with synthesis and reactions of pyrazole-3(4)-carbaldehydes as well as their biological activity. The data on the methods of synthesis, chemical reactions, and biological activity of these heterocycles published over the last years are reviewed here for the first time.

Keywords: 4-Functionally Substituted 3-Hetarylpyrazoles; Antiinflammatory Antimicrobial Agents; Vilsmeier-Haack Reagent; One-Pot Synthesis; Pyrazole Derivatives; Methylene-1-Phenyl-Pyrazolin-5 (4h)-Ones; 2(3h)-Furanones Bearing; Antiviral Activity; Propanoic Acids; Design
Abstract

In this paper, an analysis is presented to study the heat transfer characteristics of a micro polar fluid through an isotropic porous medium in a two-dimensional channel with rhythmically contracting walls. The flow analysis has been discussed under long-wavelength and low-Reynolds-number approximations. The closed-form solutions are obtained for velocity, micro rotation component, heat transfer, and the stream function. Numerical computations have been carried out for the pressure rise per wavelength. The influence of various parameters of interest is seen through graphs of frictional forces, pumping, trapping phenomena, and temperature profiles.

Keywords: Long-Wave Approximation; Heat-Transfer; Asymmetric Channel; Transport; Annulus; Endoscope
Abstract

The effect of allelopathy on many aspects of plant ecology including occurrence, growth, and structure of plant communities, dominance, and diversity has had a checkered history among ecologists. Field studies showed the increase of Amaranthus viridis density in an infested area by Trianthema portulacastrum more than uninfested area, while no difference in soil physicochemical characters at both areas. Bioassay was done under two different temperatures 25 and 35 degrees C with different types of T. portulacastrum leaf and stem extracts. The untreated seeds showed very small germination percent at the high temperature, while the treated seeds showed very high percentage. Different types of extracts had highly significant increase in seed germination, radicle and plumule growth of A. viridis. Treatment by T. portulacastrum extracts increased soluble protein, amylase and total phenol of A. viridis. Stimulation of all the previous parameters was higher in high temperature than in the lower. HPLC analysis for T. portulacastrum leaf and stem estimated eight phenolic compounds. The present study supports the ecological importance of allelopathy in Agriculture.

Keywords: Allelopathy; Trianthema; Amaranthus; Stimulation; Ecology
Abstract

The current review article represents a survey covering the literatures on azoles, azines and azepines fused to the a face of a benzimidazole moiety since 1980. Synthetic routes leading to benzimidazole fused with different ring systems; five-, six-, and seven-membered heterocyclic rings, containing one-, two- and three-heteroatoms were reported utilizing simple reactive benzimidazole synthons

Keywords: Condensed Ring-Systems; Potential Anxiolytic Agents; Bridgehead Nitrogen Atom; One-Step Synthesis; One-Pot Synthesis; Heterocyclic Synthesis; Antitumor Agents; In-Vitro; Facile Synthesis; Regioselective Synthesis
Abstract

The objective of the present work is to study the possible role of neurotransmitters in the central nervous system (CNS) side effects due to the administration of ciprofloxacin (80 mg/kg body weight) and gatifloxacin (32 mg/kg body weight) in male albino rats for 3, 7 and 14 days. The frontal cortex of ciprofloxacin and gatifloxacin treated groups revealed decrease of glutamate, gamma-aminobutyric acid (GABA), dopamine and serotonin levels and elevation of aspartate, asparagine, glycine, serine and norepinephrine levels and acetylcholinesterase (AChE) activities in a time related effect. In the hippocampus area, the results varied in each antibiotic where in ciprofloxacin treated groups, there is an elevation of asparagine, GABA, glycine, serine, taurine, norepinephrine and dopamine levels and a reduction of glutamate, aspartate and serotonin levels and AChE activities in a time related effect. In gatifloxacin treated groups, there is an elevation of glutamate, aspartate, asparagine, GABA, glycine, taurine and norepinephrine and reduction in the levels of dopamine and serotonin and the AChE activities. The histopathological examinations showed sever congestion with perivascular oedema in the blood vessels and capillaries of cerebral cortex as well as of the hippocampus. Overall, the data suggest that there is a shift in the balance between neurotransmitters towards increased production of excitatory potency in groups subjected to ciprofloxacin or gatifloxacin administration.

Keywords: Ciprofloxacin; Gatifloxacin; Amino Acids; Monoamines; Acetylcholinesterase
Abstract

Seafood toxins resulted from a wide variety of naturally occurring or man-made toxic compound may cause a serious hazard to consumers. Biogenic amines that cause histamine poisoning and (STX) that cause paralytic shellfish poisoning (PSP) are among these seafood toxins that may occur in mackerel fish and their presence may be affected by seasonal and locality variation. The presence of STX and biogenic amines together will increase the hazard to consumers. That is why the present study was conducted to explore the simultaneous occurrence of these toxins in mackerel fish in Egyptian markets. Also, to study the effect of catching areas and seasonal variation on the level of these toxins. Mouse bioassay method was used for STX determination, where the toxicity detected in mackerel fish in this study ranged from 21.4 to 45 μg STX/100 g. The quantitative Thin-layer chromatography (TLC) technique was applied for biogenic amines determination indicating that catching source had the main significant impact on the level of biogenic amines in mackerel fish samples under study. However, catching areas combined with seasonal variation affect the incidence level of STX in mackerel fish. Significant increase in the level of histamine (71), putrescine (64), cadaverine (42%), spermidine (65%), spermine (88%) and tyramine (48) was detected in the samples due to the thawing process.

Keywords: Mackerel; Biogenic Amines; Saxitoxins; Thin-Layer Chromatography (TLC); Paralytic Shellfish Poisoning (PSP).