Abstract:
An electrochemi-l study related to the redox characteristics of Ethyl-3-acetyl-6-methyl-1, 4-diphenyl-4, 3a-dihydro-1, 3, 4-triazolino[3, 4-a] pyrimidine-5-carboxylate ester and its derivatives (1a-f) and (2a-e) in nonaqueous solvents such as 1,2-dichloroethane (DCE), dichloromethane (DCM), acetonitrile (AN), dimethylsulphoxide (DMSO) and tetrahydrofurane (THF) using 0.1 mol dm-3 tetrabutylammonium perchlorate (TBAP) as a supporting electrolyte at platinum, glassy carbon and gold electrodes, has been performed using cyclic voltammetry (CV). Controlled potential electrolysis (CPE) is also carried out to elucidate the course of different electrochemical reactions through the separation and identification of the intermediates and final electrolysis products. The redox mechanism is suggested and proved. It was found that all the investigated compounds in all solvents are oxidized in a single irreversible one electron donating process following the well known pattern of the EC-mechanism to give a dimer. On the other hand, these compounds are reduced in a single irreversible one electron step to form the anion radical, which is basic enough to abstract proton from the media forming the radical which undergoes tautomerization and then dimerization processes to give also another bis-compound through N-N linkage formation.

Keywords:
Cyclic voltammetry; Oxidation; Reduction; Triazolopyrimidine; Non-Aqueous media; Platinum electrode; Glassy carbon electrode; Gold electrode
Possibility of Mesophase Formation in Some Model Compounds Based on the N-Aryl Benzamide Group

S. Z. Mohammady, M. Al-Aasar and Abdel Gawad Ali Fahmi

Title : Possibility of Mesophase Formation in Some Model Compounds Based on the N-Aryl Benzamide Group

Keywords : Mesophase formation; 4-Alkoxybenzylamides

Abstract : Five series of N-aryl-4-alkoxybenzamides [RO–C6 H4 –CONH–C6 H4 –X] were prepared where the terminal alkoxy group (RO) possesses a number of carbon atoms (n) that varies between 8, 10, 12, 14, or 18 carbons, while the other terminal substituent (X) alternatively changes from CH3 O, CH3 , H, Cl, and NO2 . The terminal group X was introduced once in position 4- with respect to the anilide C O group, furnishing, as expected, linear molecules, and others in the 2- (or 3-) positions aiming to induce some steric hindrance to the linear association of the rod-shaped molecules, specially in the solid phase. Further replacement of the anilide-H atom with a methyl (CH3 ) group was performed into the unsubstituted derivatives ) X H) in order to disrupt any unfavourable hydrogen bonding between any two neighboring molecules. Compounds prepared were characterized by elemental analyses, infrared, and 1 H NMR spectra, and their phase behaviour investigated by differential scanning calorimetry and polarized-light microscopy. The results were discussed in terms of mesomeric, steric, polarity, and polarizability effects. Independent of the polarity or position of the substituent X, all compounds prepared were found to be non-mesomorphic. The N-methyl derivative (that excludes the possibility of hydrogen bond formation) was also found to be non-mesomorphic. In all five series of compounds, their tendency to form a mesophase (smectic or nematic) was estimated from their binary phase diagrams with either of the smectogenic compound, 4-n-C16 H33 O–C6 H4 –COO–C6 H4 –OOC–C6 H4 –CN, or the nematogenic compound, 4n-C16 H33 O–C6 H4 –COO–C6 H4 –OOC–C6 H4 –CH3 . Dipole moment calculations for the core structure (benzanilide) revealed that such a group of compounds exists in a non-linear, non-planar conformation.
Title: Depositional Framework and Sequence Stratigraphic Aspects of the Coniacian–Santonian Mixed Siliciclastic/Carbonate Matulla Sediments in Nezzazat and Ekma Blocks, Gulf of Suez, Egypt

M. H. El-Azabi and Abdel Monam Ahmad El-Araby

Abstract:
Superb outcrops of mixed siliciclastic/carbonate rocks mark the Coniacian–Santonian Matulla Formation exposed in Nezzazat and Ekma blocks, west central Sinai. They are built up of various lithofacies that reflect minor fluctuations in relative sea-level from lower intertidal to slightly deep subtidal settings. Relying on the facies characteristics and stratal geometries, the siliciclastic rocks are divided into seven depositional facies, including beach foreshore laminated sands, upper shoreface cross-beded sandstone, lower shoreface massive bioturbated and wave-ripped sandstones, shallow subtidal siltstone and deep subtidal shale/claystone. The carbonate rocks comprise lower intertidal lime-mudstone, floatstone and dolostone, shallow subtidal skeletal shoal of oyster rudstone/bioclastic grainstone, and shoal margin packstone. Oolitic grain-ironstone and ferrifans are partially intervened the facies types. Deposition has taken place under varied conditions of restricted, partly open marine circulation, low to high wave energy and normal to raised salinity during alternating periods of abundant and ceased clastic supply. The facies types are arranged into asymmetric upward-shallowing cycles that record multiple small-scale transgressive–regressive events. Lime-mudstone and sandstone normally terminate the regressive events. Four sequence boundaries marking regional relative sea-level falls divide the Matulla Formation into three stratigraphic units. These boundaries are Turonian/Coniacian, intra-Coniacian, Coniacian/Santonian and Santonian/Campanian. They do not fit with those sequence boundaries proposed in Haq et al.’s global eustatic curves (1988) except for the sea-level fall associated with the intra-Coniacian boundary. Other sequence boundaries have resulted from regional tectonic impact of the Syrian Arc Fold System that has been initiated in north Egypt during the Latest Turonian–Coniacian. These boundaries enclose three well-defined 3rd order depositional sequences; their enclosing shallowing-upward cycles (i.e. parasequences) record the 4th order relative sea-level fluctuations. 34 and 20 parasequence sets, in the order of a few meters to tens of meters thick, mark the Matulla sequences in Nezzazat and Ekma blocks respectively. Each sequence shows an initial phase of rapid sea-level rise with retrogradational sets, followed by lowering sea-level and progradation/aggradation of the parasequence sets. The transgressive deposits display predominance of deep subtidal lagoonal facies, while highstand deposits show an increase in siliciclastic and carbonate facies with the progressive decrease of lagoonal facies. The sedimentary patterns and environments suggest that the regional, partly eustatic sea-level (i.e. intra-Coniacian) changes controlled the overall architecture of the sequence distribution, whereas changes in the elastic input controlled the
variations in facies associations within each depositional sequence.

**Keywords:**
Depositional facies; Matulla formation; Coniacian–Santonian; Sea-Level change; Sequence stratigraphy; Gulf of Suez
Abstract:
The interactions of a proton (3.7 GeV) with an emulsion can reveal the behavior of the nucleon–nucleus interactions. Furthermore, the interactions of 4He (2.1A GeV) and 7Li (2.2A GeV) with an emulsion introduce adequately a manner-representing nucleus–nucleus interactions. On the other hand, a major part of this work concerns the target fragmentation process. Thus, the yields of the target fragmentation (heavily ionizing particles Nh) have been studied on the basis of a comprehensive analysis of the data in the literature. The complete destruction of Ag nuclei (heaviest target in the emulsion) is achieved at a limiting value of Nh (Nh ≥ 28) for the nucleus–nucleus interactions. This study gives an indication of being a rich source of information on nuclear structure.

Keywords:
Target fragmentation; Light nuclei; Nucleon; Nucleus interactions; Heavily ionizing particles
Abstract:
An experimental study of the forward and backward emission of relativistic and fast hadrons in the interactions of 4.5 AGeV/c 32S with emulsion was carried out. The study supports the conclusion that a collective mechanism is responsible for the production of particles in the backward hemisphere (which is restricted beyond the kinematics limit). The backward emission of both shower and grey particles can be described by an exponential decay law independent of the projectile size. The experimental results suggest that the backward particles result from the decay of the system in a latter stage of the interaction. While the average multiplicities of the shower particles emitted in the forward hemisphere are strongly dependent on the projectile size and incident momentum, the average values of those emitted into the backward hemisphere are found to be only a function of the target size (i.e., impact factor). Thus, the backward particle production can be considered as a yield of a highly excited target system, in its rest frame.
Abstract:
Pyrazolo [5,1-a] pyrimidines and pyrazolo [5,1-c][1,2,4] triazines containing benzooxazole moiety are synthesised from N-[3-amino-4-(benzooxazol-2-y1)pyrazol-5-y1]phenylamine or its diazonium chloride with the appropriate active methylene compounds. The newly synthesised compounds were elucidated by elemental analysis, spectral data and alternative synthetic route whenever possible.

Keywords:
Pyrazolo [5,1-a] Pyrimidines; Pyrazolo [5,1-c][1,2,4] Triazines; Benzooxazoles; Activated nitriles.

Abdou Othman Abdelhamid, Zeineb H. Ismail and Anhar Abdel-Aziem

Journal: Chemical Research

ISSN: 0308-2342

Impact Factor: 0.21

Abstract:
Thieno[2',3':4,5]pyrimidino[1,2-b][1,2,4,5]tetrazine,[1]benzothieno[2',3':4,5]pyrimidino[1,2-b][1,2,4,5]tetrazine,pyrazolo[3',4':4,5]pyrimidino[1,2-b][1,2,4,5]tetrazine,triaprola[4,3-a]pyrimedin-5(1H)-one,1-[(2-(1-benzofuran-2-yl)-5-phenyl-4,5-dihydro-1H-pyrazol-1-yl)-4-substituted-1,3-thiazol-5-yl]-2phenyl diazene, 3-acyl-4-(1-benzofuran-2-ylcarbonyl) pyrazole and pyrazolo[3,4-d] pyridazine derivatives could be obtained via reactions of hydrazonoyl halides with the appropriate pyrimidine-2-thione, 3-amino-5,6-dimethyl-2-lflanylthieno[2,3-d] pyrimidin-4(3H)-one, 5-amino-6-mercapto-1-phenyl-1,5-dihydropyrazolo[3,4-d] pyrimidin-4-one and 1-(benzofuran-2-yl)-3-(dimethylamino)prop-2-en-1-one. Structures of the products have been determined by elemental analyses, spectral data studies and alternative synthesis whenever possible.

Keywords:
Tetrazino[2,3-A]Thieno[2,3-D]Pyrimidine; Triazolo[4,3-A]Pyrimidine; Pyrazolo[3,4-D]Pyrimidines; Pyrimidine-2-Thione; Hydrazonoyl halides
Abstract:
Pyrazolyl- and isoxazolylpregnene derivatives were synthesized from the appropriate hydrazonyl chlorides and hydroximoyl chlorides with enaminoprogesterone derivative. The newly synthesized compounds were elucidated by elemental analysis, spectral data and chemical transformation. Some products were tested towards some bacteria and some Fungal-plant pathogens.
Abstract:
[5-Substituted 2-(3-phenyl-5-substituted 2-pyrazoliny|1,3-thiazol-4-yl)] phenylidiazene and 2,3-dihydro-1,3,4-thiadiazoles were synthesized via reactions of hydrazonoyl halides with 5-substituted-3-phenyl-4,5-dihydropyrazole-1-carboximidothionic acid and {[2-2-aza-2-(methylthioxomethyl)-amino] vinyl} phenyl-1-azaviny|amino| methyl thiomethane-1-thione, respectively. All structures of the newly synthesized compounds were elucidated by elemental analysis, spectral data, X-ray single crystal, and alternative synthesis methods whenever possible. Some of the new compounds were tested towards bacteria. In general, all tested compounds were capable of high inhibiting the growth of gram positive and gram negative.

Keywords:
2,3-Dihydro-1,3,4-thiadiazoles; Arylazothiazoles; Hydrazonoyl halides; Pyrazolines
Reactions with Hydrazonoyl Halides 53:1 Synthesis and Antimicrobial Activity of Triazolino[4,3-a]pyrimidines and 5-Arylazothiazoles

Abdou Othman Abdelhamid, Zeineb H. Ismail, Marwa S. El Gendi and Moustafa M. Ghorab

Phosphorus, Sulfur, and Silicon
1042-6507
0.52

6-(2-Naphthyl)-1-phenyl-4-3,5-disubstituted 4,3a-triazolino[4,3-a]pyrimidines, [2-(1-(2-naphthyl)-5-substituted (1-pyrazolin-3-yl)-4-phenyl(thiazol-5-yl)phenyldiazineand 1-(2-aza-2-[(4-phenyldiazenyl)-(1,3-thiazol-2-yl])amino}vinyl)-naphthalene-2-ol were synthesized via reactions of hydrazonoyl halides with 4-(2-naphthyl)-6-substituted 3,4-dihydropyrimidine-2-thione, Amino(3-(2-naphthyl)-5-substitutedpyrazolin-2-ylmethane-1-thione, and 2-hydroxynaphthalenecarbaldehyde-thiosemicarbazone. All structures of the newly synthesized compounds were elucidated by elemental analysis, spectral data, and alternative synthesis methods whenever possible. Some of the new compounds were tested towards bacteria. In general, all tested compounds were capable of highly inhibiting the growth of gram positive of bacteria and gram negative

2,3-Dihydro-1,3,4-Thiadiazoles; Arylazothiazoles; Hydrazonoyl Halides; Pyra-Zolines; Triazolino[4,3-A] Pyrimidines
International Publications Awards
Cairo University

Name: Prof. Abdou Othman Abdelhamid

Dep.: Chemistry

Title: Synthesis and Reactivity of 1-Amino-4-methyl-3,4-dihydro-5H-pyrazolo[3',4':4,5]pyrimido[1,6-a]benzoimidazo-5-one

Abdou Othman Abdelhamid and Ahmed A. Awad

Journal: Heterocyclic Chem

ISSN: 0022-152X Impact Factor: 0.776

Abstract:
Pyrimido[2',1':5,6']pyrazolo[3',4':4,5]-pyrimido[1,6-a]benzoimidazoloc-2,8(1H,7H)-diones, and [1,2,4]-triazino-[3',4':5',6']pyrazolo[3',4':4,5]pyrimido[1,6-a]benzimidazo-8(7H)-ones were synthesized in a good yields via 1-amino-4-methyl-3,4-dihydro-5H-pyrazolo[3',4':4,5]pyrimido[1,6-a]benzoimidazo-5-one and the appropriate active methylene compounds. Structures of the newly synthesized compounds were elucidated on the basis of elemental analyses, spectral data, and alternative synthesis methods whenever possible.
Abstract:
Pyrazolo[1,5-a]pyrimidines were synthesized from the appropriate 3-aminopyrazoles with the appropriate sodium (3-oxocycloalkylidene)methenolate, diketone, ketones or 1,2-disubstituted acrylonitrile. Elemental analyses, spectral data, alternative synthesis route and X-ray elucidated structures of the newly synthesized compounds.
Name: Prof. Abdou Othman Abdelhamid

Dep.: Chemistry

Title: Reaction of Hydrazonoyl Halides 51: A Facile Synthesis of 5-Arylthiazoles and Triazolino[4,3-a]pyrimidines as Antimicrobial Agents

Abdou Othman Abdelhamid, Abdelwahed R. Sayed and Yasser H. Zaki

Journal: Phosphorus, Sulfur, and Silicon and the Related Elements

ISSN: 1042-6507

Impact Factor: 0.52

Abstract:
[5-Substituted 2-(3-phenyl-5-substituted 2-pyrazolyl)(1,3-thiazol-4-yl)]phenyl- diazenes, triazolo[3,4-a]pyrimidines, and 2,3-dihydro-1,3,4-thiadiazoles were synthesized with good yields from reactions of hydrazonoyl halides with 5-substituted-3-phenyl-4,5-dihydropyrazole-1-carboximidothionic acid, pyrimidine-2-thione, methyl carbodithioate, respectively. All structures of the newly synthesized compounds were elucidated by elemental analysis, spectral data, and alternative synthesis methods. Newly developed compounds are capable of inhibiting the growth of bacteria (gram positive and gram negative) greatly.

Keywords: 1,3,4-Thiadiazolines; Aryazothiazoles; Hydrazonoyl halides; Triazolino[4,3-A]pyrimidines
Abstract:
Reactions of Hydrazonoyl Halides 541: Synthesis and Reactivity of 3-aza-2-bromo-1-(3-oxobenzo[f]chromen-2-yl)-3-(arylamino)prop-2-en-1-one
Abdou Othman Abdelhamid and Hassen M. Abdelaziz

Keywords:
2,3-Dihydrothiadiazoles; 5-arylothiazol; HydrazonoylbroTriazolinomides[4,3-a]pyrimidines
Abstract:
2,3-Dihydro-1,3,4-thiadiazolylsteroids were synthesized from the appropriate hydrazonoyl halides and alkyl carbodithioates containing steroid moiety. The newly-synthesized compounds were elucidated by elemental analysis, spectral data, and alternative synthetic route whenever possible.

Keywords:
2,3-dihydro-1,3,4-thiadiazoles; Alkyl carbodithioate; Hydrazonoyl halides; Steroid
Name: Prof. Ahmad Samy Shawali

Dep.: Chemistry

Title: Synthesis and Tautomeric Structure of the Azo-Coupling Products of 2-Methyl-7-Phenylpyrimido[1,2-B][1,2,4]Triazepine-4,9(3H,5H)-Dione

Ahmad Samy Shawali, Sherif M. Sherif, Thoraya A. Farghaly, M.R. Shehata and Manal A.A. Darwish

Journal: Chemical Research

ISSN: 0308-2342 Impact Factor: 0.21

Abstract:
A simple synthetic strategy is described for synthesis of 3-arylaizo-2-methyl-7-phenylpyrimido[1,2-b][1,2,4]triazepine-4,9-diones 4a-j. The acid dissociation constants were determined for the series preapd and were correlated by a Hammett-typeequatio using enhancedsubsituent constants. The results of such cor together with the spectral data, including 15N isotopic labelling, indicated that the studied compoundsexis predominant in the hydrazone tautomeric form.

Keywords:
Fused Pyrimidines; L2,4-triazepines; Arylazo compounds; Tautomerism; N-15 labelling
Abstract:
Two series of the title compounds were prepared via reaction of N-aryl 2-oxohydrazonoylhalides with 1-amino-4-phenylimidazoline-2-thione. Their tautomeric structure was elucidated by spectral analysis, and the correlation of their acid dissociation constants with the Hammett equation, to be as the hydrazone form.

Keywords:
Imidazoles; Fused imidazoles; 1,3,4-Thiadiazines; Azo-Hydrazone tautomerism; Hydrazonoyl halides; Thiohydrazonates
Abstract:
Reaction of 4-amino-5-phenyl-4H-[1,2,4]triazole-3-thiol 3 with 2-(1-naphthyl)-2-oxoethanohydrazonoyl bromides 2 afforded the respective title thiohydrazonates 4. Treatment of the latter esters with acetic acid yielded the corresponding 7-arylazo-5H-[1,2,4]triazolo[3,4-b]-[1,3,4]thiadiazines 5. The electronic absorption spectra of compounds 5 were investigated in different solvents and buffer solutions. The acidity constants pK and pK* of 5 in both ground and excited state, respectively were determined and their correlations with Hamnett equation were examined. The results of such correlations indicated that compounds 5 exist predominantly in the hydrazone tautomeric form A in both ground and excited states.

Keywords:
Hydrazonoyl halides; 1,2,4-triazole-3-thione; Thiohydrazonate esters; Forster cycle; Ham Ett Equation; Tautomerism
Abstract:
Starting from bis (substituted methylene) carbonothioic dihydrazides, a series of the title compounds have been synthesized via their oxidative cyclization. The mechanism and regioselectivity of the reactions studied are discussed. The structures of the compounds prepared were elucidated on the basis of their elemental analyses, spectral data and alternate synthesis.

Keywords:
Hydrazones; 1,5-Electrocyclization; Nitrilimines; Heterocycles
International Publications Awards
Cairo University

Name: Prof. Ahmad Samy Shawali
Dep.: Chemistry

Title: Synthesis and Antimicrobial Activity of New Functionalized Derivatives of [1,2,4]Triazolo[4,3-a]pyrimidin-5(1H)-one
Ahmad Samy Shawali, Asma M. Mahran and Afaf A. Nada

Journal: Heteroatom Chemistry
ISSN: 1042-7163  Impact Factor: 0.838

Abstract:
New functionalized-1,7-diaryl-6-cyano-1,2,4-triazolo[4,3-a]pyrimidin5(1H) - one derivatives (5a-j) were synthesized via reaction of 5-cyano-6-phenyl-2-thiouracil 1 with the respective hydrazonoyl halides 2a-j and their biological activity was evaluated. The mechanism and the regioselectivity of the studied reactions are discussed.
**Title:** A New Site-Selective Route for Synthesis of Functionalized Imidaz[2,1-c][1,2,4]Triazoles  
Ahmad Samy Shawali, Magda A. Abdallah, Mosselhi N. Mosselhi and Mahmoud. Elewa  

**Journal: Heterocyclic Chemistry**  

**ISSN:** 0022-152X  
**Impact Factor:** 0.776  

**Abstract:**  
Reactions of 4-arylhydrazono-2-methylthio-imidazolin-50H)-one3 with various hydrazonoyl halides 1 proved to be site-selective and yielded the respective imidazo[2,1-c][1,2,4]triazole derivative 8. The structure of the latter was elucidated by X-ray analysis and the mechanism of the studied reactions was discussed.
Abstract:
The chemistry of esters of hydrazonoi acids has gained increase interest in both synthetic organic chemistry and biological fields. Since a large number of developments in the use of such esters, a review of such developments covering the literature up to mid 2005, seems to be of considerable value. The present review presents their structural features, nomenclature, synthetic methods and chemical reactions. The utility of the latter reactions for synthesis of various heterocyclic ring systems including mono-, bi-, tri-, tetra- and penta-heterocycles in presented. In addition, their silicon chelates and biological applications are presented.
Abstract:
The distribution of plant communities and the pattern of species diversity were studied along an altitudinal gradient in the northwestern Red Sea region. A total of 58 stands were studied, using ten quadrats (10 m x 10 m) per stand. The classification of vegetation using the Two Way Indicator Species Analysis (TWINSPAN) identified five groups representing different altitudinal ranges. Detrended Correspondence Analysis (DCA) clearly distinguished these groups by the first two DCA axes. Edaphic factors such as soil texture, CaCO, organic carbon, and electrical conductivity contribute to the distribution of plant communities. Species richness, Shannon index of diversity and evenness show a hump-shaped curve along the altitudinal gradient, whereas beta diversity decreases with elevation. Variation in the diversity and the distributional behaviour of plant species and plant communities in the study area may be attributed to the change of water resources, climatic factors, edaphic variables and anthropogenic pressures along the elevation gradient. The implications of the results are discussed and recommendations are suggested for conservation and sustainable utilization of vegetation.

Keywords:
Altitude; Desert; Diversity; Red Sea; Vegetation
Abstract:
Anastatica hierochuntica L. (Brassicaceae) is a desert monocarpic annual species characterized by a topochory/ ombrohydrochory type of seed dispersal. The hygrochastic nature of the dry skeletons (dead individuals) permits controlling seed dispersal by rain events. The amount of dispersed seeds is proportional to the intensity of rainfall. When light showers occur, seeds are released and remain in the site. Seeds dispersed in the vicinity of the mother or source plant (primary type of seed dispersal) resulted in clumped pattern and complicated interre- lationships among size-classes of the population. Following heavy rainfall, most seeds are re-leased and transported into small patches and shallow depressions which collect runoff water. The dead A. hierochuntica skeletons demonstrate site-dependent size-class structure, spatial pattern and spatial interrelationships in different microhabitats. Four microhabitat types have been sampled: runnels, patches and simple and compound depressions in two sites (gravel and sand). Ripley’s K-function was used to analyze the spatial pattern in popu-lations of A. hierochuntica skeletons in the study microhabitats. Clumped patterns were ob- served in nearly all of the study microhabitats. Populations of A. hierochuntica in the sand site were more productive than in the gravel site and usually had more individuals in the larger size-classes. In the compound-depression microhabitat, the degree of clumping de-creased from the core zone to the intermediate zone then shifted into overdispersed pattern in the outer zone. At the within size-class level, the clumped pattern dominated in small size classes but shifted into random and overdispersed patterns in the larger size classes. Aggre-gation between small and large size-classes was not well-defined but large individuals were found closer to the smaller individuals than to those of their own class. In relation to the phy- tomass and the size-class structure, the outer zone of the simple depression and the outer and intermediate zones of the compound depression microhabitats were the most produc-tive sites.

Keywords:
Anastatica hierochuntica; Spatial pattern ripley’s K-function hygrochasy; Size-Class structure
Abstract:
A regioselective synthesis is reported of a series of polysubstituted 1,2,4-triazoles and 4,4'- and 5,5'-bi-(1,2,4-triazoles) via 1,3-dipolar cycloaddition reactions of nitrilimines with some aza- and diaza-butadiene derivatives.

Keywords:
1,2,4-Triazoles; 4,4'-bi-(1,2,4-triazoles); 5,5'-bi-(1,2,4-triazoles); Nitrilimines; Azabutadiene; Diazabutadiene.
Abstract:
3-(3-Methylthiazolo[3,2-a]benzimidazol-2-yl)-3-oxopropionitrile was synthesized by refluxing ethyl 3-methylthiazolo[3,2-a] benzimidazole-2-carboxylate, acetonitrile and sodium hydride. Treatment of 3-(3 methylthiazolo[3,2-a]benzimidazol-2-yl)-3 oxopropionitrile with phenyl isothiocyanate, in the presence of KOH, furnished the corresponding potassium salt which was converted into thioacetanilide derivative upon neutralization. The thioacetanilide derivative reacts with chloroacetylecetone and ethyl chloroacetoxoacetate to give the 1,3-thiazole derivatives, while the reaction of the thioacetanilide derivative with hydrazonyl chlorides gave 1,3,4-thiadiazole derivatives. On the other hand, 3-(3-methylthiazolo[3,2-a]benzimidazol-2-yl)-3 oxopropionitrile reacted with the diazonium salt of both 3-phenyl-5-amino-(1H) pyrazole and 5-amino-1,2,4-(1H)-triazole to afford the corresponding hydrazones. The latter hydrazones underwent an intramolecular cyclization upon boiling in pyridine to give pyrazolo[5,1-c]-1,2,4-triazine and 1,2,4-triazolo[5,1-c]-1,2,4-triazine derivatives. Moreover, the behavior of thiazolo[3,2-a] benzimidazol-3(2H)-one towards phenyl isothiocyanate followed by the reaction with chloroketones or hydrazonyl chlorides was investigated. Some of the latter compounds exhibited moderate effects against some bacterial and fungal species.

Keywords:
Heterocycles; Cyclizations; Michael addition; Hydrazonyl chlorides
Abstract:
The reaction of 3-methylthiazolo[3,2-a]benzimidazole-2-carboxylic acid ethyl ester (1) with hydrazine hydrate gives the hydrazide 2 which reacts with CS2/KOH to afford the potassium salt 3. Treatment of 3 with 1-aryl-2-bromoethanones 4a,b afforded the 1,3-thiazoline derivatives 6a,b, respectively, while the reaction of 3 with hydrazine hydrate afforded 1,2,4-triazole-3-thione derivative 9. The reaction of 9 with 1-aryl-2-bromoethanones 4a,b and with hydrazonyl chlorides 11a,b gave the 1,2,4 triazolo[3,4-b]-1,3,4-thiadiazine derivatives 10a,b and 12a,b, respectively. Treatment of hydrazide 2 with phenyl isothiocyanate in refluxing benzene gave the thiosemicarbazide derivative 16. The latter reaction gave 1,3,4-oxadiazole derivative 17 when benzene was replaced by DMF. Cyclization of the thiosemicarbazide derivative 16 with NaOH resulted in the formation of the 1,2,4-triazolo-3-thione derivative 18.

Keywords:
Thiazolo[3,2-a]benzimidazole; Pyrazoles; 1,3,4-oxadiazoles; 1,3-Thiazolidines; 1,2,4-Triazoles; 1,2,4-triazolo[3,4-b]-1,3,4-thiadiazines; Hydrazonyl chlorides.
Regioselective Synthesis of some Novel Pyrazoles, Isoxazoles, Pyrazolo[3,4-d] Pyridazines and Isoxazolo[3,4-d] Pyridazines Pendant to Benzimidazole

Mohamed R. Shaaban, Tamer S. Saleh, Fayez H. Osman and Ahmad Mahmoud Farag

Journal: Heterocyclic Chemistry

ISSN: 0022-152X

Abstract:
2-Acetyl-1-methyl-1H-benzimidazole reacts with dimethylformamide-dimethyl-acetal (DMF-DMA) to afford the corresponding E-1-(1-methyl-1H-benzimidazol-2-yl)-3N,N-dimethylaminoprop-2-enone. The latter compound reacts regioselectively with some nitrilimines and nitrileoxides to afford the corresponding pyrazole and isoxazole derivatives, respectively. These reaction products react with hydrazine hydrate to give the novel pyrazolo[3,4-d]pyridazine and isoxazolo[3,4-d]pyridazine derivatives, respectively.
Title: Synthesis and Antimicrobial Evaluation of Novel Pyrazolo[1,5-a]pyrimidine, Triazolo[1,5-a]pyrimidine and Pyrimido[1,2-a]benzimidazole Derivatives

Mohamed R. Shaaban, Tamer S. Saleh and Ahmad Mahmoud Farag

Journal: Heterocycles
ISSN: 0385-5414
Impact Factor: 1.077

Abstract:
The applicability and synthetic potency of E-1-(1-methylbenzimidazol-2-yl)-3-N,N-dimethylaminoprop-2-enone towards some nitrogen nucleophiles was investigated as a convenient route for the synthesis of some novel aminopyrimidine, pyrazolo[1,5-a] pyrimidine, triazolo[1,5-a]pyrimidine, pyrimido[1,2-a]benzimidazole, and pyrido [2,3-d] pyrimidine derivatives. Some of the newly synthesized compounds were tested in vitro for their antibacterial and antifungal activities, and showed promising results.
Title: Mixed Ligand Complexes of Cu(II) 2-(2-Pyridyl)-Benzimidazole and Aliphatic or Aromatic Dicarboxylic Acids and. Synthesis, Characterization and Biological Activity. Ahmed Abdoh El-Sherif

Journal: Spectrochimica Acta Part A

ISSN: 1386-1425

Impact Factor: 1.27

Abstract:
The synthesis and structural characterization of mixed ligand complexes derived from 2-(2-pyridyl)-benzimidazole (PBI) (1ry ligand) and aliphatic or aromatic dicarboxylic acids (2ry ligand) are reported. Cu(II) complexes were characterized on the bases of their elemental analyses, IR, UV/VIS and ESR spectral studies and thermal analyses. The elemental analysis indicated the formation of mixed ligand complexes in a mole ratio 1:1:1 (Cu:L1:L2), L1 = PBI and L2 = oxalic acid, phthalic acid or malonic acid. IR spectra showed that PBI acts as a neutral bidentate coordinated to the Cu(II) via the pyridyl and imidazolyl nitrogen atoms. The dicarboxylic acids are bidentate the monodentate carboxylate groups. Thermal decomposition study of complexes was monitored by TG and DTG analysis in N2 atmosphere. The decomposition course and steps were analysed and the activation parameters of the nonisothermal decomposition were calculated from the TG curves and discussed. The isolated metal chelates were screened for their antimicrobial activities and the results are reported, discussed and compared with some known antibiotics.

Keywords:
Pyridyl)-Benzimidazole; Dicarboxylic acids; Complexes IR; ESR; Thermal 2-(2-Pyridyl)-benzimidazole; Dicarboxylic acids; Complexes IR; ESR; Thermal decomposition; Biological activity.
Abstract:
The interaction of Mo(CO)6 and Ru3(CO)12 with 2-aminoethylpyridine (aepy), 2-hydrazinopyridine (hpy) and dipicolylamine (dpa) have been investigated. Molybdenum complexes were found to have either mono- or binuclear derivatives, [MoO2(CO)2(aepy)] (1), [MoO2(CO)2(hpy)] (2), [Mo2O6(aepy)2] (3), [Mo2O6(hpy)2] (4), and [Mo2O4(dpa)2] (5), depending on the reactions conditions. Ruthenium complexes are shown to have a molecular formulae of a mononuclear species; [Ru(CO)3(aepy)] (6), [Ru(CO)3(hpy)] (7) and [Ru(CO)2(dpa)] (8). The proposed structures of the complexes were elucidated using elemental analyses, i.r., u.v.–vis. and n.m.r. spectroscopy. The thermal stabilities of the reported complexes were also investigated using the t.g. technique.
Abstract:
This review article summarizes the structural features of complexes of salicylidene Schiff bases containing, in addition to the phenolic-OH and the azomethine (-RC=N-) groups, a thiole group, and/or a sulfur atom participating in coordination. Structural aspects of metal complexes of salicylidene-2-amin thiophenol, salicylidene-3-amin thiophenol, salicylidenedithiocarbazone, salicylidenedithiocarbazates, salicylidenedithio-carbazates, salicylideneaminopropyleneamino-cyclopentenedithiocarboxylates, salicylidene- imidazoles, and salicylidene-thiosalicylidene-1,3-propanediamine are reported.
Abstract:

For the first time a 1-cyclopropyl substituted tetrazole (C3tz) has been used as a potential ligand for iron(II) spin-transition complexes. The complexation of 1-cyclopropyltetrazol with iron(II) tetrafluoroborate yielded a fine powdered product of [Fe(C3tz)6](BF4)2 being poorly soluble in most common solvents. Single crystals of complex were grown in situ from a solution of ligand and iron(II) hexafluorophosphate, which yielded a hexagonal prismatic crystalline product of [Fe(C3tz)6](PF6)2. A comparison of XRPD data of the homologues [Fe(C3tz)6](BF4)2 and [Fe(C3tz)6](PF6)2 proves them to be homeotypic. The thermally induced spin-crossover phenomenon of [Fe(C3tz)6](BF4)2 complex shows very abrupt spin transitions, with a spin-crossover temperature T1/2 180 K which is found to be 50 K above the T1/2 of all known iron(II) complexes with n-alkyltetrazoles as ligands. The T1/2 was determined by temperature-dependent 57Fe-Mossbauer, far FT-IR and UV-Vis–NIR spectroscopy as well as temperature dependent magnetic susceptibility measurements (SQUID).
Title: Spectral and Thermal Studies on Ruthenium Carbonyl Complexes with 5-Trifluoromethyl-2,4-Dihydropyrazol-3-One Ligands

Ahmed Ahmed Soliman

Journal: Spectrochimica Acta,

ISSN: 1386-1425         Impact Factor: 1.27

Abstract:
Reactions of the cluster compound [Ru3(CO)12] with 5-trifluoromethyl-2,4-dihydropyrazol-3-one(HL1), 4-(2,4-dichlorophenylhydrazono)-5-trifluoro- methyl-2,4-dihydropyrazol-3-one (H2L2), 4-(3-fluorophenylhydrazono)-5-trifluoromethyl-2,4-dihydropyrazol-3-one (H2L3), 4-(3-trifluoromethyl-phenylhydrazono)-5-trifluoromethyl-2,4-dihydropyrazol-3-one (H2L4) and 4-(3-nitrophenylhydrazono)-5-trifluoromethyl-2,4-dihydropyrazol-3-one (H2L5) have been carried out in benzene and under reduced pressure. The structures of the isolated complexes were elucidated using elemental analyses, IR, UV–vis, mass and NMR spectroscopy. All the complexes are diamagnetic and have trigonal bipyramidal structures with general formulae [Ru(CO)4(HL1)] and [Ru(CO)3(H2L2–5)]. The thermal decompositions of the complexes were studied in correlation with the mass spectral fragmentation patterns.

Keywords:
Ruthenium; Pyrazolone derivatives; IR spectra; UV–vis; NMR; Mass; Thermal analysis
Name: Dr. Ahmed Fahmy Youssef

Dep.: Chemistry

Title: Potentiometric Batch and Flow Injection Analysis of Betaine Hydrochloride

Sayed S. BADAWy, Ahmed Fahmy Ahme Youssef and Ali A. Mutair

Journal: Annali di Chimica

ISSN: 0003-4592 Impact Factor: 0.516

Abstract:
Novel PVC membrane electrodes for the determination of betaine ion based on the formation of betaine tetraphenylborate (Be-TPB) and betaine-phosphotungstate (Be-PT) ion-exchangers as electroactive materials are described. The sensors show a fast, stable, near Nernstian response for 6.92 × 10⁻⁶ to 7.94 × 10⁻³ M and 1.0 × 10⁻⁴ to 1.0 × 10⁻² M betaine hydrochloride (BeCl) in case of Be-TPB electrode applying batch and flow injection analysis (FIA), respectively, and 2.95 × 10⁻⁵ to 2.26 × 10⁻³ M and 3.16 × 10⁻⁵ to 1.0 × 10⁻² M in case of Be-PT electrode for batch and FIA electrodes, respectively, at 25 °C over the pH range of 3.5-10 with a cationic slope of 60.2 and 59.1 mV decade⁻¹ and a fast potential response of ≤ 15 s. The lower detection limits are 7.94 × 10⁻⁶ and 3.18 × 10⁻⁵ M BeCl for Be-TPB and Be-PT electrodes, respectively. Selectivity coefficient data for some common inorganic cations, sugars, amino acids and the components other than betaine, of the mixed drug investigated show negligible interference. The electrodes have been applied to the direct potentiometric determination of betaine hydrochloride in water and in a pharmaceutical preparation under batch and FIA conditions. Potentiometric titrations of BeCl with NaTPB and PTA as titrants were monitored with the developed betaine electrodes as an end point indicator electrode. The determination of BeCl shows an average recovery of 100.8 % with mean relative standard deviation of 0.61 %. The effect of temperature on the electrodes was also studied.

Keywords:
Membrane Electrodes Betaine Hydrochloride Flow Injection Analysis NaTPB
Abstract:
Conducting polymers were modified with Cu-phthalocyanine or Co-phthalocyanine embedded in a sol–gel matrix. The resulting films were characterized using electrochemical impedance spectroscopy, Fourier transform infrared spectroscopy and scanning electron microscopy. Electrochemical impedance spectroscopy data showed that the application of the sol–gel layer to the conductive polymer caused a noticeable increase in the impedance of the film across the frequency ranges studied. The hydrophobic character of the film was greatly influenced by the sol–gel and caused an increase in its capacitance. A modified ‘Randles’ equivalent cell was used to correlate the electrochemical parameters of the films. Elemental analysis and infrared data confirmed the presence of the phthalocyanine moieties in the film and the empirical formula of the film was estimated. The surface morphology of the sol–gel-modified conducting polymer was distinctly amorphous compared to the poly(3-methyl thiophene).

Keywords:
Conducting polymers; Metal–phthalocyanines; Hybrid organic/inorganic composites; EIS; FTIR; SEM.
Abstract:
Conducting polymers were deposited on the surface of platinum and glassy carbon electrodes. The monomers used were N-methyl pyrrole and 3-methyl thiophene. The electrochemical synthesis of the polymer was achieved using constant applied potential or cyclic polarization techniques in acetonitrile as a solvent and tetraalkyl ammonium salts as supporting electrolyte. The resulting conducting polymeric film was modified with an inorganic metal complex, namely, Cu–phthalocyanine or Co–phthalocyanine. Two different approaches were adopted for the modification: (1) the first was to directly apply the metal–phthalocyanine layer on the surface of the polymer, and (2) the second was by the inclusion of the metal–phthalocyanine in a sol–gel matrix that was in turn applied to the conducting polymer film. In the first part of this work, we studied the effect of changing the type of polymer matrix and the central metal of the inorganic complex on the electrochemical behavior of the resulting film. We also found that changing the method of metal–phthalocyanine application to the polymer film affected the electrochemical response and kinetics at the electrode surface. The new electrode was tested for the reduction of hydrogen peroxide and showed better conversion efficiency compared to conventional surfaces, which suggests its use in fuel cell applications.

Keywords:
Conducting polymers; Metal–phthalocyanines; Hybrid organic/inorganic composites; Voltammetry; Fuel cells
Title: A convenient Synthesis of Thiamacrocyclic Dilactams

Ashraf Abdel-Daym Abbas and Adel S. Girgs

Journal: Heteroatom Chemistry

ISSN: 1042-7163  Impact Factor: 0.838

Abstract:
A convenient synthesis of 26-28 membered thiamacrocyclic dilactams was achieved via base-catalyzed condensation reaction of bis 2-cyanoacetamides with dialdehyde derivatives. The reaction was assumed to be geometrically stereoselective affording E, E'-configuration as the only isolable isomer. N,N'-[Alkanediylbis(thia-2,1-phenylene)]bis[2-cyanoacetamides] were obtained through reaction of cyanoacetic acid with the corresponding diamine hydrochlorides.

Keywords:
Macrocycles; Bis 2-cyanoacetamides; Bisbenzenamines; Bisbenzaldehydes
Synthesis of Mixed-donor Azaoxathia Macrocyclic Tetraamides, Acyclic Polyether di/and Tetraamides and Their C Pivot Lariat Derivatives

Ashraf Abdel-Daym Abbas

Heterocyclic Chem

ISSN: 0022-152X

Impact Factor: 0.776

Abstract:
The macrocyclic tetraamides 11a-e and 15-hydroxy macrocyclic tetraamides 23a-c were prepared in good yields by the nucleophilic reaction of the potassium salts of the bis-phenoles 10a-c with the appropriate dihalo compounds 5a-d and 15. Moreover, the acyclic diamides 7, 9, 17-21 and bis-acyclic tetraamide 22 were obtained in high yields by the reaction of the appropriate dichloro compounds with different phenoxides and secondary amines. Acylation of 23a-c with different acid chlorides gave the corresponding esters 24a-c. Compounds 24a-c reacted with different secondary amines to afford the corresponding novel lariat macrocycles 25a-d in high yields.

Keywords:
Tetraamides; Acyclic polyether; C Pivot lariat derivatives
Abstract:
The interaction of the palladium(II) complex \([\text{Pd(Pip)(H}_2\text{O)}\text{]}^{2+}\), where Pip is piperazine, with a series of biologically relevant nucleophiles including guanosine-5’-monophosphate, L-methionine and thiourea was studied under pseudo-first-order conditions as a function of nucleophile concentration and temperature, using UV-Vis spectrophotometric and stopped-flow techniques. The reactions were found to occur in two subsequent steps. For the sulfur donor containing nucleophiles thiourea and L-methionine, a third reaction step, the displacement of the labilized amine, as a result of the strong trans-effect of S-donor ligands, was observed. The activation parameters for all reactions studied suggest an associative substitution mechanism.
Abstract:
A systematic study of the reduction of (ImH) [trans-RuCl₄(dmso)(Im)] (NAMI-A; dmso is dimethyl sulfoxide, Im is imidazole), a promising antimetastasing agent entering phase II clinical trial, by L-ascorbic acid is reported. The rapid reduction of trans-[RuIIICl₄(dmso)(Im)]₂⁻ results in formation of trans-[RuIIICl₄(dmso)(Im)]₂⁻ in acidic medium (pH = 5.0) and is followed by successive dissociation of the chloride ligands, which cannot be suppressed even in the presence of a large excess of chloride ions. The reduction of NAMI-A strongly depends on pH and is accelerated on increasing the pH. Over the small pH range 4.9–5.1, the reaction is quite pH-independent and the influence of temperature and pressure on the reaction could be studied. On the basis of the reported activation parameters and other experimental data, it is suggested that the redox process follows an outer-sphere electron transfer mechanism. A small contribution from a parallel reaction ascribed to inner-sphere reduction of aqua derivatives of NAMI-A, was found to be favored by lower concentrations of the NAMI-A complex and higher temperature. In the absence of an excess of chloride ions, the reduction process is catalyzed by the Ru(II) products being formed. The reduction of NAMI-A is also catalyzed by Cu(II) ions and the apparent catalytic rate constant was found to be $1.5 \times 10^6 \text{ M}^{-2} \text{ s}^{-1}$ at 25°C.
Abstract:
6-Amino-4-naphtho-2-thioxo-1,2-dihydropyridine-3,5-dicarbonitriles 3a,b were synthesized from the reaction of naphthaldehydes 1a,b and cyanothioacetamide (2). Compounds 3a,b were taken as starting materials for the synthesis of pyrazolo[3,4-b]pyridine 7a,b, and 8a, Pyrido-[2,3 : 3,4]pyrazolo[1,5-a]pyrimidine 9a,b; thieno[2,3-b]pyridine 16a–d, 18a,b, 21a–d, 24a,b, and 25a; and pyrido[3,2 :4,5]thieno[3,2-d]pyrimidine 17a,b derivatives through their reactions with the corresponding reagents. All structures of the newly synthesized hetero-cyclic compounds were established on the basis of IR, 1 H NMR, 13 C NMR, mass spectra, and elemental analyses.

Keywords:


Azza Mohamed Abdel Fattah, Mohamed A. A. Elneairy and Mohamed A. M. Gad-Elkareem

Journal: Phosphorus, Sulfur, and Silicon

ISSN: 1042-6507 Impact Factor: 0.52

Name: Prof. Azza Mohamed Abdel-Fattah
Dep.: Chemistry

Abstract:
Pyrazolo[3,4-b]pyridine derivatives 7 and 9 were synthesized via the reaction of 3-amino-1H-pyrazolo[3,4-b]pyridine derivative 2 with o-bromoacetophenones. Reaction of 7 and 9 with Ac20 afforded the imidazolo[1´,2´:1,5]pyrazolo[3,4-b]pyridine derivative 8 and pyrazolo[3,4-b]pyridine derivative 10 respectively. Reaction of 2 with chloroacetoniitrile followed by DMF-DMA gave imidazolo[1´,2´:1,5]pyrazolo[3,4-b]pyridines 4 and 5 respectively. Acetylacetone and 1,1-dicyano-2,2-dimethylthioethene were reacted with 2 afforded the pyrido[2,3,4]pyrazolo[1,5-a]pyrimidines 11 and 14 respectively. Also 2 reacted with DMF-DMA yielded the formamidine 15 which intern reacted with active methylene reagents yielded the corresponding pyrido[2,3,4]pyrazolo[1,5-a]pyrimidines 18 and 23a-d.

Keywords:
Title: Systematic Analysis of Reaction Cross Sections of Carbon Isotopes

W. Horiuchi, Y. Suzuki, Badawy Abu-Ibrahim and A. Kohama

Journal: Physical Review

ISSN: 0556-2813

Impact Factor: 3.327

Abstract:
We systematically analyze the total reaction cross sections of the carbon isotopes with N=6-16 on a 12C target for wide range of incident energy. The internal structure of the carbon isotopes are described by a Slater determinant generated from a phenomenological mean-field potential, which fairly well reproduces the ground state properties for most of the isotopes. We need separate studies for not only odd nuclei but also 16C and 22C. For the calculations of the cross sections, we take two schemes; one is the Glauber approximation, and the other is the eikonal model using a global optical potential. We find that both schemes reasonably well reproduce the cross sections of 12C, 13C and 16C on 12C which are available at low and high incident energies. The enhanced reaction cross section of 15C observed at low energy remains to be understood. We also find a consistent parametrization of the nucleon-nucleon scattering amplitude, differently from previous ones. Finally, we predict the total reaction cross section of 22C on 12C.
Title: The Effect of Ti$^{4+}$ Ions and Gamma Radiation on the Structure and Electrical Properties of Mg Ferrite.

Ebtsam Ateia, M.A. Ahmed and A.K. El-Aziz

Journal: Mater Sci

ISSN: 0022-2461

Impact Factor: 0.999

Abstract:
Ferrite samples of the general formula Mg$^{1+x}$Ti$^x$Er$^y$Fe$^{2-2x}$-yO$^4$; $0.1 \leq x \leq 0.9$, $y=0.025$ were prepared using the standard ceramic method. The final sintering temperature was 1200°C with heating rate 4°C/min during 100hr. X-ray diffraction analysis was carried out to assure the formation of the spinel structure. The effect of Ti$^{4+}$ ion concentration on the structural and the electrical properties of the investigated samples is studied. It change the iron ion concentration from 2 to 2x thereby decreasing the number of ferrous ions on octahedral sites, with a consequent decrease the dielectric constant. The most important result of irradiation on the electrical properties is the change of the ratio on the octahedral site leading to increase the conductivity as well as the dielectric constant. The variation of the thermoelectric power with a temperature is performed, the common feature of all compositions is the fluctuation of Seebeck coefficient between positive and negative over the whole range of temperature. This indicates that the charge carriers are electrons and holes, depending on both the temperature range and the additive in the ferrite samples.

Keywords:
Title: Effect of Rare Earth Radius and Concentration on the Structural and Transport properties of Doped Mn–Zn Ferrite

Ebtesam Ateia, M.A.Ahmed and A.K.El-Aziz

Journal: Magnetism and Magnetic Materials
ISSN: 0304-8851
Impact Factor: 1.212

Abstract:
Dielectric constant ($\varepsilon''$), ac conductivity and Seebeck coefficient have been measured for the ferrite samples of the general formula $\text{Mn0.5Zn0.5RyFe}_2\text{O}_4$; where $R=$Dy, Gd, Sm, Ce and La, prepared by standard ceramic technique and sintered at 1200°C with a heating rate 4oC/min. X-ray diffractograms show that all samples posses the spinel structure with the appearance of small peaks representing secondary phases. There is a lowering in the porosity starting after Sm-doped samples due to the presence of the secondary phases which limits the grain growth. Due to seebeck measurements the Mn-Zn ferrite doped with the rare earth has been classified as P-type semiconductors. It is possible to increase the electrical resistivity by using a small quantity of $\text{Dy}^{3+}$ ions substitutions owing to the structural heterogeneity generated by the insulating intergranular layers. The isolation of the grains is the most promising approaches for further reduction in the eddy current losses at the operating frequencies.

Keywords:
Ferrite; Rare earth; Sintering catalyst; Porosity; Diffraction patterns.
Abstract:
It is well known that spectral methods (tau, Galerkin, collocation) have a condition number of $O(N^{4})$ where $N$ is the number of retained modes of polynomial approximations. This paper presents some efficient spectral algorithms, which have a condition number of $O(N^{2})$, based on the ultraspherical-Galerkin methods for the integrated forms of second-order elliptic equations in one and two space variables. The key to the efficiency of these algorithms is to construct appropriate base functions, which lead to systems with specially structured matrices that can be efficiently inverted. The complexities of the algorithms are a small multiple of $N^{d+1}$ operations for a $d$-dimensional domain with $N−1/d$ unknowns, while the convergence rates of the algorithms are exponentials with smooth solutions.

Keywords:
Spectral-Galerkin method; ultraspherical polynomials; Poisson and Helmholtz equations.
Abstract:
The clo index values for different wear have been estimated for daytime and nighttime for different months of the year in order to investigate human climates in Egypt. The clo values may also be used as a good guide to gauge the thermal human comfort under different atmospheric conditions and also express the resistance to heat transfer by clothing, and are expressed relative to the units of thermal insulation. A complete set of measurements for air temperature and cloud amount in addition to wind speed for the daytime (1200 GMT) and nighttime (0000 GMT) hours for the period 1991–2002 at 40 meteorological stations in Egypt have been used. The percentage area (%) requiring different wear during daytime and nighttime for all the months of the year have been determined. The study revealed that the whole country is characterized by the requirement of very cold weather wear during winter nighttime while 72% of the area of the country requires tropical weather wear during summer daytime. Only 71% of the area of the country requires comfortable weather wear during summer nighttime while there is no area requiring comfortable weather wear during winter nighttime. Latitudinal gradient of clo values was observed during all months of the year. Maximum latitudinal gradients of clo values during the daytime were found for the months of April and May. The clo classification in relation to climate has been done for Egypt.
Abstract:
This study deals with using the least-squares method (LSM) to separate the absolute aeoradiospectrometric maps (T.C., 40K, eU, and eTh) into highly radioactive zones and the normal radioactive background of the host rocks. The Gabal Um-Rabul area, selected for testing the efficiency of the present method, lies in the northern part of the Eastern Desert of Egypt and is covered mainly by Precambrian basement rocks, which are unconformably overlain by Phanerozoic sedimentary successions.

In the present study, the least-squares (first-order) residual anomaly analysis method was used and contour maps were drawn to delineate the significant aeroradiospectrometric anomalies over the study area. It was found that, the least-squares first-order regional and residual total-count (T.C.) and the three absolute radioelements (K, eU, & eTh) maps of the study area show a high degree of coincidence with the anomalous maps constructed by the conventional statistical methods in terms of the locations, intensities, and trends of anomalous zones. Therefore, it is recommended to apply the least squares method for locating radioelements anomalous zones in any surveyed area.

Keywords:
Least-Square Method (LSM); Aeroradiospectrometry; Gabal Um Rabu; Geological setting; Normal probability plot; Regional residual separation;

Northern Eastern Desert of Egypt.
Abstract:
We have developed a least-squares minimization approach to depth determination using numerical second horizontal derivative anomalies obtained from magnetic data with filters of successive window lengths (graticule spacings). The problem of depth determination from second-derivative magnetic anomalies has been transformed into finding a solution to a non-linear equation of the form, $f(z) = 0$. Formulae have been derived for a sphere, a horizontal cylinder, a dike and a geological contact. Procedures are also formulated to estimate the magnetic angle and the amplitude coefficient. We have also developed a simple method to define simultaneously the shape (shape factor) and the depth of a buried structure from magnetic data. The method is based on computing the variance of depths determined from all second-derivative anomaly profiles using the above method. The variance is considered a criterion for determining the correct shape and depth of the buried structure. When the correct shape factor is used, the variance of depths is less than the variances computed using incorrect shape factors. The method is applied to synthetic data with and without random errors, complicated regions, and interference from neighbouring magnetic rocks. Finally, the method is tested on a field example from India. In all the cases examined, the depth and the shape parameters are found to be in good agreement with the actual parameters.
Title: A Least-squares Window Curves Method for Interpretation of Magnetic Anomalies Caused by Dipping Dikes


Abstract:
We have developed a least-squares method to determine simultaneously the depth and the width of a buried thick dipping dike from residualized magnetic data using filters of successive window lengths. The method involves using a relationship between the depth and the half-width of the source and a combination of windowed observations. The relationship represents a family of curves (window curves). For a fixed window length, the depth is determined for each half-width value by solving one nonlinear equation of the form \[ f(z) = 0 \] using the least-squares method. The computed depths are plotted against the width values representing a continuous curve. The solution for the depth and the width of the buried dike is read at the common intersection of the window curves. The method involves using a dike model convolved with the same moving average filter as applied to the observed data. As a result, this method can be applied to residuals as well as to measured magnetic data. Procedures are also formulated to estimate the amplitude coefficient and the index parameter. The method is applied to theoretical data with and without random errors. The validity of the method is tested on airborne magnetic data from Canada and on a vertical component magnetic anomaly from Turkey. In all cases examined, the model parameters obtained are in good agreement with the actual ones and with those given in the published literature.

Keywords:
Magnetic dipping dike; Depth and width solutions; Least-squares method; Window curves method
Abstract:
We have developed three different least-squares approaches to determine successively: the depth, magnetic angle, and amplitude coefficient of a buried sphere from a total magnetic anomaly. By defining the anomaly value at the origin and the nearest zero-anomaly distance from the origin on the profile, the problem of depth determination is transformed into the problem of finding a solution of a nonlinear equation of the form \( f(z) = 0 \). Knowing the depth and applying the least-squares method, the magnetic angle and amplitude coefficient are determined using two simple linear equations. In this way, the depth, magnetic angle, and amplitude coefficient are determined individually from all observed total magnetic data. The method is applied to synthetic examples with and without random errors and tested on a field example from Senegal, West Africa. In all cases, the depth solutions are in good agreement with the actual ones.

Keywords:
Magnetic interpretation; Sphere model; Least-squares method
Abstract:
Treatment of 3-cyanoacetyl indole 1 with the diazonium salts of 3-phenyl-5-aminopyrazole and 2-aminobenzimidazole afforded the corresponding hydrazones 4 and 5. 3-Cyanoacetyl indole reacted with phenylisothiocyanate to give the corresponding thioacetanilide derivative 7. Treatment of 7 with hydrazonoyl chlorides afforded the corresponding 1,3,4-thiadiazole derivatives 8a–f and 9. Also, the thioacetanilide reacted with α-haloketones to afford thiophene derivatives 10a,b (tenidap analogues), or thiazolidin-4-one derivative 11. The newly synthesized compounds were found to possess potential anti-inflammatory and analgesic activities.

Title: Synthesis and Biological Evaluation of New 3-Substituted Indole Derivatives as Potential Anti-Inflammatory and Analgesic Agents
Mohamed A.A. Radwan, Eman Aly Ragab, Nermien M. Sabrya and Siham M. El-Shenawy

Journal: Bioorganic & Medicinal Chemistry
ISSN: 0968-0896 Impact Factor: 2.624
The stability of naturally grown passive films on some Mo-containing stainless steel specimens was examined in aerated and deaerated universal buffer solutions with different pH (2–12) as well as in sulphate and chloride solutions. Open circuit potential (Eoc) and electrochemical impedance spectroscopy (EIS) were used as measuring techniques. In all cases, Eoc shifts towards less negative values with time until the potential reaches its steady-state (Ess) value. The Ess value is found to be more positive with decrease in solution pH or increase in Mo content in the alloy and becomes less positive in deaerated buffer solutions. Also, the thickening rate of the outer layer for the duplex passive film increases with increasing extent of Mo in the steel substrate or pH of the test solution. For a given alloy, Ess decreases linearly with the anion concentration (C), and is always more positive in Cl media for C > 0.05 M. Analysis of the EIS data showed that the total resistance (RT) of the passive film has higher values in aerated solutions, and is generally lower in basic solutions. This indicates that lower solution pH favours the formation of oxide films offering better protection. Furthermore, the higher values of RT in Na2SO4 solutions suggest the formation of more stable passive films in sulphate than in chloride solutions. This is discussed on the basis of the relative degree of anion incorporation into the passive films.
Title: FTIR, Magnetic, Mass Spectral, XRD and Thermal Studies of Metal Chelates of Tenoxicam.

M.A. Zayed, Faten A. Nour El-Dien, Gehad G. Mohamed and Nadia E.A. El-Gamel

Journal: Molecular Structure

ISSN: 0022-2860

Impact Factor: 1.495

Abstract:
Metal chelates of anti-inflammatory drug, tenoxicam (Ten), are synthesized and characterized using elemental analyses, IR, solid reflectance, magnetic, mass spectra, thermal analyses (TGA and DTA) and X-ray powder diffraction techniques. The chelates are found to have the general formulae [M(H2L)2(H2O)x][A]2yH2O (where H2L = neutral Ten, A = Cl in case of Ni(II) and Co(II) or AcO in case of Cu(II) and Zn(II) ions, x = 0–2 and y = 0–2.5) and [M(H2L)3](A)z:yH2O (A = SO4 in case of Fe(II) ion (z = 1) or Cl in case of Fe(III) (z = 3) and y = 0–4). IR spectra reveal that Ten behaves as a neutral bidentate ligand coordinated to the metal ions through the pyridyl-N and carbonyl-O of the amide moiety. The solid reflectance spectra and magnetic moment measurements reveal that these chelates have tetrahedral, square planar and octahedral geometrical structures. Mass spectra are also used to confirm the proposed formulae and the possible fragments resulted from fragmentation of Ten and its Zn(II) and Cu(II) chelates are suggested. The thermal behaviour of the chelates (TG/DTG, DTA) are discussed in detailed manner and revealed that water molecules of crystallization together with anions are removed in the first and second steps while the Ten molecules are removed in the subsequent steps. Different thermodynamic parameters are evaluated and the relative thermal stabilities of the complexes are discussed. X-ray powder diffraction patterns are used to indicate the polymorphic form of Ten and if the complexes have molecular similarity with respect to type of coordination.

Keywords:
Tenoxicam; Metal chelates; IR; Mass; TGA and DTA; Magnetic; Reflectance spectra and XRD
Abstract:
A simple and rapid spectrophotometric method has been developed for the determination of tricyclic anti-depressant drugs such as trazodone (TZH), amineptine (APH) and amitriptyline (ATPH) hydrochlorides in pure form and in different pharmaceutical preparations. The charge transfer (CT) reaction between TZH, APH and ATPH as electron donors and TCNQ as electron acceptor was utilized for their spectrophotometric determination. The optimum experimental conditions, like time, temperature, stoichiometry, solvents, for the CT complex formation are established. The method permits the determination of TZH, APH and ATPH over a concentration range of 10–400, 10–440 and 10–300 g ml⁻¹, respectively. The sensitivity (S) is found to be 0.09, 0.087 and 0.069 g cm⁻² for TZH, APH and ATPH, respectively. The SD values are found to be 0.146–0.293, 0.154–0.285 and 0.091–0.212 and RSD values are 0.142–1.92, 0.297–1.92 and 0.212–0.915 for TZH, APH and ATPH, respectively. The low values of the relative standard deviation indicate the high accuracy and precision of the method. The mean recovery values obtained together with a high correlation coefficient values, amount in the range 98–101.5, 98.7–102.9 and 93–101.9 for TZH, APH and ATPH, respectively. The method is applicable for the assay of the investigated drugs in different dosage forms and the results are in good agreement with those obtained by the official method.

Keywords:
Spectrophotometric; THZ; APH and ATPH Determination; TCNQ; Pharmaceutical Preparations
International Publications Awards
Cairo University

Name: Prof. Fathy Mohamed Abd-Elrazek
Dep.: Chemistry

Title: A Novel Synthesis of some New Benzoyl-substituted Heterocycles from 2-Benzyol-3-phenylpent-2-ene-1,S-dinitrile
Fathy M. Abdelrazek, Said A. Ghozlan and Farid A. Michael

Journal: Heterocyclic Chem
ISSN: 0022-152X Impact Factor: 0.776

Abstract:
Benzoyl-3-phenylpent-2-cnc-1.5-dlnitrile 1 undergoes bromination with N-bromosuccinimide (NBS) to afford the bromo derivative 2u. This bromo derivative undergoes reactions with sodium hydrogen sulfide, ethyl thioglycollate, hydroxylamine hydrochloride, hydrazines, cyanoacetamide, cyanacetohydrazide and urea derivatives to afford the thiophene 4, 4H-thiopyran 6, 4H-1,2-oxazine 8, 4H-pyrazides 10a,b, the pyridine 15, pyrrolo[1,2-b]pyridazine 17 and the N-substituted-pyrole derivatives 19a,c respectively.
Synthesis and Molluscicidal Activity of New Chromene and Pyrano[2,3-c]pyrazole Derivatives

Fathy M. Abdelrazek, Peter Metz, Olga Kataeva, Anne Jäger and Sherif F. El-Mahrouky

The chromene derivative 4 reacts with acetic anhydride, phenylisothiocyanate and ethyl orthoformate to afford the N-acetyl derivative 6, the chromenopyrimidine 8 and the formimidate 9, respectively. 2-(1H-Indol-3-ylmethylene)-malononitrile 10b reacts with 1,3-cyclohexanedione and dimedone 11a, b to afford the 4(3-indolyl)-chromene derivatives 12a, b respectively, and with the pyrazolone derivatives 13a-d to afford the arylidene exchange derivatives 14a-c and the pyranopyrazole derivative 15, respectively. The arylidene derivatives 10a, b react also with indane-1,3-dione 16 to afford the arylidene exchange derivatives 18a, b. The molluscicidal activity of the synthesized compounds towards Biomphalaria alexandrina snails, the intermediate host of Schistosoma mansoni, was investigated and most of them showed weak to moderate activity.
Abstract:
2-cyanoethanthioamide reacted with 1H-indole-3-carbaldehyde to give the corresponding
2-cyano-3-(1H-indol-3-yl)prop-2-enethioamide in a very good yield, which in turn, reacted with
2,4-pentanedione to give 5 cetyl-1,2-dihydro-4(1H-indol-3-yl)-6-methyl-2-thioxo-
pyridine-3-carbonitrile. The synthetic potential of this product examined through its reaction with
several active halogen-containing reagents, to give the corresponding thieno[2,3-b]pyridine
derivatives. The data of elemental analyses as well as that of IR (cm\(^{-1}\), 1H NMR (\(\delta\)ppm), and mass
spectra elucidated structures of all newly synthesized heterocyclic compounds. All newly
synthesized heterocyclic compounds were evaluated as antibacterial and control for GST, GSH
enzyme level.

Keywords:
2-Cyanoethanthioamide; 1H-Indole-3-Carbaldehyde; Prop-2-Enethioamide; 2-
Thioxopyridine-3-Carbonitrile; Thieno [2,3-B] Pyridine
Abstract:
Nicotinaldehyde reacted with 2-cyanoethane-thioamide to give 2-cyano-3-pyridinylprop-2-enethio-amide, which reacted with a second mole of 2-cyano-ethanethioamide to give the corresponding 6'-amino-2'-thioxo-1',2'-dihydro-3',4'-bipyridine-3',5'-dicarbonitrile. The synthetic potentiality of this compound investigated via its reaction with several active halogen-containing reagents to afford the corresponding thieno[2,3-b]pyridine derivatives whose structures elucidation based on the data of elemental analyses, and IR, 1H NMR, as well as mass spectra. Cytotoxicity, anti-HSV1, anti-HAV, and MBB activities were evaluated for all newly synthesized heterocyclic compounds. Some compounds were much safer for cell culture inoculation than the other ones. On the other hand, some compounds showed promising inhibition for both HSV1 and HAV viruses and other ones exhibit a moderate inhibition for these viruses.

Keywords:
2-Cyano-3-Pyridin-3-Yl-Prop-2-Enethioamide;2-CyanoethanethioamidBipyridine-3',5'-Dicarbonitrile; Nicotinaldehyde; Thieno[2,3-B]Pyridine;
Name: Prof. Fawzy Ali Attaby

Dep.: Chemistry

Title: Synthesis, Characterization, and Antiviral Activities of Pyridopyrazolotriazines

Fawzy A. Attaby, A. H. Elghandour, M. A. Ali and Yasser M. Ibrahem

Journal: Phosphorus, Sulfur, and Silicon

ISSN: 1042-6507 Impact Factor: 0.52

Abstract:
A pyrazolo[3,4-b]pyridine-5-carbonitrile derivative was diazotized to give the corresponding diazonium salt, which was used as a good synthon to synthesize pyrido[2,3-c:3,4]pyrazolo[5,1-c]triazines via its coupling with several active hydrogen-containing reagents, e.g., 2,4-pentandione, ethyl 3-oxo-butanoate, diethyl malonate, malononitrile, 2-cyanoethanethioamide, and ethyl cyanoacetate. Also, it reacted with phenylisothiocyanate to afford the corresponding pyrazolo[3,4-b]pyridin-3-ylphenylthiourea derivative, which, in turn, was used for further chemical transformations. The data of IR, 1H NMR, mass spectra, and chemical analyses elucidated the structures of all newly synthesized heterocyclic compounds. Cytotoxicity, anti-HSV1 and anti-HAV, and MBB activities were evaluated for all newly synthesized heterocyclic compounds.

Keywords:
2-Cyanoethanethioamide; Phenylisothiocyanate; Pyrazolo[3,4-B]Pyridine-5-Carbonitrile; Pyrazolo-[3,4-B]Pyridin-3-Ylphenylthiourea; Pyrido[2 ,3 :3,4]Pyrazolo[5,1-C]Triazines
Title: Optical Spectroscopic Studies of Perylene Dye Doped in Copolymer of ST/MMA as Solar Collector
G. M. Nasr, A. F. Mansour, R. M. Ahmed and A. H. Bassyouni

Journal: Polymeric Materials
ISSN: 0091-4037 Impact Factor: 0.34

Abstract:
Spectral characteristic of perylene dye doped in copolymer of ST=MMA was 10 studied. The changes in the optical absorption spectrum and optical parameters including the band tail width and band gap energies for the samples were investigated before and after irradiation by c-ray and also after a continuous exposure to filtered and UV radiation for 10 h. The study was extended to calculate the rate constants of photodegradation and the fluorescence quantum yield of the 15 samples.

Keywords:
Absorption spectra; Fluorescence; Gamma radiation; Perylene; Photostability

Name: Prof. Gamal Abdel-Nasr
Dep.: Physics
Name: Prof. Gamal Abdel-Nasr
Dep.: Physics

Title: Electrical Properties of Gamma-Irradiated ST/MMA Copolymers

Journal: Polymeric Materials
ISSN: 0091-4037 Impact Factor: 0.34

Abstract:
Copolymer films with various concentrations of Styrene (ST) and Methylmethacrylate (MMA) were prepared by thermal polymerization method. The films were exposed to different doses of gamma radiation up to 10 Mrad. The effects of e-radiation on the electrical properties were investigated for dosimetry applications.

Keywords:
Conduction mechanism; Copolymer; Dosimeter; Gamma radiation; PMMA; PS
Title: Metal Complexes of Schiff Base Derived from Sulphametrole and o-Vanilin Synthesis, Spectral, Thermal Characterization and Biological Activity

Gehad G. Mohamed, Carmen M. Sharaby

Journal: Spectrochimica Acta Part A

ISSN: 1386-1425  Impact Factor: 1.27

Abstract:
Metal complexes of Schiff base derived from condensation of o-vanilin (3-methoxysalicylaldehyde) and sulfametrole [Ni-(4-methoxy-1,2,5-thiadiazole-3-y)sulfanilamide] (H2L) are reported and characterized based on elemental analyses, IR, 1H NMR, solid reflectance, magnetic moment, molar conductance, mass spectra, UV–vis and thermal analysis (TGA). From the elemental analyses data, the complexes were proposed to have the general formulae [M2X3(HL)(H2O)5]•yH2O (where M = Mn(II), Co(II), Ni(II), Cu(II), Zn(II) and Cd(II)), X = Cl, y = 0–3; [Fe2Cl5(HL)(H2O)3]•2H2O; [(FeSO4)2(H2L)(H2O)4] and [(UO2)2(NO3)3(HL)(H2O)]•2H2O. The molar conductance data reveal that all the metal chelates were non-electrolytes. The IR spectra show that, H2L is coordinated to the metal ions in a tetradentate manner with ON and NO donor sites of the azomethine-N, phenolic-OH, enolic sulphonamide-OH and thiadiazole-N. From the magnetic and solid reflectance spectra, it is found that the geometrical structures of these complexes are octahedral. The thermal behaviour of these chelates shows that the hydrated complexes losses water molecules of hydration in the first step followed immediately by decomposition of the anions and ligand molecules in the subsequent steps. The activation thermodynamic parameters, such as, $E^*$, $\Delta H^*$, $\Delta S^*$ and $\Delta G^*$ are calculated from the DTG curves using Coats–Redfern method. The synthesized ligand, in comparison to their metal complexes also were screened for their antibacterial activity against bacterial species, Escherichia coli, Salmonella typhi, Bacillus subtillis, Staphylococcus aureus and Fungi (Aspergillus terreus and Aspergillus flavus). The activity data show that the metal complexes to be more potent/antimicrobial than the parent Schiff base ligand against one or more microbial species.

Keywords: Sulphametrole; o-Vanilin; Transition metal complexes; IR; 1H NMR; Conductance; Solid reflectance; Magnetic moment; Thermal analysis; Biological activity
Title: Synthesis, Characterization and Thermal Studies on Metal Complexes of New Azo Compounds Derived From Sulfa Drugs

Gehad G. Mohamed, Mohamed A.M. Gad-Elkareem

Journal: Spectrochimica Acta Part A

ISSN: 1386-1425  Impact Factor: 1.27

Abstract:
Four new azo ligands, L1 and HL2–4, of sulfa drugs have been prepared and characterized. [MX2(L1)(H2O)m]nH2O; [(MX2)2(HL2 or HL3)(H2O)m]nH2O and [M2X3(L4)(H2O)]nH2O; M= Co(II), Ni(II) and Cu(II) (X = Cl) and Zn(II) (X = AcO); m= 0–4 and n ≈ 0–3, complexes were prepared. Elemental and thermal analyses (TGA and DTA), IR, solid reflectance spectra, magnetic moment and molar conductance measurements have accomplished characterization of the complexes. The IR data reveal that HL1 and HL2–3 ligands behave as bidentate neutral ligands while HL4 ligand behaves as a bidentate monoionic ligand. They coordinated to the metal ions via the carbonyl O, enolic sulfonamide S(O)OH, pyrazole or thiazole N and azo N groups. The molar conductance data reveal that the chelates are non-electrolytes. From the solid reflectance spectra and magnetic moment data, the complexes were found to have octahedral, tetrahedral and square planar geometrical structures. The thermal behaviour of these chelates shows that the water molecules (hydrated and coordinated) and the anions are removed in a successive two steps followed immediately by decomposition of the ligand in the subsequent steps. The activation thermodynamic parameters, such as, E*, ΔH*, ΔS* and ΔG* are calculated from the TG curves applying Coats–Redfern method.

Keywords:
Sulfa drugs; Metal complexes; IR; Conductance; Solid reflectance; Magnetic moment; Thermal analysis
Title: Effect of Li2O and CoO-Doping of CuO/Fe2O3 System on its Surface and Catalytic Properties

Abstract:
Physicochemical, surface and catalytic properties of pure and doped CuO/Fe2O3 system were investigated using X-ray diffraction (XRD), energy dispersive X-ray analysis (EDX), nitrogen adsorption at 196 °C and CO-oxidation by O2 at 80–220 °C using a static method. The dopants were Li2O (2.5 mol%) and CoO (2.5 and 5 mol%). The results revealed that the increase in precalcination temperature from 400 to 600 °C and Li2O-doping of CuO/Fe2O3 system enhanced CuFe2O4 formation. However, heating both pure and doped solids at 600 °C did not lead to complete conversion of reacting oxides into CuFe2O4. The promotion effect of Li2O dopant was attributed to dissolution of some of dopant ions in the lattices of CuO and Fe2O3 with subsequent increase in the mobility of reacting cations. CoO-doping led also to the formation of mixed ferrite CoxCu1-xFe2O4. The doping process of the system investigated decreased to a large extent the crystallite size of unreacted portion of Fe2O3 in mixed solids calcined at 600 °C. This process led to a significant increase in the SBET of the treated solids. Doping CuO/Fe2O3 system with either Li2O or CoO, followed by calcination at 400 and 600 °C decreased its catalytic activity in CO-oxidation by O2. However, the activation energy of the catalyzed reaction was not much affected by doping.

Keywords:
CuFe2O4; Li2O-doping; Coprecipitation; CO Oxidation; EDX; XRD
Abstract:
The catalytic conversion of isopropanol was carried out over pure and Li2 O-doped (0.75–4.5 mol%) cobalt ferrite prepared by heating Fe/Co mixed hydroxides at 400 and 600 °C. The techniques employed were XRD, N2 adsorption at −196 °C and conversion of isopropanol at 200–400 °C using a flow method. The results showed that Li2 O-doping and increasing the heating temperature of the system investigated from 400 to 600 °C stimulated CoFe2O4 formation also. Pure and variously doped solids were moderately crystallized CoFe2O4 phase having a crystallite size varying between 5 and 15 nm. The SBET of various solids was found to decrease by increasing their calcination temperature and also by doping with 4.5 mol% Li2 O. However, this treatment, resulted in a significant increase in their catalytic activities which much increased by doping. The presence of 1.5 mol% Li2 O brought about an increase in the catalytic activity, measured at 300 °C, of 97% and 65% for the solids being calcined at 400 and 600 °C, respectively. All solids investigated behaved as dehydrogenation catalysts (having selectivities to acetone formation above 95%). The doping process did not alter the mechanism of dehydrogenation of isopropanol, but increased the concentration of active sites involved in the catalyzed reaction.

Keywords:
Dehydrogenations; Dehydration of isopropanol; Li2O-doping; Nanocrystalline CoFe2O4
Name: Prof. Hamdy Mahmoud Hassaneen

Dep.: Chemistry

Title: Studies with 6,7-Dimethoxy-3,4-dihydroisouquinolin-1-yl-acetonitrile: Novel Syntheses of 1-Azolyl- and Pyridoisoquinolines

Huwaida M. E. Hassaneena, Enas M. Awadb and Hamdi M. Hassaneena

Journal: Z. Naturforsch

ISSN: 0932-0776 Impact Factor: 0.825

Abstract:
The reaction of 3,4-dihydroisoquinolin-1-yl-acetonitrile with DMFDMA afforded the enaminonitrile 5. Compound 5 was reacted with 2-aminobenzimidazole to yield 4 amino-3-(dihydroisoquinolin-1-yl)-benzo[4,5]imidazo[1,2-a]pyrimidine (11) and with acetonitrile derivatives to afford pyrido[2,1-a]isoquinolines (15a – g).

Keywords:
(6,7-Dimethoxy-3,4-Dihydroisouquinolin-1-yl)-Acetonitrile; Enaminonitrile; 2-Aminobenzimidazole malononitrile; DMFDMA
Abstract:
A comparative study was made between developed chemically modified carbon paste electrodes and PVC membrane electrodes for the cationic surfactant cetyltrimethylammonium bromide (CTAB). The carbon paste electrode modified with cetyltrimethylammonium-tetrachloropalladate(II) (CTA-TCIP) provides a more sensitive and stable device than that shown by electrodes with an inner reference solution. The best performance was obtained by an electrode based on the paste containing 3.6 wt% CTA-TCIP, 1.8 wt% ethylhexadecyldimethylammonium bromide, 37.6 wt% graphite and 57 wt% tricresyl phosphate. The sensor exhibited a Nernstian response for CTAB over a wide concentration range of 3.5 × 10–7 to 1.0 × 10–3 M with a detection limit of 2.0 × 10–7 M between pH 2.7 and 8.2 with a fast response time of ≤15 s. The electrode showed excellent selectivity for CTAB over a large number of ions. Interferences caused by common cationic surfactants have been investigated in simulated mixtures containing high concentration levels of interfering surfactants, and the sensor was found to be tolerant against these compounds.

Huwaida M. E. Hassaneen

ISSN: 1424-6376  Impact Factor: 0.8

Abstract:
6-Amino-2-thioxo-1,2,3,4-tetrahydropyrimidin-4-one 1 reacted with a mixture of formaldehyde and indane-1,3-dione 7 in one-pot synthesis to yield the tetracyclic system 11a. On the other hand, the dihydro derivatives 10b-f were isolated when a mixture of 1 and 7 reacted with aromatic aldehydes. Compounds 11 reacted with hydrazonoyl chlorides 5 to yield the title compounds 12. The proposed structures of the newly synthesized compounds are based on spectral data and are confirmed by alternative method.

Keywords:
Indane-1,3-dione; X-ray; Hydrazonoyl chloride; 6-Amino-2-Thioxo-1,2,3,4-Tetrahydropyrimidin-4-one
Title: Studies with 2-(Arylhydrazono)aldehydes: Synthesis and Chemical Reactivity of Mesoxalaldehyde 2-Arylhydrazones and of Ethyl 2-Arylhydrazono-3-oxopropionates

Saad Makhseed, Huwaida M. E. Hassaneen and Mohamed H. Elnagdi

Journal: Z. Naturforsch

ISSN: 0932-0776 Impact Factor: 0.825

Abstract: The coupling reaction of 3-(dimethylamino)acrolein (2a) and ethyl 3-(dimethylamino)acryhite (2b) with arenediazonium chlorides afforded the 2-(arylhydrazono)aldehydes la-e. Compounds la, b reacted with hydroxylamine hydrochloride to yield the oximes 4a, b. The dioxime 5 was obtained from reacU9Q of la with an excess of hydroxylamine hydrochloride. This dioxime afforded the 1,2,3-triazole Carbonitrile.6 when treated with acetic anhydride, while a-hydrazone pro¬pionitrile 8 was obtained when 5 was treated with acetic acid. Compounds la - e could be utilized for the synthesis of a variety of pyrazoles and arylazolopyrimidines via reaction with hydrazines, haloketones and aminoazoles, respectively.

Keywords: 2-Arylhydrazonopropane-1,3-dial; 2-Aryl-1,2,3-triazole-4-Carbonitrile; Formazanes
Title: New Approach to 4- and 5-Aminopyrazole Derivatives
Huwaida M. Hassaneen

Journal: Synthetic Communications
ISSN: 0039-7911
Impact Factor: 1.001

Abstract:
3-Oxo-3-(pyrrol-2-yl)-propanenitrile 1 coupled with aromatic diazonium salts to yield the corresponding 2-arylhydrazones 2a–c. The latter products reacted with chloroacetonitrile and ethyl chloroacetate to yield 4-aminopyrazole derivatives 5a–f. Reaction of 2 with hydrazine hydrate led to formation of 5-amino-4-arylazopyrazole 6a–c. Compound 1 reacted also with trichloroacetonitrile to yield enamine 7, which in turn reacted with hydrazine hydrate to yield 5-amino-3-(pyrrol-2-yl)-pyrazole-4-carbonitrile 8.

Keywords:
4-Amino and 5-Aminopyrazoles; Dimethyl formamide dimethylacetale; Enamine; 3-oxo-3-(pyrrol-2-yl)-Propanenitrile
Title: Alkylazinylcarbonitriles as Building Blocks in Organic
Synthesis: Synthesis Of 3-Amino-7-Arylhyrazonothieno-7
H-[3,4-C]-Pyridine 4,6-Diones and Pyrido-[3,4-C]-Pyridazine-5-Carbonitrile

Saleh Mohamed Al-Mousawi, Ismail A. Abdelhamid and Moustafa Sherief Moustafa

Journal: Arkivoc
ISSN: 1424-6376  Impact Factor: 0.8

Abstract:
A series of 5-aryldiazonol-1,2,5,6-tetrahydro-1,4-dialkyl-2,6-dioxopyridine-3-carbonitriles 4 has been prepared and reacted with elemental sulfur to yield the thieno[3,4-c]pyridine-4,6-dione 5. Reaction of 5 with dimethyl acetylenedicarboxylate afforded arylazoisoquinolines 7. Condensation of 4 with dimethylformamide dimethylacetal afforded pyrido[3,4-c]pyridazine-5-carbonitrile 9.
Abstract:
Reactions of arene and heteroaromatics diazonium salts with active methylene compounds having cyano group have been illustrated to afford hydrazonoalkanenitriles with a range of substituents. Structural investigation for hydrazonoalkanenitriles has been made. Furthermore the reactivity of hydrazonoalkanenitriles towards nucleophilic and electrophilic reagents has been displayed.
Abstract:
Treatment of 3-(3-methylbenzofuran-2-yl)-3-oxopropanenitrile (1) with phenyl isothiocyanate afforded the thioacetanilide derivative 3, which when reacted with α-haloketones, α-halodiketones, and hydrazoneyl chlorides gives thiophene, 1,3-oxathiole, and 1,3,4-thiadiazole derivatives 6a,b,10a,b and 14a-g, respectively. Treatment of 3-methyl-2-benzofuran carboxylic acid hydrazide (15) with benzaldehyde followed by bromine afforded the 1,3,4-oxadiazole derivative 18. Treatment of the acid hydrazide15 with phenyl isothiocyanate gave the thiosemicarbazide 20. Compound 20 could be converted into 1,3,4-oxadiazole, 1,2,4-triazole-3-thione, and 1,3,4-thiadiazole derivatives 21, 22, and 23, respectively.
Title: Microwave-accelerated Mizoroki-Heck and Sonogashira cross-coupling reactions in water using a heterogeneous palladium(II)-precatalyst

Kamal M. Dawood, Wladimir Solodenko and Andreas Kirschning

Journal: Arkivoc

ISSN: 1424-6376  Impact Factor: 0.8

Abstract:
The catalytic activity of a 2-pyridinealdoxime-based Pd(II)-complex covalently anchored via the oxime moiety to a glass/polymer composite material was evaluated both under thermal as well as microwave (µw) irradiating conditions in water in Mizoroki-Heck as well as Sonogashira C-C cross-coupling reactions. Synthesis of benzo[b]furan derivatives via Sonogashira cross coupling reaction was achieved when ortho-halo-phenols were employed as aryl halides. The stability and reusability of this Pd-precatalyst was part of the present study.

Keywords: Catalysis; Immobilization; Microwave; Mizoroki-Heck reaction; Palladium; Sonogashira reaction
Abstract:
The catalytic activity of benzothiazole-based Pd(II)-complexes was evaluated in Suzuki–Miyaura and Heck–Mizoroki C–C cross-coupling reactions of aryl chlorides and bromides with olefins and arylboronic acids both under thermal as well as microwave irradiation conditions in water. The factors affecting the optimization of such reactions as well as the reusability of the Pd-precatalysts are studied.

Keywords:
Pd(II) Precatalysts; Microwave irradiation; Suzuki–miyaura; Heck–mizoroki cross-coupling reactions.
Title: Evaluation of Cysteine as Environmentally Friendly Corrosion Inhibitor for Copper in Neutral and Acidic Chloride Solutions

Khaled M. Ismail

Journal: Electrochimica Acta

ISSN: 0013-4686 Impact Factor: 2.955

Abstract:
The efficiency of cysteine as a non-toxic corrosion inhibitor for copper metal in 0.6 M NaCl and 1.0 M HCl has been investigated by electrochemical studies. Potentiodynamic polarization measurements and electrochemical impedance spectroscopy “EIS” were used to study the effect of cysteine on the corrosion inhibition of copper. Inhibition efficiency of about 84% could be achieved in chloride solutions. The presence of Cu2+ ions increases the inhibition efficiency to 90%. Potentiodynamic polarization measurements showed that the presence of cysteine in acidic and neutral chloride solutions affects mainly the cathodic process and decreases the corrosion current to a great extent and shifts the corrosion potential towards more negative values. The experimental impedance data were analyzed according to a proposed equivalent circuit model for the electrode/electrolyte interface. Results obtained from potentiodynamic polarization and impedance measurements are in good agreement. Adsorption of cysteine on the surface of Cu, in neutral and acidic chloride solutions, follows the Langmuir adsorption isotherm. The adsorption free energy of cysteine on Cu (C−25 kJ mol−1) reveals a strong physical adsorption of the inhibitor on the metal surface.

Keywords: Copper; Cysteine; Adsorption; Inhibitor; Chloride ions
Title: Electrochemical Preparation and Kinetic Study of Poly(o-tolidine) in Aqueous Medium

Khaled M. Ismail

Journal: Electrochimica Acta

ISSN: 0013-4686 Impact Factor: 2.955

Abstract:
Poly(o-tolidine), PoT, film was prepared by electrochemical oxidation of the monomer, oT, in 0.1 M HCl + 0.1 M KClO4. The presence of KClO4 in the formation medium was found to be essential for the electropolymerization process to proceed. Increasing the upper potential limit up to +1.5 V, instead of +1.0 V, leads to appearance of a new anodic peak at +1.36 V and enhancement of the polymer formation of PoT without changing the film structure. The electrochemical behavior of the formed polymer films was investigated in 1.0 M HClO4. The kinetic parameters were calculated from the values of the charge consumed during the electropolymerization process. The rate of the polymerization reaction was found to depend on the concentration of the monomer rather than the electrolyte. The polymerization rate is first order with respect to the monomer concentration and zero order with respect to the electrolyte. The electrolyte plays no active role in the kinetics of the electropolymerization process and its role is most likely limited to polymer doping.

Keywords:
Poly (o-tolidine); Electropolymerization; Kinetics; Chronoamperometry; Potential limit; Reaction
Abstract:
Phenyl urea derivatives have been prepared and investigated as photo stabilizers for rigid PVC by measuring the extent of weight loss (%), the amount of gel formation as well as the intrinsic viscosity of the soluble fractions of the degraded polymer. Moreover, the efficiency of these stabilizers was evaluated from the extent of discoloration of the degraded polymer in their presence. The results indicated a reasonable stabilizing effect of these derivatives when compared with the commercially used UV stabilizers: phenyl salicylate (Salol) and methanone, 2-hydroxy-4-(octyloxy)-phenyl-benzophenone. A synergistic effect is achieved when the phenyl urea derivatives are mixed with the UV absorbers in the ratio (75 : 25%), respectively. A radical mechanism is proposed to account for the stabilizing action of the products investigated.

Keywords:
Poly(vinyl chloride); UV absorbers; Phenyl Urea Derivatives; Intrinsic Viscosity; Gel Content; Weight Loss; SEM
Title: Organic Thermal Stabilizers For Rigid Poly(Vinyl Chloride). Part XIII: Eugenol (4-Allyl-2-Methoxy-Phenol)
Magdy W. Sabaa and Riham R. Mohamed

Journal: Polymer Degradation and Stability
ISSN: 0141-3910 Impact Factor: 2.174

Abstract:
Eugenol (4-allyl-2-methoxy-phenol) has been examined as a thermal stabilizer and co-stabilizer for rigid PVC in air, at 180 oC. Its high stabilizing efficiency is detected by its high thermal stability value (Ts) when compared with some of the common reference stabilizers used industrially such as dibasic lead carbonate, calcium-zinc soap and octyl tin mercaptide.
Blending this organic stabilizer with some of the reference stabilizers in different ratios had synergistic effect on both the induction period and the dehydrochlorination rate together with the longer extent of discolouration of PVC stabilized by Eugenol as compared with the blank and the samples stabilized with reference commercial stabilizers.
A probable mechanism for the stabilizing action of Eugenol has been proposed. The stabilizing efficiency is attributed partially to the stabilizer’s ability to intervene in the radical chain degradation process of PVC and to the replacement of the labile chlorine atoms on PVC chains by a relatively more stable moiety of the organic stabilizer.

Keywords:
Poly(vinyl chloride); Eugenol; Induction period (Ts); Degradation; Thermal stability; Extent of discolouration
Abstract:
In the present study, the effects of ionizing radiation of Cs-137 and Co-60 from 4.95 to 743.14 Gy and from 40 Gy to 300 kGy, respectively, on some bovine hemoglobin characteristics were studied. Such an effect was evaluated using electron paramagnetic resonance (EPR) spectroscopy, and infra-red (IR) spectroscopy. Bovine hemoglobin EPR spectra were recorded and analyzed before and after irradiation and changes were explained in detail. IR spectra of unirradiated and irradiated Bovine hemoglobin were recorded and analyzed also. It was found that ionizing radiation may lead to the increase of free radicals production, the decrease in a-helices contents, which reflects the degradation of hemoglobin molecular structure, or at least its incomplete performance. Results also show that the combined application of EPR and FTIR spectroscopy is a powerful tool for determining structural modification of bovine hemoglobin samples exposed to gamma irradiation.

Keywords:
EPR; ESR; Radiation; Bovine; Hemoglobin
Abstract:
Using frequency response analyzer covering a frequency range from 102–106 Hz in a wide range of temperature, the dielectric behavior of the investigated systems was studied. In order to investigate the relaxation mechanisms of such systems, the dielectric loss data on the frequency domain were analyzed using Havriliak-Nagami and/or Frohlich functions in addition to the conductivity term. These mechanisms are discussed in terms of the orientation of the main chain and its related motions. The relaxation times related to both mechanisms noticed for PHB/PVAc blend with composition 50% are found to be higher than those for other compositions. This could be attributed to the interaction expected through hydrogen bond formation. This result is supported by the data given by FTIR spectroscopy as the carbonyl region at 1750 cm\(^{-1}\) showed a more broad band spectrum when compared with those for the other compositions.

Keywords:
Dielectric Relaxation; Spectroscopy; Polyhydroxy-Butyrate PHB; Polyvinyl Acetate; PVAc and Poly(Vinylacetate-Co-vinyl Alcohol) PACA
Investigation of the Relaxation Behavior of Novel Terpolymers of Acrylonitrile, Methyl Methacrylate and Indene

Sayed Z Mohammady, Said S Elkholy and Maher Z Elsabee

Abstract:
Terpolymer samples were prepared by free radical polymerization of methyl methacrylate (MMA), indene (In) and acrylonitrile (AN) in bulk. The samples were chosen so that the molar ratio of AN to MMA varied from 1.00:4.39 to 1.00:0.83, while the molar ratio of In was kept almost unchanged. The glass transition temperatures (Tg) of the samples were determined using differential scanning calorimetry. Moreover, isochronal dynamic mechanical measurements of the complex bending modulus as well as the complex dielectric permittivity were carried out over wide temperature ranges, namely from 50 to 190 °C, depending on the material investigated. All samples exhibited a single common Tg value, which increased to higher temperature upon increasing the content of AN. In addition, the results were investigated quantitatively in the framework of a molecular model.

Keywords:
Terpolymers; Free Radical Polymerization; Complex Bending
Abstract:
Modification of chitosan by grafting with vinyl acetate (VAc) was carried out using potassium persulfate and sodium bisulfite as redox initiators. The effect of monomer, initiator concentration, time, and temperature was studied. The grafted samples were subjected to alkaline hydrolysis and the polyvinyl acetate (PVAc) branches were consequently partially converted into polyvinyl alcohol (PVA) graft, which showed enhanced swelling in water. The graft copolymers showed a better dye uptake for both acidic and basic dyes. Chitosan/VAc and chitosan/VAI copolymers were both subjected to reaction with dimethyl sulfate in alkaline medium to yield quaternized copolymers. The antifungal behavior of chitosan and its graft copolymers was investigated in vitro on the mycelial growth, sporulation, and germination of conidia or sclerotia of the following sugarbeet: Beta vulgaris pathogens isolated in Egypt, Rhizoctonia solani Ku’hn (AG2-2), Sclerotium rolfsii Sacc. and Fusarium solani (Mart.) Sacc. These polymers were also screened against several fungi and it has been found that grafting with polyvinyl alcohol branches enhances the antifungal activity dramatically.

Keywords:
Chitosan; Graft Copolymer; Vinyl Acetate; Hydrolysis; Dye Uptake; Swelling; Quaternization; Antifungal Activity
Abstract:
Oxygen evolution reaction (OER) at flow-through porous anode was simulated with the aid of a mathematical model. The OER was assumed to be the only reaction takes place at the electrode. The model accounts for effects of the kinetics, ohmic, hydrodynamics, structural parameters and bubble formation on the potential and current distributions within the electrode and on the overall performance of the electrode. The latter was evaluated via interpretation of the polarization curves of the OER at porous anode. The model results were discussed in the light of some controlling dimensionless groups. The conductivities of both the electrolyte and the solid matrix have dramatic effects on the general behavior of the porous anode and lower performance of the electrode was observed when both and/or one of them have limited conductivity values. The electrode potential and hence the power required to attain a specific current (rate) is highly dependent on the degree of bubble formation within the bed matrix. The model predictions were compared with collected experimental data of OER from flowing sulfuric acid solution at Pt-loaded reticulated vitreous carbon. Good agreements were obtained at the employed experimental conditions. The present work helped to understand the anode performance for further application for simultaneous gas evolution e.g., O2 and O3 gases.

Keywords:
Oxygen; Anode; Mathematical Modeling; Bubbles; Porous
Title: Azimuthal Angle Dependence of Coulomb and Nuclear Interactions Between Two Deformed Nuclei

M. Ismail, A. Y. Ellithi, M. M. Botros and A. E. Mellik

Abstract:
The azimuthal angle (φ) variation of the Coulomb and nuclear heavy ion (HI) potentials is studied in the framework of the double folding model, which is derived from realistic nuclear density distributions and a nucleon-nucleon (NN) interaction. The present calculation shows that the variation of HI potentials with the azimuthal angle depends strongly on the range of the NN forces. For the long-range Coulomb force, the maximum variation with φ is about 0.9%, and for HI potential derived from zero-range NN interaction the φ-variation can reach up to 90.0%. Our calculations are compared with the recent φ-dependence of the HI potential derived from proximity method. The present realistic φ-dependence calculations of the HI potential is completely different from the results of the proximity calculations.
Title: The Accelerating Expansion of the Universe and Torsion Energy

Mamdoh I. Wanas

Abstract:
In the present work, it is shown that the problem of the accelerating expansion of the Universe can be directly solved by applying Einstein geometrization philosophy in a wider geometry. The geometric structure used to fulfil the aim of the work is a version of Absolute Parallelism geometry in which curvature and torsion are simultaneously non-vanishing objects. It is shown that, while the energy corresponding to the curvature of space-time gives rise to an attractive force, the energy corresponding to the torsion indicates the presence of a repulsive force. A fine tuning parameter can be adjusted to give the observed phenomena.

Keywords:
Dark energy; Torsion; Anti-Gravity
On the Relation Between Mass and Charge: A Pure Geometric Approach

Mamdoh I. Wanas

Title: Geometric Methods in Modern physics
ISSN: 0219-8878 Impact Factor: 0.769

Abstract:
A new solution of the field equations of the generalized field theory, constructed by Mikhail and Wanas in 1977, has been obtained. The geometric structure used, in the present application, is an absolute parallelism (AP)-space with spherical symmetry (type FIGI). The solution obtained represents a generalized field outside a charged massive central body. Two schemes have been used to get the physical meaning of the solution: The first is related to the metric of the Riemannian space associated with the AP-structure. The second is connected to a covariant scheme known as Type Analysis. It is shown that the dependence on both schemes for interpreting the results obtained, is more better than the dependence on the metric of the Riemannian space associated with the AP-structure. In General, if we consider the solution obtained as representing a geometric model for an elementary charged particle, then the results of the present work can be summarized in the following points: (i) It is shown that the mass of the particle is made of two contributions: The first is the gravitational contribution, and the second is the contribution due to the existence of charge. (ii) The model allows for the existence of a charged particle whose mass is completely electromagnetic in origin. (iii) The model prevents the existence of a charged massless particle. (iv) The electromagnetic contribution, to the mass, is independent of the sign of the electric charge. (v) It is shown that the mass of the electron (or a positron) is purely made of its charge.

Keywords:
Unified field theories; Exact solutions; Electromagnetism; Elementary particles; Absolute parallelism
Methanol electro-oxidation is investigated at graphite electrodes modified with various platinum and nickel nano-particle deposits using cyclic voltammetry. The modified electrodes are prepared by the simultaneous electrodeposition of metals from their salt solutions using potentiostatic and galvanostatic techniques. They show enhanced catalytic activity towards methanol oxidation in KOH solution. The catalytic activity of platinum nano-particles is found to be significantly affected by the presence of relatively small amounts of nickel deposits. A comparison is made between the electrocatalytic activity of Pt/C and (Pt-Ni)/C electrodes. The results show that the methanol electro-oxidation current increases with an increase in the nickel content. In particular, the highest catalytic activity is achieved for platinum to nickel deposits of 95%/5% (wt-%), in other cases the catalytic activity decreases. It is found that Ni enhances the catalytic activity of Pt by increasing the number of active sites, as well as through an electron donation process from Ni to Pt. This process takes place once the nickel hydroxide (Ni(OH)2)/nickel oxy-hydroxide (NiOOH) transformation begins. The effect of the methanol concentration on the methanol oxidation reaction is investigated. The order of reaction, with respect to methanol, at the modified (Pt-Ni)/C electrode is found to be 0.5.

**Keywords:**
Alkaline Media; Electrocatalyst; Methanol Fuel Cells; Nano-Particles; Platinum-Nickel
Abstract:
Carbon fibres have high reactivity and poor wetting characteristics with most molten metals. These drawbacks cause difficulties in fabricating metal matrix composites reinforced with carbon fibres. One solution to overcome these drawbacks is to apply a compatible metal or metal carbide layer on carbon fibres. In this investigation, a very thin coating of either chromium or chromium carbide was applied on carbon fibres of the PAN type. The coated fibres were used to reinforce the Cu matrix using two fabricating techniques, namely vortex and powder metallurgy. The loading of coated carbon fibre in the matrix in both fabricating techniques was 5%. For comparison, uncoated carbon fibres were also used to reinforce the Cu matrix using the same fabricating techniques. The fabricated composites resulting from different techniques and different coatings were evaluated and compared in terms of transverse rupture strength (TRS), electrical conductivities, hardness and density measurements. The results indicated that the composite reinforced with Cr carbide-coated carbon fibres showed the highest TRS, electrical conductivities and densities, while the composites made from uncoated carbon fibres exhibited the lowest properties. A Cu matrix reinforced with Cr coated carbon fibres composites has intermediate properties between the other two composites.
Title: Preparation and Characterization of the Porous (TiO2) Oxide Films of Nanostructure for Biological and Medical Applications

Rabab A. El-Serief, Sahar A. Fadl-allah and Mohamad Waheed A. Badawy

Abstract:
Titanium and its alloys are vital important materials because of their intrinsic mechanical properties (high strength, fatigue resistance), chemical stability (corrosion resistance) and high strength-to-density ratio. Crystalline titanium oxide (TiO2) film is of great interest in many applications e.g. photoelectronic, optical devices, gas sensors, photocatalysts and as biomaterials. In hot concentrated sulfuric acid, titanium and its alloys produce oxide films with interference colors depending on the thickness of the formed oxide film. Since biological tissues are known to interact with the outermost atomic layer of an implant, so the surface oxide properties of the implant play an important role in using Ti and Ti alloys as biomaterials. Increasing the surface area of the film is a promising way to achieve the desired functions because almost implant applications utilize interfacial reactions. Generally, when titanium and titanium alloys are anodized in aqueous solutions, oxide film is formed. This electrolytic process is called (Anodizing of titanium). Depending on the type of electrolytic solutions, pH, time of anodization, temperature and voltage of anodization, barrier-type oxide film or porous-type oxide film may be formed. The thickness of the porous film is the main point of view for using Ti and Ti alloys as biomaterials. This thickness depends on many factors such as anodization time, current density, and electrolyte temperature. In this study, the oxide films formed on titanium in sulfuric acid solutions with and without H2O2 additions have been investigated by electrochemical impedance spectroscopy (EIS). In absence of H2O2, the impedance response indicated a stable thin oxide film on titanium. However, the introduction of H2O2, into the solution resulted in significant changes in the EIS-spectra. The interpretation of the results is based upon a duplex layer model of the oxide film, consisting of a thin barrier-type inner layer and a porous outer layer. The H2O2 addition in the solution has led to a significant decrease in the corrosion resistance of titanium and also to a thickening of the porous outer layer. The results provide an explanation of the unexpected in vivo titanium oxide growth and ion incorporation into titanium implant oxide surfaces.

Keywords:
Impedance spectroscopy; Titanium; Oxide film; H2O2; Biomaterials.
Name: Prof. Mohamd Waheed Badawy
Dep.: Chemistry

Title: Porous Silicon Modified Photovoltaic Junctions An Approach to High-Efficiency Solar Cells
Waheed A. Badawy

Journal: American Institute of Physics (AIP)
ISSN: 0094-243X

Abstract:
The solution of the energy problems of our universe is based on the use of the ultimate source of energy, THE SUN, as the main source of useable energy. The trials to obtain solar cells of appropriate efficiency and suitable price represent one of the main tasks of different research groups over the whole world. In this respect silicon represent the main absorber of sun light that could be converted to electricity, photovoltaic cells, or to high energy chemical products, photoelectrochemical cells.
Photovoltaic and photoelectrochemical systems were prepared by the formation of a thin porous film on silicon. The porous silicon layer was formed on the top of a clean oxide free silicon wafer surface by anodic etching in HF/H2O/C2H5OH mixture (2:1:1). The silicon was then covered by an oxide film (tin oxide, ITO or titanium oxide. The oxide films were prepared by the spray/pyrolysis technique which enables the incorporation of foreign atoms like In, Ru or Sb in the oxide film matrix during the spray process. The incorporation of foreign atoms improves the surface characteristics of the oxide film which leads to the improvement of the fill factor and higher solar conversion efficiency.
The prepared solar cells are stable against environmental attack due to the presence of the stable oxide film. It gives relatively high short circuit currents (Isc) compared to our improved silicon single crystal solar cells, due to the presence of the porous silicon layer, which leads to the recorded high conversion efficiency. Although the open-circuit potential (Voc) and fill factor (FF) were not affected by the thickness of the porous silicon film, the short circuit current was found to be sensitive to this thickness. An optimum thickness of the porous film and also the oxide layer is required to optimize the solar cell efficiency. The results represent a promising system for the application of porous silicon layers in solar energy converters. The use of porous silicon instead of silicon single crystals in solar cell fabrication and the optimization of the solar conversion efficiency will lead to the reduction of the cost as an important factor and also the increase of the solar cell efficiency making use of the large area of the porous structures

Keywords: Porous Silicon; Photovoltaics; Photoelectrochemical Cells; Tin Dioxide; Titanium Oxide.
Title: Conducting poly(N-(1-Naphthyl) ethylene-diamine dihydrochloride) electro polymerization, characterization and electroanalytical applications and electroanalytical applications

Name: Prof. Mohamd Waheed Badawy

Dep.: Chemistry

Journal: Appl Electrochem

Abstract:
Uniform conducting polymer films of poly(N-(1-Naphthyl) ethylene-diamine dihydrochloride), PNED, were prepared conveniently and reproducibly by the anodic oxidation of the monomer, N-(1-Naphthyl) ethylene-diamine dihydrochloride, NED, in an acidic aqueous solution using the conventional potentiodynamic technique. The different parameters influencing the preparation conditions like monomer concentration, solvent constitution, scan range, scan rate, scan repetition, rotation speed of the working electrode and the type of the substrate were investigated and the optimum preparation conditions are specified. The stability of the prepared films was tested in both aqueous and non-aqueous media. The characteristics of the polymer films and their electrochemical activity towards catalyzing some technologically promising redox reactions were also examined. The films were found to be very stable in aqueous solutions and in some organic solvents like acetone, acetonitrile, and chloroform and dimethyl sulfoxide. The film stability was found to depend on the solution pH. The polymer films were capable of catalyzing the redox processes of several natural products and amino acids e.g. vitamin C and glycine. The polymer film possesses electrochromic properties and the color of the film changes from purple to violet to dark blue and then to brown according to the preparation and/or polarization conditions. The electrochromic properties are related to polaron formation, which subsequently oxidizes to diimine species followed by the oxidation of the aromatic ring. The mechanism of the polymerization process was investigated and discussed. The process involves deprotonation reactions and a head-to-tail coupling of the oxidized monomer with cation radicals.

Keywords:
Aqueous media; Biosensors; Electrochromic properties; Electropolymerization; N-(1-Naphthyl) ethylene-diamine dihydrochloride

ISSN: 0021-891X
Impact Factor: 1.409
Abstract:
The electrochemical behavior, especially the corrosion and passivation, of a Cu–Al bronze was investigated. Conventional electrochemical techniques including open-circuit potential, anodic polarization, cyclic voltammetry and electrochemical impedance spectroscopy were used. It was found that the addition of chloride ion up to 0.15 M in 0.5 M Na2SO4 solution decreases the corrosion rate due to the formation of CuCl, whereas at higher concentration of the chloride ion, the corrosion rate increases due to the formation of the soluble CuCl2. The activation energy was found to be 10 kJ mol−1. This value indicates that the corrosion process is under diffusion control. The impedance measurements showed that the passive film can be represented by a duplex layer, a relatively thick porous outer film on top of a thin compact layer. An equivalent circuit was used to explain and analyze the impedance data. The model includes another R-C combination and Warburg impedance in addition to the simple Randles cell to account for the spontaneously formed passive film and the diffusion phenomena.

Keywords:
Aluminium Bronze; Corrosion; Chloride; Cyclic Voltammetry; Impedance; Sulfa
Title: The Effect of Curing Time and Porosity on the Microstructure Hydrated Products in Some Blended Cement Pastes.
A.E.Al-Salami, M.S.Al-Assiri, A.Al-Hajry, M.A.Ahmed and S.Taha

Journal: Silicate Industrial
ISSN: 0037-5225 Impact Factor: 0.198

Abstract:
This study investigated the effects of the curing time, water/cement ratio (w/c) and the types of the additive materials on the morphology and microstructure of the hydrated CSH and CH phases in some blended cement pastes. The blended cement paste is composed from ordinary Portland cement (OPC) (M 0), (35% fly ash +65% OPC) (M01), (35% slag +65%OPC) (M02) and (35% fly ash + 35% slag +30%OPC) (M03), by weight. The samples having w/c ratio (0.25, 0.30, up to 0.40), and curing time (3, 28) days at room temperature ≈20°C. The hydration products of these samples were examined by X-Ray diffraction, Scanning electron microscopy, accompanied by the EDX analysis. The experimental results showed that the main hydration products formed from the hydration are CSH and CH phases, which are increased with the curing time. The changes in the CSH hydrated phases are controlled by the w/c ratios, which are leading to the changes in the local porosity inside the matrix of the system, and the changes in the CH hydrated phases are depending on the activity of the additive materials to the OPC matrix. The microstructure of the blended cement paste are more clearly depending on the Ca/Si ratio in the M0, M01, M 02 and M03 system. The ratio of Ca/Si on the M 03 system, can be consider as the optimum ratio, because this ratio is leading to the modification and durability of the microstructure of this system, by comparing with the other systems. So that, from this result, we can consider the admixture of (fly ash +slag) with the OPC matrix as a pozzolanic material.
Abstract:

Changes in the dielectric constant (ε) can be used to monitor the hydration process and characterize the development of microstructure in blended cement paste. The behavior of the dielectric constant (ε) for cement mixtures has been studied in the initial stages of setting (during 6 hours) to correlate the evolution of this electrical parameter with the physical and microstructure modifications. In this investigation, the effect of curing temperature (20, 30 and 40°C), w/c ratio (0.20, 0.25 ... up to 0.40) and additive materials on the hydration characteristics of blended cement was studied. The blended cement used in this investigation consists of ordinary Portland cement (OPC) (M0) and mixed with either 35% fly ash (M01), or 35% slag (M02) and (35% fly ash + 35% slag) (M03). The dielectric constant of the cement paste will be dependent on, for example the changes in the physical state of water and ionic concentrations within the mixing water (the case with which dipoles and polar molecules can move within the paste) and the degree of association of the system. During the first 24h after mixing with water, C3S in cement clinker will, perhaps have the greatest influence upon the electrical response. Clearly the dielectric constant (ε) increases as the w/c ratio increases. This result is mainly associated with the increase of the total porosity of hydrated pastes which are filled with capillary water containing the concentrations of free ions. Results also indicate that the optimum conditions for enhancement of the hydration process inside the matrix of the mortar occurs at ≈ 30°C and w/c ratio ≈ (0.30-0.35). That may suggest an increase in the pozzolanic effect (pore structure density) of the admixture materials to the M0 matrix (especially in the M03 system) in the early stages under this particular condition.

Title: Study of the Effect of Admixture on the Dielectric Behavior of Blended Cement Pastes at Different Conditions

A. E. Al-Salami, A. Al-Hajry, M. A. Ahmed and S. Taha
Abstract:
Samples of Ni1-yZnCu0.3Fe1.7O4; 0.0pyp0.6 were prepared by the solid state reaction method. X-ray investigations were carried out in order to assure the formation of the samples in single spinel phase. The analysis of X-ray data shows that the unit cell parameter increases with increasing Zn concentration and ascribed to the variation of the predicted cation distribution. Seebeck coefficient measurements were performed to know the type of charge carriers participating in the conduction mechanism. The magnetic susceptibility for the prepared samples was measured using Faraday’s method at different temperatures as a function of the magnetic field intensity. The magnetic parameters were calculated from the magnetic susceptibility data, in the temperature range (300–800 K) at three different magnetic field intensities of (1280, 1733 and 2160Oe). The effective magnetic moment (\(\mu_{\text{eff}}\)) showed that, the critical Zn content was \(y = 0.2\).
Abstract:
The effect of rare-earth ions on the structural, magnetic and electrical properties of rare-earth-doped manganese–zinc ferrite is reported. The compounds with the formula Mn0.5Zn0.5R0.05Fe1.95O4 where R = Tb, La, Ce and Th, were prepared by the flash combustion technique. The prepared samples reveal that by introducing a relatively small amount of R(NO3)3 or R(Cl3) instead of Fe2O3, an important modification of both structure and physical properties was obtained. Curie temperature, effective magnetic moment, electrical resistivity, density, thermoelectric and lattice constant were directly affected by these substitutions either by their partial diffusion in the spinel lattice or the formation of the crystalline secondary phases (orthoferrite and/or garnet) on the grain boundaries which suppress the abnormal grain growth. Correlation between the ionic radii and the measured physical properties were studied.
The role of Mg Substitution on the Microstructure and Magnetic Properties of BaCoZn W-Type Hexagonal Ferrites
M. A. Ahmed, N. Okasha, M. Aouf and R. M. Kershi

Abstract:
A series of W-type hexagonal ferrites with the composition BaCoZn1-xMgxFe16O27 (0£x£0.6) was prepared by the conventional ceramic method to study their structural and magnetic properties as a function of temperature and composition. The characterization using X-ray diffraction indicated that a hexagonal W-type single-phase structure and the effect of composition on the unit cell parameters, density and porosity was studied. The variation of the magnetic susceptibility (cM) with temperature for all the investigated samples in the temperature range (300–800 K) shows three regions of behavior that was explained on the basis of the distribution of Zn2+ and Mg2+ ions in the lattice and leads to the anomalous behavior of the effective magnetic moment meff. The Curie temperature indicated that the critical concentration is at x= 0.5. Paramagnetic nature of the samples above the Curie temperature is observed. The Curie-Weiss constant y calculated from the plot of 1/cM vs. T (K) is in agreement with the expected value. The effective magnetic moment meff decreases with increasing the intensity of magnetic field. The possible mechanisms contributing to these properties are discussed in the text.

Keywords:
Hexagonal ferrite; X-ray analyses; Microstructure SEM; Magnetic susceptibility; Curie temperature
Abstract:
6-Aminopyridine-2(1H)thiones 1 reacting with α-halo-compounds 2a–c afforded the alkylthiopyridine derivatives 3a–c which in turn cyclized to the corresponding thieno[2,3-b]pyridine derivatives 4a–c. Several thieno[2,3-b]pyridine derivatives 7, 16, 19, pyrido[3,2,4,5]thieno[3,2-d]pyrimidine derivatives 6a,b, 11a–c, 21 and pyrido-[3,2,4,5]thieno[3,2-c]pyridazine derivatives 13, 17 derivatives were prepared starting from compounds 4a-c.
Abstract:
6-Aminopyridine-2(1H)-thiones 1a,b reacted with dimethylformamide-dimethylacetal (DMF-DMA) to give the corresponding 6-\{[N,N-dimethylamino]methylene\}amino[pyridine derivatives 2a,b. The latter compounds reacted with hydrazine hydrate to afford the 3,6-diamino-1H-pyrazolo[3,4-b]pyridine derivative 4 and 3-amino-5-hydrazino-1H-pyrazolo[4,3 : 5,6]pyrido[2,3-d]pyrimidine derivative 7, respectively. Compound 4 condensed with DMF-DMA to yield the 3,6-bis\{[N,N-dimethylamino]methylene\}amino \{-1H-pyrazolo-[3,4-b]pyridine derivative 10, which reacted with malononitrile to give the corresponding pyridopyrazolo-pyrimidine derivative 15.
Foaming occurs in many distillation and absorption processes. The drainage of liquid foams involves the interplay of gravity, surface tension, and viscous forces. In this paper, we use a semi analytic method, the Adomian decomposition method, and an analytic method, the tanh method to handle the foam drainage equation. The powerful tanh method gives the solution in a closed form. However, Adomian decomposition method computes the solution in a rapidly convergent infinite series. The comparison between the two approaches is conducted to illustrate the performance of each method.

Keywords:
Foam Drainage Equation; Decomposition Method; The Tanh Method
Title: A Comparative Study Between two Different Methods for Solving the General Korteweg–De Vries Equation (Gkdv)

M.A. Helal and M.S. Mehanna

Abstract:
The family of the KdV equations, the most famous equations embodying both nonlinearity and dispersion, has attracted enormous attention over the years and has served as the model equation for the development of soliton theory. In this paper we present a comparative study between two different methods for solving the general KdV equation, namely the numerical Crank Nicolson method, and the semi-analytic Adomian decomposition method. The stability of the numerical Crank Nicolson scheme is discussed. A comparison between the two methods is carried out to illustrate the pertinent features of the two algorithms.
Title: Preparation and Spectroscopic Characterization of Novel Cyclodiphosph(V)azane of N1-2-Pyrimidinylsulfanilamide Complexes Magnetic, Thermal and Biological Activity Studies.

Carmen M. Sharaby, Gehad G. Mohamedb, and M.M. Omar

Journal: Spectrochimica Acta Part A

ISSN: 1386-1425  Impact Factor: 1.27

Abstract:
Hexachlorocyclophosph(V)azane of sulfadiazine, (sulfapyrimidine) [N1-2-pyrimidinylsulfanilamide] (H2L1), was prepared and reacted with sulfur and glycine to give (H2L2) and (H2L3) ligands, respectively. The prepared ligands; H2L1, H2L2 and H2L3, react in 1:2 [ligands]:[metalions] molar ratio with transition metals to give coloured complexes in a relatively good yields. The complexes were characterized using different physicochemical techniques, namely elemental analyses, IR, UV–vis, mass, 1H NMR, molar conductance, magnetic, solid reflectance and thermal analysis. The spectral data reveal that all the ligands behave as neutral bidentate ligands and coordinated to the metal ions via pyrimidine-N and enolic sulfonamide OH. The molar conductance data reveal that the complexes are non-electrolytes while UV–vis, solid reflectance and magnetic moment data have been shown that the complexes have octahedral geometry. The thermal behaviour of the complexes is studied and the thermodynamic activation parameters are calculated. The ligands and their complexes show high to moderate bactericidal activity.

Keywords: Sulfadiazine; Phosphorus Pentachloride; Sulfur; Glycine; Transition Metals; Thermal Analysis; Biological Activity
Abstract:
The refractive indices as a function of temperature were measured for the individual components of 4-substituted-phenyl-4-hexyloxybenzoates as well as their binary mixtures. In these components one terminal substitution is C6H13O and the other terminal is either the methoxy (CH3O), methyl (CH3), cyano (CN), or nitro (NO2) group. Refractive index data were used to estimate the molecular order parameter (S) and the length-to-breadth ratio (k) for all samples investigated. The entropy change (Dsc) at the nematic–isotropic transition temperatures (Tc) was also calculated from differential scanning calorimetry data (DSC). The results were thoroughly analyzed and compared.

Keywords:
Binary Mixtures; Index of Refraction; Liquid crystals; Optical Properties
Abstract:
Axisymmetric oscillating pendant drop shape analysis has been used to study the interfacial rheology of the liquid crystal 4'-pentyl-4-biphenylcarbonitrile (5CB) in water with homeotropic anchoring. Nearly spherical 5CB droplets were subjected to low frequency (1-5 mHz) volume oscillations, and the increase in tension with surface dilation was used to calculate the complex modulus. The droplet interface response is completely elastic, with no relaxations occurring on the experimental time scale. This surprising result is attributed to droplet storage of elastic energy in the form of distorted orientational distributions within the bulk (Frank elasticity) and on the surface (anchoring elasticity).
Abstract:
The complexing properties of nitrilo-tris(methylphosphonic acid) (NTP) with cadmium(II) were investigated pH-metrically at 25 °C and at ionic strength of 0.1 mol dm⁻³ (NaNO₃). Stoichiometry and stability constants for the complexes formed are reported. Cadmium (II) forms Cd(NTP)₄⁻ and the corresponding hydroxy complexes. The ternary complexes are formed in a stepwise mechanism whereby NTP bind to cadmium(II), followed by coordination of amino acids, peptides or DNA. The concentration distribution of the various complex species has been evaluated.
Name: Prof. Mohamed Shoukry
Dep.: Chemistry


Ahmed A. El-Sherif and Mohamed M. Shoukry

Journal: Inorganica Chimica Acta
ISSN: 0020-1693 Impact Factor: 1.674

Abstract:
Formation equilibria of copper(II) complexes of 2-(aminomethyl)-benzimidazole (AMBI) and the ternary complexes Cu(AMBI)L (L = amino acid, peptide, dicarboxylic acid or DNA constituents) have been investigated. Ternary complexes of amino acids or peptides are formed by a simultaneous mechanism. Amino acids form the complex Cu(AMBI)L, whereas peptides form two complex species Cu(AMBI)L and Cu(AMBI)(LH-1). The ternary complexes of copper(II) with AMBI and dicarboxylic acids or DNA units are formed by a stepwise mechanism, whereby binding of copper(II) to AMBI is followed by ligation of the dicarboxylic acids or DNA components. The values of ΔLogK indicate that the ternary complexes containing aromatic amino acids are significantly more stable than the complexes containing alkyl- and hydroxyalkyl-substituted amino acids. This may be taken as an evidence for a stacking interaction between the aromatic moiety of AMBI and the aromatic side chains of the bio-active ligands. The solid complexes Cu(AMBI)L, where L = CBDA and malonic acid were separated and identified by elemental analysis and infrared spectroscopy and magnetic moment. The hydrolysis of glycine methyl ester (MeGly) is catalysed by the Cu(AMBI)2+ complex. The kinetic data is fitted assuming that the hydrolysis reaction proceeds in two steps. The first step, involving coordination of the amino acid ester by the amino and carbonyl groups, is followed by rate-determining attack by OH- ion. The second step involves the equilibrium formation of the hydroxo-complex Cu(AMBI)(MeGly)(OH) followed by intramolecular OH- attack.
Abstract:
The formation equilibria of copper(II) complexes and the ternary complexes Cu(PDC)L (PDC = 2,6-bis-(hydroxymethyl)-pyridine, HL = amino acid, amides or DNA constituents) have been investigated. Ternary complexes are formed by a simultaneous mechanism. The results showed the formation of Cu(PDC)L, Cu(PDC, H−1)(L) and Cu(PDC, H−2)(L) complexes. The concentration distribution of the complexes in solution is evaluated as a function of pH. The effect of dioxane as a solvent on the protonation constant of PDC and the formation constants of Cu(II) complexes are discussed. The thermodynamic parameters ΔH° and ΔS° calculated from the temperature dependence of the equilibrium constant are investigated.

Keywords:
2,6-Bis-(hydroxymethyl)-pyridine (PDC); Amino acids; Amides; DNA constituents; Potentiometry; Thermodynamics
Abstract:
The synthesis and characterization of zinc (II), cadmium (II), lead (II), mercury(II) and phenylmercury (II) complexes of 4-amino-6-hydroxy-2-mercapto pyrimidine (AHMP) are reported. The stoichiometry of the complexes was found to be 1:2 except for phenylmercury(II) complex where the ratio is 1:1. Characterization of complexes have been carried out by by means of elemental analyses, IR and 1H NMR measurements. In these complexes the ligand is bonded to the metal through its sulphur atom. The potentiometric results showed the formation of 1:1 and 1:2 complexes and the corresponding stability constants were determined for both Zn(II) and Cd(II) ions. The high insolubility of mercury(II), phenylmercury(II) and lead(II) complexes prevented the determination of their stability constants. The concentration distribution of the complexes in solution was evaluated. The effect of temperature on the dissociation constant of AHMP, and the formation constant of both Zn-AHMP and Cd-AHMP complexes were studied and the thermodynamic parameters were calculated.

Keywords:
Keywords Synthesis; Thermodynamic Investigation; 4-amino-6-hydroxy-2-mercapto; Pyrimidine; Complexes; Divalent Metal Ions
Abstract:
The molecular dynamics and molecular alignment of the dispersed 4-octyl-49-cyanobiphenyl (8CB) liquid crystal with 5wt% of SiO2 nanosphere particles have been studied using dielectric spectroscopy. The measurements were performed in the frequency range between 102–107 Hz in the SmA, N and I phases. The results show only one Debye relaxation process at high frequency (105–107 Hz). In the bulk material, activation energies of 40, 58 and 63 kJ mol21 were determined for the SmA, N and the I phases, respectively. In the dispersed sample, the activation energies were found to be 52, 76 and 81 kJ mol21, respectively. These results are compared with the available data in the literature. The reversible electromechanical response of the dispersed sample under the influence of an applied a.c. electric field was investigated in the SmA, N, and I phases.
Title: Preparation, Characterization and Crystal Structure of the Room Temperature Phase of [(CH3)(C6 H5)3P]2[ZnBr4 ]: A Member of the A2BX4 Family

Mohga F. Mostafa, Ahmed A. Youssef, Thanaa S. El-Dean, Aisha M. Mostafa and Ibrahim S. Farag

Journal: Z. Naturforsch

ISSN: 0932-0784  Impact Factor: 0.904

Abstract:
The compound bis(methyltriphenylphosphonium) tetrabromozincate(II), [C19 H18 P]2[ZnBr4 ], Mr = 939.640, has a monoclinic unit cell, space group P21. The lattice parameters are a = 9.769(3) Å, b = 12.5508(4) Å, c = 16.5372(6) Å, α = 90.00°, β = 105.2670(11)°, γ = 90.00°, V = 1956.11(11) Å³, Z = 2, Dx = 1.595 mg m⁻³ at T = 298 K. The structure consists of one dis-orted [ZnBr4 ]₂⁻ tetrahedron and two [(CH3 )C6 H5 ]3 P⁺ cations. Differential scanning calorimetry indicates a continuous second-order transition at (276 ± 2) K that may be classified as a commensurate to incommensurate transformation. A first-order transition to a higher symmetry is associated with a four-fold rotation of the [ZnBr4 ]₂⁻ ion and a change of entropy ∆S = 22.92 J/K • mol at T = (362 ± 3) K. Dilatometric measurements showed a decrease of the lattice parameters in the temperature range 230 – 260 K, confirmed the transition at (276 ± 2) K, and indicated the presence of a third transition at 282 K. – PACS numbers: 61.10.i, 64.70.Kb, 61.44.Fw.

Keywords:
Crystal Structure; Phase Transition; Commensurate-Incommensurate
Abstract:
The crystal structure of bis-(methyltriphenylphosphonium) tetrabromocobaltate (II), [(C19H18P)2CoBr4] is determined: Mr = 933.203, monoclinic, P21, a = 9.6977 (3) Å, b = 12.5547 (4) Å, c = 16.4503 (6) Å, β = 105.603 (2)°, V = 1929.04 (11) Å³, Z = 2, Dx = 1.607 Mg m⁻³, T = 298 K. Differential thermal analysis at high temperatures shows three endothermic peaks characterizing four phases, with onset temperatures at T1 = 313±2 K, T2 = 320±4 K and T3 = 360±1 K. The structural instability detected via the temperature dependence of permittivity at T1 is ascribed to order-disorder transition associated with cation dipole reorientation. Permittivity and ac conductivity studies as a function of temperature (295 K- 375 K) and frequency (0.11 kHz < f < 100 kHz) are presented. The results indicate the importance of the cation size and shape on the phase transitions in the system. Bulk conductivity behavior is thermally activated. The associated activation energies are in the range 2.9 to 1.0 eV depending on the temperature regime. Two contributions to the ac conductivity, one dominating at low temperatures and high frequencies which are characterized by superlinear frequency exponent and the second dominates at high temperatures characterized by a sublinear frequency exponent. The behavior is interpreted in terms of the jump relaxation model.

Keywords:
Dielectric Permittivity; AC Conductivity; X-Ray Structure Analysis
Abstract:
Electric transport in a Cu-doped Cd salt \([\text{CH}_2\text{N}_3\text{CdCl}_4\times\text{Cu}_{x}\text{Cl}_4\times\frac{x}{2}0.0,0.07,0.395\text{ and }0.69]\) was investigated in the frequency range 60 Hz–100 kHz and the temperature range 290–450 K. The conductivity increases with increasing copper doping. Samples with \(x \frac{1}{2} 0.0\) and 0.07 undergo phase transitions at 374 K and 369 K, respectively. Ferroelectric relaxor-like behaviour appears for \(x \frac{1}{2} 0.395\) and 0.69. The conduction mechanism of the samples with \(x \frac{1}{2} 0.0\) and 0.07 depends on the temperature region. Below the transition temperatures chlorine vacancy and proton hopping prevail, whereas above the transition temperatures mainly proton conduction dominates. Transport in the new non-oxide ferroelectric relaxors, where \(x = 0.395\) and 0.69, can be explained by the jump relaxation model where proton and ionic hopping contribute to the conductivity throughout the whole temperature range.
Abstract:
The potential use of liposomes as a delivery system is still limited by the poor understanding of their interaction mechanisms with biological media. Interaction between liposome and protein is important for the structure and function of natural cell. In the present work, interaction between collagen and dipalmitoyl phosphatidylcholine (DPPC) liposomes was studied using solubilization process using non-ionic detergent octylglucoside (OG) as well as monolayer technique. The solubilization of liposomal membrane was found to exhibit three stages transition from vesicular form to mixed micellar form. Moreover, amount of detergent needed to completely solubilize liposomal membrane was also increased after incubation of liposomes with collagen, indicating increasing membrane resistance to the detergent and hence change in the natural membrane permeation properties. The addition of collagen in the subphase of different monolayer films induced a considerable shift towards larger area/molecule in the compression-isotherm curves. This is either referred to the insertion of collagen into the monolayer by its hydrophobic residues or to an adsorption process causing a protein layer to be located parallel to the lipid monolayer. It was concluded that collagen significantly altered the physical state of liposome membrane, which may be attributed to collagen interaction with liposomes surface and/or by its incorporation within the bilayer membrane.
Abstract:
Randonia africana Coss. (Resedaceae) is a perennial endangered vascular plant species in Egypt. It inhabits the sandy plains along Mersa Matruh–Siwa Oasis road crossing the Western Desert of Egypt, where it represents the easternmost limit of distribution in North Africa. The vegetation associates within each of the five known population sites of R. africana were studied, and their edaphic correlates were analysed. Classification and ordination techniques were employed to the importance values of the 29 recorded species in 25 stands. Application of TWIN-SPAN classified the floristic data into five vegetation groups, and separated along detrended correspondence analysis axes 1 and 2. Group E was the most diversified among the other vegetation groups, while monotypic stands of R. africana (group B) was the least. Detrended canonical correspondence analysis (DCCA) indicated that the distribution of R. africana and its associates was mainly controlled by soil salinity, percentages of surface sediments of different size classes, calcareous deposits, and organic matter.

Keywords:
Arid Ecosystems; Diversity; Multivariate Analysis; Vegetation
Abstract:
In this paper we discuss linear connections and curvature tensors in the context of the geometry of parallelizable manifolds (or absolute parallelism geometry). Different curvature tensors are expressed in a compact form in terms of the torsion tensor of the canonical connection. Using the Bianchi identities, some other identities are derived from the expressions obtained. These identities, in turn, are used to reveal some of the properties satisfied by an intriguing fourth order tensor which we refer to as Wanas tensor. A further condition on the canonical connection is imposed, assuming it is semi-symmetric. The formulae thus obtained, together with other formulae (Ricci tensors and scalar curvatures of the different connections admitted by the space) are calculated under this additional assumption. Considering a specific form of the semi-symmetric connection causes all non-vanishing curvature tensors to coincide, up to a constant, with the Wanas tensor. Physical aspects of some of the geometric objects considered are pointed out.

Keywords:
Parallelizable Manifold; Absolute parallelism Geometry; Dual Connection; Semi-symmetric Connection; Wanas Tensor; Field Equations
Abstract:
Conducting polymers are electrochemically polymerized at platinum electrode substrates. The thickness, porosity and surface morphology of the resulting films are controlled by the charge passing during electropolymerization step and the synthesis conditions. The polymer films are modified by electrochemically depositing platinum particles. The technique of deposition depends on applying a programmed potential pulse at the polymer film from a solution containing platinum complex that resulted in the formation of platinum particles of controlled size and distribution. The effect of changing the size of platinum particles and polymer film thickness on the voltammetric behavior of the resulting hybrid material showed noticeable changes in the electro-catalytic current in acid medium. On the other hand, the electrochemical impedance spectroscopy experiments showed that diffusion and charge-transfer rate increased in the order: unmodified polymer films, thin polymer films containing small size/amount of platinum particles and relatively thick polymer films containing larger size/amount of platinum particles. The morphology of polymer films, size and distribution of platinum particles in the film were studied by scanning electron microscopy. The presence of platinum and its distribution over the film surface was confirmed from the X-ray dispersive analysis and surface mapping. The hybrid materials are good candidates for the application in devices for exchange of hydrogen ions.

Keywords:
Conducting Polymers; Nano-Particles In Polymers; Electrochemistry; Electrocatalytic Activity; EIS; SEM
Title: Effect of Surfactants on the Voltammetric Response and Determination of an Antihypertensive Drug

Nada F. Atta, Soher A. Darwish, Sayed E. Khalil, A. Galal

Journal: Talanta

ISSN: 0039-9140

Impact Factor: 2.81

Abstract:
The effect of adding surface-active agents to electrolytes containing terazosin, an antihypertensive drug, on the voltammetric response of glassy carbon electrode was studied. The current signal due to the oxidation process was a function of the amount of terazosin, pH of the medium, type of surfactant, and accumulation time at the electrode surface. Two surfactants were used, an anionic type, sodium dodecyl sulfate (SDS) and a cationic type, cetyl trimethyl ammonium bromide (CTAB). Addition of SDS to the terazosin-containing electrolyte was found to enhance the oxidation current signal while CTAB showed an opposite effect. Beside the interfacial interaction of the surfactant with the electrode surface in reference to the bias applied potential and the charge of surfactant, terazosin-surfactant interaction in the electrolytic solution was found to be critical to the magnitude of current signal. Addition of SDS to terazosin-containing buffer solution resulted in a decrease in the drug absorption spectrum both in the ultra-violet and visible (UV–vis) regions. Moreover, NMR measurements showed considerable chemical shifts for the aromatic protons of the quinazolinyl moiety of the terazosin in presence of SDS. The affected aromatic protons are positioned next to the interacting protonated amino-group of the terazosin with the charged sulfonate-group of SDS. On the other hand, addition of CTAB did not cause noticeable changes both to the UV–vis and NMR spectra of the drug. The use of SDS in the electrochemical determination of terazosin using linear sweep voltammetry and differential pulse voltammetry at solid glassy carbon electrode enhanced the detection limit from 6.00×10−7 mol L−1 in absence of surfactant to 4.58×10−9 mol L−1 when present. The validity of using this method in the determination of drug active ingredient in urine samples and tablet formulations was also demonstrated.

Keywords:
Surfactants; Modified Electrodes; Voltammetry; UV–vis; NMR; Drug Interaction; Terazosin
Title: Structure - Property Relationships for Novel Wholly Aromatic Polyamide – Hydrazides Containing Various Proportions of Para - Phenylene and Meta - Phenylene UnitsV: Evaluation of the Electrical Surface Conductivity of Several Metallized Plastic Films

Nadia Ahmed Mohamed

Journal: Polymer Testing

ISSN: 0142-9418

Impact Factor: 1.312

Abstract:
Electrical conductivities of several metallized polyamide-hydrazide films have been investigated. These metallized plastic films were prepared by reduction of the corresponding polyamide-hydrazide-transition metal complex films using sodium boron hydride (NaBH4). The metals incorporated into the polymeric chains include silver, copper, and cobalt. The effect of NaBH4 concentration, temperature and time of exposure on the conductivity of the polyamide-hydrazide-metal complex films has been studied. The optimum effect was attained using 4-6 wt % of NaBH4 aqueous solution for about 2-3 min of exposure at 60-80 °C. The electrical resistivities are in the range of 10-6 – 103 Ω cm-2, and are influenced by the type of metal incorporated into the polymeric chains. They decrease in the following order: Co > Cu > Ag. For a particular metal, the surface resistivity of the films decreases with increasing metal content. The metallic layer generated on the surfaces of the films upon reduction was believed to be responsible for their electrical conductivity. Moreover, the surface resistivity is also affected by polymer structural variations and is decreased by increasing para-oriented phenylene rings content of the polymer. The metallized films showed good environmental stability.

Keywords:
Polyamide-Hydrazide-Metal Complexes; Metallized Films; Electrical Surface Resistivity; Electrical Conductors; Environmental Stability.
Abstract:
The effect of blending some N-(substituted phenyl)itaconimide derivatives, N-(RPh)II, (R: -H, or -OMe) with phenyl salicylate UV absorber on the stabilizing efficiency in photo-degradation of PVC plasticized with dioctyl phthalate (DOP) has been investigated. Blending was effected in the range of 0-100 wt % of the itaconimide relative to reference stabilizer. The stabilizing efficiency was evaluated by measuring the length of the induction period (Ts), the period during which no detectable amounts of hydrogen chloride gas could be observed, and also from the rate of dehydrochlorination as measured by continuous potentiometric determination on one hand, and the extent of discoloration of the degraded polymer on the other. The efficiencies are also evaluated by determining the amount of gel formation as well as the intrinsic viscosity of the insoluble and the soluble fractions of the degraded polymer. The results show a true synergistic effect from the blending of itaconimide derivative with phenyl salicylate UV absorber. Blending of the stabilizers improves the Ts values, decreases the rate of dehydrochlorination, and lowers the extent of discoloration and the gel content of the polymer. The synergism attains its maximum when both the itaconimide and the reference stabilizers are taken in equimolar ratios. The observed synergism may be attributed to the combination of mechanisms by which the itaconimide and the reference stabilizer work.

Keywords:
Plasticized poly (vinyl chloride); Blended photo-stabilizers; Potentiometric determination; Discoloration; Gel content; Intrinsic viscosity; Synergistic effect.
Several N-(substituted phenyl) itaconimide derivatives, N-(RPh)II (R: -NO2, -COOH, -H, -OH, -OME, -Me, -Cl, or -Br), have been investigated as organic photo-stabilizers for poly(vinyl chloride) (PVC) plasticized with dioctyl phthalate (DOP). Their stabilizing efficiencies are evaluated by measuring the length of the induction period (Ts), the period during which no detectable amounts of hydrogen chloride gas could be observed, and also from the rate of dehydrochlorination as measured by continuous potentiometric determination, and the extent of discoloration of the degraded polymer. The efficiencies are also evaluated by determining the amount of gel formation as well as the intrinsic viscosity of the insoluble and the soluble fractions of the degraded polymer, respectively. The results have proved the greater stabilizing efficiency of the N-(RPh)II derivatives relative to that of the phenyl salicylate UV absorber which is a commonly used industrial stabilizer. A radical mechanism is proposed to account for the stabilizing action of the investigated products.

**Keywords:**
Plasticized poly(vinyl chloride); Organic photo-stabilizers; Photo-dehydrochlorination; Discoloration; Cross-linking; Stabilization mechanism.
Abstract:
Ternary Fe(III), Co(II), Ni(II), Cu(II), Zn(II) and UO2 (II) chelates with tenoxicam (Ten) drug (H2 L1) and dl-alanine (Ala) (HL2) and also the binary UO2 (II) chelate with Ten were studied. The structures of the chelates were elucidated using elemental, molar conductance, magnetic moment, IR, diffused reflectance and thermal analyses. UO2 (II) binary chelate was isolated in 1:2 ratio with the formula [UO2 (H2 L2) ](NO3 )2 . The ternary chelates were isolated in 1:1:1 (M:H2 L1 :L2 ) ratios and have the general formulae [M(H2 L1 )(L2 )](Cl)n (H2 O)m ]yH2 O (M = Fe(III) (n =2, m =0, y = 2), Co(II) (n =1, m =1, y = 2) and Ni(II) (n =1, m =1, y = 3)); [M(H2 L1 )L2 ](X)z +yH2 O (M = Cu(II) (X = AcO, z =1, y = 0), Zn(II) (X = AcO, z =1, y = 3) and UO2 (II) (X = NO3 , z =1, y = 2)). IR spectra reveal that Ten behaves as a neutral bidentate ligand coordinated to the metal ions via the pyridine-N and carbonyl-O groups, while Ala behaves as a uninegatively bidentate ligand coordinated to the metal ions via the deprotonated carboxylate-O and amino-N. The magnetic and reflectance spectral data confirm that all the chelates have octahedral geometry except Cu(II) and Zn(II) chelates have tetrahedral structures. Thermal decomposition of the chelates was discussed in relation to structure and different thermodynamic parameters of the decomposition stages were evaluated.

Keywords:
Tenoxicam and alanine ternary chelates; Transition metal chelates; IR; Conductance; Magnetic and diffuse reflectance; Thermogravimetric analysis
Abstract:
In this paper, we apply the variational iteration method proposed by Ji-Huan He to simulate numerically a system of two coupled nonlinear one-dimensional Schrödinger equations subject to a prescribed periodic wave solution. Test examples are given to demonstrate the accuracy and capability of the method with different wave–wave interaction coefficients. The accuracy of the method is verified by ensuring that the energy conservation remains almost constant. The numerical results obtained with a minimum amount of computation show that the variational iteration method is much easier, more convenient and efficient for solving nonlinear partial differential equations.
Title: Fourth order integro-differential equations using variational iteration method
N. H. Sweilam

Journal: Computers and Mathematics with Applications
ISSN: 0898-1221 Impact Factor: 0.611

Abstract:
In this paper, the variational iteration method proposed by Ji-Huan He is applied to solve both linear and nonlinear boundary value problems for fourth order integro-differential equations. The numerical results obtained with minimum amount of computation are compared with the exact solutions to show the efficiency of the method. The results show that the variational iteration method is of high accuracy, more convenient and efficient for solving integro-differential equations.
Abstract:
This paper applies the variational iteration method and Adomian’s decomposition method to solve numerically the harmonic wave generation in a nonlinear, one-dimensional elastic half-space model subjected initially to a prescribed harmonic displacement. The results show that the variational iteration method is much easier, more convenient, and more stable and efficient than Adomian decomposition method.
Abstract:
The variational iteration method is applied to solve the cubic nonlinear Schrödinger (CNLS) equation in one and two space variables. In both cases, we will reduce the CNLS equation to a coupled system of nonlinear equations. Numerical experiments are made to verify the efficiency of the method. Comparison with the theoretical solution shows that the variational iteration method is of high accuracy.
Title: Numerical Studies for a Multi-order Fractional Differential Equation

N. H. Sweilam, M. M. Khader and R. F. Al-Bar

Journal: Physics Letters A

ISSN: 0375-9601 Impact Factor: 1.468

Abstract:
In this Letter, we implement the variational iteration method and the homotopy perturbation method, for solving the system of fraction differential equations (FDE) generated by a multi-order fraction differential equation. The fractional derivatives are described in the Caputo sense. In these schemes, the solution takes the form of a convergent series with easily computable components. Numerical results show that the two approaches are easy to implement and accurate when applied to partial differential equations of fractional order. An algorithm to convert a multi-order FDE has been suggested which is valid in the most general cases.

Keywords:
Variational Iteration Method; Homotopy Perturbation Method; Lagrange Multiplier; Fractional Differential Equation; Caputo Fractional Derivative
Abstract:
This paper applies the variational iteration method to solve the Cauchy problem arising in one dimensional nonlinear thermoelasticity. The advantage of this method is to overcome the difficulty of calculation of Adomian’s polynomials in the Adomian’s decomposition method. The numerical results of this method are compared with the exact solution of an artificial model to show the efficiency of the method. The approximate solutions show that the variational iteration method is a powerful mathematical tool for solving nonlinear problems.
Title: Convenient Synthesis and Antimicrobial Evaluation of Multicyclic Thienopyridines
Nora M. Rateb

Journal: Phosphorus Sulfur And Silicon
ISSN: 1042-6507
Impact Factor: 0.52

Abstract:
Thieno[2,3-b]pyridines 7,8 and 10 could be obtained via the S-alkylation of 3-cyano-4,6-di-2-furyl-2(1H)pyridinethione (3) with a variety of alkylating agents. These compounds were conveniently converted into novel pyrido[3',2':4,5]thieno[3,2-d]pyrimidines 12-15 and 17-20 and thieno[2,3-b:4,5-b']dipyridine 11 derivatives. Structures of the products have been determined by elemental analyses and spectral data studies. All the tested compounds were found to exhibit moderate antimicrobial activity.

Keywords:
Multicyclic pyridines; Thienopyridine; Pyrido[3,2-d]pyrimidine; Thienodipyridine
Title: Flow-Injection Potentiometric Determination of Clobutinol Hydrochloride in Pure State and Pharmaceutical Preparations

N. T. Abdel-Ghani, R. M. El Nashar and S. M. Hamed

Journal: Analytical Chemistry

ISSN: 1061-9348

Impact Factor: 0.444

Abstract:
Clobutinol (Cb) ion-selective plastic-membrane electrodes based on ion associates of clobutinolum phosphotungstate (Cb-PTA), clobutinolum phosphomolybdate (Cb-PMA), or a mixture of both Cb-PTA and PMA were prepared. The electrodes were fully characterized in terms of membrane composition, life span, pH, and temperature. The electrodes were applied to the potentiometric determination of clobutinol in pure form and pharmaceutical preparations under batch and flow-injection conditions. Also, conductimetric titrations were applied to the assay of clobutinol in its pure form and pharmaceutical preparations. The selectivity of the electrodes towards a large number of inorganic cations, amino acids, and sugars was tested. The solubility product of ion-associates and the formation constant of the precipitation reactions leading to the ion-associate formation were determined conductimetrically.
New Plastic membrane ion-selective electrode for buspirone hydrochloride based on buspironium tetraphenylborate was prepared. The electrode exhibited mean slope of calibration graph of 58.4 mV per decade of BusCl concentration at 25°C. The electrode can be used within the concentration range 6.3 x10-5-10-2 M BusCl at a pH range of 2.5-7.0. The standard electrode potentials were determined at different temperatures and used to calculate the isothermal temperature coefficient of the electrode, amounting to 0.00056 V°C-1. The electrode showed a very good selectivity for BusCl with respect to a number of inorganic cations, sugars and amino acids. The electrode was applied to the potentiometric determination of the buspirone ion and its pharmaceutical preparation under batch and flow injection conditions. Also, buspirone was determined by conductimetric titrations. Graphite rod, copper and silver coated wire electrodes were prepared and characterized as sensors for the drug under investigation.
Abstract:
5-Amino-4-arylazo-3-methyl-1-phenylpyrazole and its complexes with Co(II), Ni(II), Cu(II), Zn(II), Cd(II) and Hg(II) ions were synthesized. The complexes are in the ratio 1:1 and 1:2 (metal:ligand). Ligands and complexes were subjected to elemental analysis, IR, Raman, UV-Vis and 1H-NMR spectroscopy. The mass spectra of the ligands were discussed. Thermal analysis and magnetic measurements were carried out for the prepared complexes. The X-ray single crystal structure of [Ni(L1)2] was performed. The investigated pyrazole compounds coordinate as bidentate ligands through amino and azo nitrogens or tridentate through NNO. The molar conductance of the chelates is measured and reflected the non-electrolytic nature of the prepared complexes.

Keywords:
Arylazo-pyrazoles; Azo-complexes; Spectroscopy; X-ray; Thermal; Magnetic Moment
Title: Validated Polarographic Methods for the Determination of Certain Antibacterial Drugs

N. T. Abdel ghani, M. A. El ries and M. A. El shall

Journal: Analytical Sciences

ISSN: 0910-6340    Impact Factor: 1.589

Abstract:
Two simple, precise, inexpensive and sensitive voltammetric methods for the determination of lomefloxacin (LFX), sparfloxacin hydrochloride (SFX), gatifloxacin (GFX), and moxifloxacin (MFX) were developed. The present methods were first used to explore the adsorption behavior of the four investigated antibacterial agents at a hanging mercury dropping electrode (HMDE), by a direct method and secondly by a modification via their complexation with PdCl\textsubscript{2}. For the direct method drugs were accumulated on (HMDE), and a well-defined reduction peak was obtained in Britton–Robinson buffer of pH 7 for LFX, and SFX, and pH 6 for GFX and MFX. The adsorptive stripping response was evaluated as a function of some variables such as the scan rate, pH, and accumulation time and potential. For the modified method the adsorptive behavior of Pd(II)-4-quinolone complexes at the HMDE developed a stripping voltammetry peak at a more negative potential than that of the free Pd(II) ions (–1.05 V). The limits of detection (LOD) were 2 \(10^{-8}\) M, while the limits of quantification (LOQ) were 6 \(10^{-8}\) M for the investigated drugs. The methods were applied to the determination of LFX, SFX, GFX, and MFX in biological samples and pharmaceutical preparations, and also compared with the official reference methods. Complete validation of the proposed methods was also done.
Abstract:
Aiming to produce cyclized systems with potential bioactivity, a variety of fused and/or pendant thiophene, pyrazole, imidazole, thiazole, triazole, triazine, and coumarin systems were synthesized based on a cyanoacetic 2-[(benzoylamino)thioxomethyl] hydrazide precursor. The structure of the synthesized compounds was established based on elemental analysis and spectral data. The antibacterial and antifungal activities of the compounds are discussed and evaluated.

Keywords:
Antimicrobial; Imidazoles; Pyrazoles; Thiazoles; Thiophenes; Triazoles
Abstract:
This research work is concerned with the use of N-benzoylecyanoacetylhydrazine (3) in synthesizing several new heterocyclic compounds with potential biological activity, via its reaction with various chemical reagents. The synthesized derivatives have actually exhibited, upon screening, antibacterial and antifungal activities.

Keywords:
N-Benzoylhydrazide; Thiophene; Thiazole; Coumarin
Name: Prof. Rafat Millad Mohareb
Dep.: Chemistry

Title: Uses of 1-Cyanoacetyl-4-phenyl-3-Thiosemicarbazide in Heterocyclic Synthesis: Synthesis of Thiazole, Coumarin, and Pyridine Derivatives with Antimicrobial and Antifungal Activities

Rafat M. Mohareb, Jonathan Z. Ho and Abeer A. Mohamed

Journal: Phosphorus, Sulfur, and Silicon and the Related Elements
ISSN: 1042-6507 Impact Factor: 0.52

Abstract:
The reaction of cyanoacetyl hydrazine with phenylisothiocyanate gave the thiosemicarbazide 3. The latter underwent a series of heterocyclization reactions when it reacts with either aromatic aldehydes or α-halo ketones, followed by further reaction of the products with cyanomethylene reagents or hydrazines to give either thiazole, coumarin, or pyridine derivatives. The newly synthesized product showed antimicrobial and antifungal activities.

Keywords:
Coumarins; Pyrazoles; Pyridines; Thiazoles
Abstract:
The reaction of cyanoacetylhydrazine with 1-bromoacetophenone gave the condensation product 1-bromoacetophenone-cyanoacetylhydrazone (3). The latter product underwent ready cyclization to give the 1,3,4-oxadiazine derivative 4. The reactivities of either 3 or 4 towards some chemical reagents like cyanomethylene reagents, diazonium salts, aromatic aldehydes, phenylisothiocyanate and elemental sulfur were studied to afford 17 newly products for which the toxicity towards Fusarium oxysporum f. sp. Lycopersici and Helminthosporium oryzea was measured. Moreover their effect towards mycelial dry mass, sporulation and nucleic acid synthesis of Fusarium oxysporum f. sp. Lycopersici was measured.

Keywords:
Cyanoacetylhydrazine; 1,3,4-Oxadiazine; Pyridazine; Toxicity
Title: Rotation Barrier of the Azide Group in Azidopyridines: Molecular Orbital Treatment

Rafie H. Abu-Eittah and Mahmoud K. Khedr

Journal: Molecular Structure: Theochem

ISSN: 0166-1280

Impact Factor: 1.016

Abstract:
The height of the rotational barriers around C(pyridine)-N(azide) single bond in azidopyridines has been determined via ab initio molecular orbital calculations. The optimized geometry obtained from RHF/6-31G** results was used as an input for a single-point MP2/6-31G** calculation, the results of which are reported in this work. The potential energy function of rotation was subjected to Fourier analysis and terminated nicely at V3 as is shown from the results of least square treatment. The s-cis conformer of 2-azidopyridine is slightly more stable than the s-trans conformer and both are more stable than others obtained during rotation. A transition state is identified and confirmed, during rotation, via the location of a stationary point through a saddle-point calculation. A Hessian-type run is carried out to calculate the frequency of vibration, only one imaginary, negative, frequency was obtained. The height of the rotational barrier of the azide group in 2-azidopyridine is the largest, about 7 kcal/mol, whereas it amounts 3.32 and 4.04 kcal/mol for 3-azido and 4-azidopyridine, respectively.

Keywords:
Rotation barrier; Pyridine azides
Abstract:
Excretory-secretory products (ESP) of ex vivo Fasciola gigantica adult worms were used for immunodiagnosis of experimental and natural sheep infection with F. gigantica by enzyme-linked immunosorbent assay (ELISA) and western blotting. Specific IgG antibody binding to native or denatured ESP was detected as early as 2 weeks after experimental sheep infection with 100 or 200 metacercariae. No specific IgG antibody binding was displayed by sera obtained from 192 sheep confirmed to be Fasciola- and other parasite-free by microscopic examination of bile and feces. Additionally, sera from 200 Fasciola-free sheep, yet infected with other parasites, were all negative. The data, thus, indicated that ESP-based ELISA reached nearly 100% sensitivity and specificity in immunodiagnosis of sheep fasciolosis. As expected, the ESP molecules were immunogenic in sheep eliciting interleukin-12p40 mRNA response and considerable amounts of antibodies, which were able to bind to the surface of newly excysted juvenile worms as judged by membrane indirect immunofluorescence, and mediate their attrition via antibody-dependent cell-mediated cytotoxicity. The ESP-induced cellular and humoral immune responses were associated with a modest, yet significant (P < 0.05) reduction in worm count but with a highly significant (P < 0.0001) decrease in size of recovered worms, thus suggesting that ESP immunization might be a safe and cost-effective strategy for reducing transmission of the infection.

Keywords:
Fasciola gigantica; Excretory-Secretory products; Immunodiagnosis; Immunogenicity; Protective potential
Abstract:
Developing and adult Schistosoma mansoni and S. haematobium intact worms do not bind specific antibodies, likely because of structural and biochemical modifications of the outer lipid bilayer. We have estimated the amount of cholesterol in the apical membrane of adult schistosomes via extraction with the membrane-impermeable, cholesterol-binding drug, methyl-\(\beta\)-cyclodextrin (MBCD), followed by filipin staining of the worms, and evaluation of the amount of cholesterol released in the medium by a commercially available, enzymatic colorimetric assay. Positive correlations between amount of released cholesterol, MBCD concentration, and worm number and age provided evidence for the sensitivity and validity of the newly developed method. Treatment with 40 mM MBCD for 2 h at 37 °C led to total loss of cholesterol from the worm outer membrane, as assessed by filipin staining, and the released cholesterol values were used to estimate the amount of cholesterol per worm and per an approximate surface area unit. Additionally, total depletion of outer membrane cholesterol was associated with exposure of surface membrane antigens to specific antibody binding in 50% and 70% of S. haematobium and S. mansoni worms, respectively. These findings together suggest that cholesterol is an essential, but not the sole, factor in sequestration of surface membrane antigens in schistosomes.

Keywords:
Schistosoma mansoni; Schistosoma haematobium; Cholesterol content; Methyl-\(\beta\)-cyclodextrin; Surface membrane antigens.
Abstract:
Praziquantel (PZQ) is widely used for treatment of schistosomiasis. It induces worm muscle contractions and tegumental disruption, followed by exposure of parasite surface membrane antigens to the host immunological defense mechanisms. It may be assumed that PZQ, like cholesterol, is too hydrophobic to traverse the schistosome outer lipid bilayers by passive diffusion, and likely needs binding to a surface membrane protein carrier for distribution throughout the worm. However, PZQ binding site on the schistosome surface and precise mechanism of action are not known as yet. The Claisen's condensation reaction was used to bind PZQ on cellulose acetate membranes. Triton-insoluble surface membrane antigens of Schistosoma mansoni adult worms were allowed to bind to the PZQ column. The binding molecules were examined for identity by amino acid microsequencing and immunogenicity in outbred and inbred mice. PZQ column was found to selectively bind molecules of 45 kDa from the Triton-insoluble surface membrane antigens of S. mansoni adult worms. Amino acid microsequencing revealed that the 45-kDa species consist predominantly of schistosoma actin. This finding was supported by the poor immunogenicity of the 45 kDa molecules in outbred and inbred mice. PZQ was also shown to bind bovine actin, but not bovine serum albumin. However, pre-incubation with bovine actin did not impair PZQ effect on adult worms in vitro. The study represents an attempt to understand how PZQ distributes across schistosome outer lipid bilayers.

Keywords:
Praziquantel; Schistosoma mansoni; Praziquantel binding site; Actin; Poorly immunogenic molecules
Name: Prof. Said Ahmed Ghozlan

Dep.: Chemistry

Title: An Easy Synthesis of 5-Functionally Substituted Ethyl 4-Amino-1-Aryl-Pyrazolo-3-Carboxylates: Interesting Precursors to Sildenafil Analogues)

Said A.S. Ghozlan, Khadija O Badahdah and Ismail A Abdelhamid

Journal: Organic Chemistry

ISSN: 1860-5397 Impact Factor: 0.353

Abstract:
3-Oxo-2-arylhydrazononitriles 1a-c react readily with chloroacetonitrile, ethyl chloroacetate, and with phenacyl chloride to give 4-aminopyrazoles 4a-c. The pyrazolo[4,3-d]pyrimidine derivatives 7 and 10 are synthesized via reaction of the aminopyrazole 4b with phenylisothiocyanate and DMFDMA/NH4OAc respectively.
Abstract:
Pyruvaldehyde-1-aryldrazones react with α,β-unsaturated nitriles, to yield 6-amino-1,4-dihydropyridazines that are converted into pyridazinones 5 via refluxing in acetic acid / hydrochloric acid mixture and into ethylenemalononitrile derivatives 6 on reflux with malononitrile in ethanolic / piperidine solution.
Abstract:
Condensing 1-aryl-4-methyl-1,6-dihydropyridazine-5-carbonitrile with triethyl orthoformate and piperidine afforded the transenamine 2. This could be converted into pyrido[3,4-d]pyrazine 3 upon treatment with primary aromatic amines. Reacting 2 with hydrazonoyl chlorides 5 afforded 7 rather than 6. Compound 2 gives also pyrido[3,4-d]pyridazine 10 upon treatment with acetic acid and ammonium acetate. Compound 2 afforded N-aminopyrido[3,4-d]pyridazine 11 upon treatment with hydrazine hydrate. Compound 11 reacted with triethyl orthoformate to give [1,2,4]triazolo[2',3':1,2]pyrido[4,3-d]pyrazin-10-one 12 and can be acetylated to 13. Compound 2 could be coupled with pchlorobenzenediazonium chloride to give the pyridazino[4,5-d]pyridazine 17.
Polarization inscription in Ferroelectric (111) PZT and (100) SBT Films

Christian Erich Zybill, Mahmoud Abdel-Hafiez, Sami Allam and Tharwat El Sherbini

Journal: Progress in Solid State Chemistry
ISSN: 0079-6786 Impact Factor: 2.5

Abstract:
Ferroelectric thin films form an equilibrium domain structure compatible with their respective crystal-lographic symmetry. In tetragonal (111) PZT, 90 domains prevail; in (pseudo-tetragonal) (100) SBT both 90 and 180 domains are present. The size of 90 domains has been measured for e.g., PZT as slabs of width 15 nm width. Domain size is a result of stress minimization in the film during the paraelectric (PE)/ferroelectric (FE) transition. A precise and regular domain pattern for (111) PZT and (100) SBT films has been investigated in detail by TMSFM. Single domains can be addressed mechanically with the tip of an AFM. Such single domain switching corresponds to a data storage density of 200 Gbit/inch2. Applications of ferroelectric and high-3 paraelectric materials for e.g., non-volatile data storage replacing DRAM devices or as sensors in infrared cameras are increasingly becoming popular.

Keywords:
Polarization inscription; (111) PZT; (100) SBT; Single domain switching; Ferroelectric thin films
Abstract:
The influence of HAF carbon black and BaTiO3 ceramic powder contents in SBR vulcanizates on the dielectric constant ($\varepsilon''$) at different frequencies and at fixed temperature of 303 K is studied well in this article. The temperature dependence of the ac conductivity (crac) was also studied. $\varepsilon''$ appreciably decreases as frequency increased for both filled and unfilled SBR vulcanizates. At each frequency, $\varepsilon''$ gradually decreased with BaTiO3 loading, but its change at any fixed frequency with BaTiO3 filler loading is not uniform. For HAF group $\varepsilon''$ (at loading= 40 phr), drops rapidly with frequency. Meanwhile, it increased appreciably beyond a certain HAF filler loading (<= 20 phr). Experimental values of the dielectric constant of both BaTiO3 and HAF contents were compared with those calculated by using Tsangaris, Clausius and Bruggman models. Tsangaris model with simple modifications was applied and a fairly good agreement was obtained. The HAF particles or aggregates was found to take the shape of oblate ellipsoids with the minor axes parallel to the applied frequency as detected from the decreasing behavior of the depolarizing factor (Y) with HAF contents.

Keywords:
SBR; HAF; BaTiO3; Dielectric; AC conductivity
Title: Molecular Dynamics of the Glass Relaxation Process of the Soft Phase in Block Copolymers: Effect of Molecular Architecture

Abstract:
The objective was to determine the impact of molecular architecture on the molecular dynamics of the glass relaxation processes of soft blocks in different types of block copolymers. Model block copolymers with a variation in both molecular architecture and chemical composition were studied. Four block copolymer models, namely, two styrene–butadiene–styrene (S-B-S) block copolymers and two styrene–styrene butadiene–styrene (S-SB-S) were chosen. In each pair of block copolymers, one is linear triblock and the other is star asymmetric. For the sake of comparison, two polybutadiene (PB) homopolymer samples, having similar chain lengths of the PB blocks present in the S-B-S block copolymers, have been investigated. Dynamic mechanical measurements have been carried out for the real and imaginary parts of the complex shear modulus (G', G'') in the temperature and frequency ranges from −110 to 30 °C and from 10−2 to 15.9 Hz, respectively. Complete master curves have been constructed for all samples investigated. Moreover, broadband dielectric spectroscopy has been carried out to cover wide temperature and frequency windows, −120 to 0 °C and 10−1 to 107 Hz, respectively. The results showed that the molecular dynamics of the glass relaxation process of the PB or statistical PSB soft phase presented in the 3rd Annual European Rheology Conference (AERC) phases in the block copolymers is dramatically changed when compared to the PB homopolymer. In addition, the molecular architecture is found to be an important factor in determining the molecular mobility of the soft blocks. The results are discussed in terms of the applied confinement of the counter PS hard phase, block lengths, domain thicknesses and the type of end-to-end junctions between the different polymeric blocks.

Keywords:
Dynamic mechanical and dielectric relaxations; Linear and star asymmetric block copolymers; Glass relaxation process; Confinement
Title: Allelopathic Effects of Acacia Nilotica Leaf Residue on Pisum Sativum L.


Journal: Allelopathy

ISSN: 0973-5046 Impact Factor: 0.686

Abstract:
A greenhouse pot experiment was conducted to assess the allelopathic effects of Acacia Nilotica leaves on the growth and metabolic activities of 45-day-old pea (Pisum sativum L.) plants. Qualitative and quantitative HPLC analysis of water extract of Acacia Nilotica leaves revealed that protocatechuic and caffeic acids were the principal phenolic compounds accompanied by major amounts of ferulic, cinnamic acids and apigenin; whereas, pyrogallic, p-coumaric, syringic acids and coumarin were found in trace amounts. The lower doses of Acacia leaf residue (0.25 and 0.5 %, w/w) stimulated the growth of pea shoot and root, but the higher doses (0.75, 1.0, 1.5 and 2 %, w/w) were inhibitory to seedling growth and the effect was concentration dependent. The total phenolic content of pea shoots (particularly phenolic glycosides), increased at lower doses of Acacia residue and decreased with higher ones. While, the phenolic glycosides increased with higher doses than lower ones. Chlorophyll a, band carotenoids accumulated in pea shoot at lower doses of Acacia leaf residues, accompanied by accumulation of total sugar, mainly the insoluble fraction. On the other hand, the inhibition in the contents of photosynthetic pigments at higher doses of Acacia residues was paralleled by significant reduction in all sugar fractions. The contents of total nitrogen and phosphorus (their insoluble forms), increased with lower Acacia residues (0.25 and 0.5 %); whereas all nitrogen and phosphorus fractions declined by increasing Acacia doses up to 1 %. The total nucleic acids, including DNA and RNA increased with lower Acacia residue doses and gradually declined with the increase in Acacia level up to 1%.

Keywords:
Acacia Nilotica; Agroforestry; Allelopathy; Growth; Natural phenolics; Nitrogen; Nucleic acids; Photosynthetic pigments; Phosphorus; Pisum sativum L.
Abstract:
Resistance effects to the antimalarial agent artemisinin and its derivatives spur on the search for new compounds with related cyclic peroxide structures. In this paper a flexible route to new bicyclic peroxides and perorthoesters was provided via a sequence of ene reaction with singlet oxygen and subsequent Lewis acid catalyzed peroxyacetalization reaction of unsaturated 1,2-hydroperoxy alcohols.

Keywords:
Allylic hydroperoxides; Density functional calculations; Perorthoesters; Photooxygcnation; Trioxanes
Title: A Neat Embedding Theorem for Expansions of Cylindric Algebras
   Tarek Sayed Ahmed and Basim Samir

Journal: Logic IGPL

ISSN: 1367-0751  Impact Factor: 0.229

Abstract: We generalize two classical results on cylindric algebra to certain expansions of cylindric algebras where the extra operations are defined via first order formulas. The first result is the Neat Embedding Theorem of Henkin, and the second is Monk’s classical non-finitizability result of the class of representable algebras. As a corollary we obtain known classical results of Johnson and Biro published in the Journal of Symbolic Logic.
Name: Prof. Tarek Sayed Ahmed

Dep.: Mathematics

Title: On Neat Reducts and Amalgamation

Tarek Sayed Ahmed

Journal: Logic IGPL

ISSN: 1367-0751 Impact Factor: 0.229

Abstract:
We present a property of neat reducts commuting with forming subalgebras as a definability condition.

Keywords:
Algebraic Logic; Amalgamation; Neat reducts.
Title: Amalgamation, Interpolation and Epimorphisms in Algebraic Logic

Judit Madaras and Tarek Sayed-Ahmed

Journal: Algebra Universalis

ISSN: 0002-5240 Impact Factor: 0.23

Abstract:
In his landmark paper on amalgamation, published in Algebra Universalis in 1971, Don Pigozzi posed some open questions in connection with amalgamation of subclasses of cylindric algebras. Some of these questions were originally raised by Comer, Daigneault, Johnson, McKenzie and others. In this paper, we give answers to all these as well as a number of other related questions. Most of the solutions were found by the authors of this paper. However, a few were contributed by others who will of course be given due credit at the appropriate points.
An Interpolation Theorem for First Order Logic With Infinitary Predicates
Tarek Sayed Ahmed

Title: An Interpolation Theorem for First Order Logic With Infinitary Predicates
Tarek Sayed Ahmed

Abstract:
An Interpolation Theorem is proved for first order logic with infinitary predicates. Our proof is algebraic via cylindric algebras.

Keywords:
Algebraic Logic; Craig interpolation; Cylindric algebras
Name: Prof. Tarek Sayed Ahmed
Dep.: Mathematics

Title: An Omitting Types Theorem for First Order Logic With Infinitary Relation Symbols
Tarek Sayed Ahmed and Basim Samir

Journal: Mathematical Logic Quarterly
ISSN: 0942-5616 Impact Factor: 0.629

Abstract:
In this paper, an extension of first order logic is introduced. In such logics atomic formulas may have infinite length. An Omitting Types Theorem is proved.

Keywords:
Algebraic logic; Cylindric algebras; Omitting types
Title: Studies with Enamines: Synthesis and Reactivity of 4-Nitrophenyl-l-piperidinostyrene Synthesis of Pyridazine, Oxadiazole, 1,2,3-Triazole and 4-Aminopyrazole Derivatives

Tayseer A. Abdallah, Abdellatif M. Salaheldin and Naglaa F. Radwan

Abstract:
4-Nitrophenyl-l-piperidinostyrene (4) reacts with an aromatic diazonium salt to afford the arylhydrazonal 6. The latter condenses with active methylene compounds to yield pyridazine derivatives, and with hydroxylamine hydrochloride to produce oxadiazole and 1,2,3-triazole derivatives. Compound 12 was reacted with chloroacetonitrile to afford 4-aminopyrazoles 15.

Keywords:
2-Arylhydrazoqnitriles; Pyridazinimine; Oxadiazole; 1,2,3-Triazole; 4- Aminopyrazoles
Abstract:
2-oxo-3-(indol-3-yl)propanonitrile 2 condensed with dimethylformamide dimethylacetal to yield the enaminonitrile 3. The latter reacted with 4-chloroaniline to yield the 4-chlorophenylpropynitrile 5. Reaction of 3 with hydrazine hydrate led to formation of pyrazole-4-carbonitrile 6. Compound 3 reacted with ethyl acetooacetate in refluxing acetic acid and in presence of ammonium acetate to yield the indolopyridine 10. Enamine 3 reacted with 5(1H)-aminotriazole 13 and 3(5)-aminopyrazole 17 to yield the pyrimidine derivatives 15 and 19, respectively.

Keywords:
International Publications Awards
Cairo University

Name: Prof. Tharwat Mahmoud El-Sherbini

Dep.: Physics

Title: Measurement of the Stark Broadening of Atomic Emission Lines in Non–Optically Thin Plasmas by Laser-Induced Breakdown Spectroscopy
A. M. El Sherbini Th. El Sherbini

Journal: Spectroscopy Letters
ISSN: 0038-7010

Impact Factor: 0.772

Abstract:
We propose a new method for determining the Stark broadening of atomic emission lines using laser-induced breakdown spectroscopy. The method allows the determination of the Stark broadening in non–optically thin plasmas, through the introduction of a correction for self-absorption. Couples of lines of the same species are considered. If one of the Stark broadening is known, the determination of the other does not require the measurement of the electron density of the plasma. Examples are given for the application of the proposed method to the measurement.

Keywords:
Aluminum alloys; Double pulse; LIBS; Self-absorption; Stark broadening
Abstract:
The interaction of diazepam with picric acid (I), 3, 5-dinitrobenzoic acid (II) and 2, 4-dinitrobenzoic acid (III) was found to be useful for its spectrophotometric determination. The quantitation was carried out at 475, 500, and 500 nm for the reaction with (I), (II) and (III), respectively. The effect of several variables on the coloring process was studied. The proposed methods have been applied successfully for the determination of diazepam in pure samples and in its pharmaceutical preparations with good accuracy and precision. The results were compared to those obtained by the pharmacopoeial methods. The linear ranges for obedience of Beer’s law are up to 85.6, 180.2, and 128.6 μg/ml, ringbom ranges are 10.0-79.0, 15.2-177.8, 17.0-83.0 μg/ml, and rsD 0.048, 0.028, and 0.020% for reaction of diazepam with I, II, and III, respectively.

Keywords:
Diazepam; 2,4-Dinitrobenzoic Acid; 3,5-Dinitrobenzoic Acid; Picric Acid; Spectrophotometric Determination
Abstract:
The formation constants of some transition metal ions Cr(III), Mn(II), Fe(III), Ni(II) and Cu(II) binary complexes containing Schiff bases resulting from condensation of salicylaldehyde with aniline (I), 2-aminopyridine (II), 4-aminopyridine (III) and 2 aminopyrimidine (IV) were determined pH-metrically in ethanolic medium (80%, v/v). The formation constants were determined for all binary complexes. The important infrared (IR) spectral bands corresponding to the active groups in the four ligands and the solid complexes under investigation were studied. The solid complexes have been synthesized and studied by thermogravimetric analysis. The thermal dehydration and decomposition of these complexes were studied kinetically using the integral method applying the Coats–Redfern equation. It was found that the thermal decomposition of the complexes follow second order kinetics. The thermodynamic parameters of the decomposition are also reported. The electronic absorption spectra of the investigated ligands were carried out to determine the pKa values spectrophotometrically.

Keywords:
Salicylaldehyde Schiff Bases; Transition Metal Complexes; Absorption Spectra; Thermal Analysis; Potentiometry; Infrared
Title: Improving The Detection Limits Of Antispasmodic Drugs Electrodes By Using Modified Membrane Sensors With Inner Solid Contact

Hosny Ibrahim, Y.M. Issa and Hazem M. Abu-Shawish

Journal: Pharmaceutical and Biomedical Analysis

ISSN: 0731-7085  Impact Factor: 2.032

Abstract:
Three coated wire electrodes (CWEs) for the antispasmodic drugs; dicyclomine (Dc), mebeverine (Mv) and drotaverine (Dv) hydrochlorides were developed. Each electrode based on ion-associate of a heteropoly anion with the drug cation incorporated in membrane sensor modified with graphite and deposited on silver internal solid contact. The influence of addition of graphite to the membranes and the type of the internal solid contact on the potentiometric responses of the electrodes was investigated. The characteristics of the new electrodes were compared to the characteristics of previously reported traditional liquid inner contact electrodes of the same drugs. The lower detection limits of the proposed electrodes were somewhat better than those observed with the corresponding liquid contact ISEs and reached (1.2–2.0)×10−7 M. The potentiometric selectivity of the CWEs revealed a significant improvement and much faster response times compared to the liquid contact ISEs. The practical utility of each electrode has been demonstrated by using it successfully in potentiometric determination of its respective drug in pharmaceutical preparations both in batch and flow injection conditions. Each electrode was also used as an indicator electrode in the potentiometric titration of the drug against standard silicotungstic acid and in potentiometric determination of the drug concentration in urine samples.

Keywords:
Coated wire Electrodes; Dicyclomine; Mebeverine; Drotaverine; Lowering of Detection Limits